ENTOMOLOGICAL NEWS

VOLUME LXX, 1959

PUBLISHED BY
THE AMERICAN ENTOMOLOGICAL SOCIETY
THE ACADEMY OF NATURAL SCIENCES
PHILADELPHIA, PENNSYLVANIA, U. S. A.
1959

The numbers of ENTOMOLOGICAL NEWS for 1959 were mailed at the Post Office at Lancaster, Pa., as follows:

No. 1—January	January 15, 1959
No. 2—February	February 14, 1959
No. 3—March	March 11, 1959
No. 4—April	April 3, 1959
No. 5—May	May 18, 1959
No. 6—June	June 15, 1959
No. 7—July	July 16, 1959
No. 8—October	September 24, 1959
No. 9—November	November 3, 1959

The date of mailing the December, 1959, number will be announced on the last page of the issue for January, 1960.

ENTOMOLOGICAL NEWS

JANUARY 1959

Vol. LXX **No. 1**

CENTENNIAL YEAR
THE AMERICAN ENTOMOLOGICAL SOCIETY
1859—1959

CONTENTS

PUBLISHED MONTHLY, EXCEPT AUGUST AND SEPTEMBER, BY
THE AMERICAN ENTOMOLOGICAL SOCIETY
PRINCE AND LEMON STS., LANCASTER, PA.
AND
1900 RACE STREET, PHILADELPHIA 3, PA.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada.
Second-class postage paid at Lancaster, Pa.

ENTOMOLOGICAL NEWS

ENTOMOLOGICAL NEWS is published monthly, excepting August and September, by The American Entomological Society at Prince and Lemon Sts., Lancaster, Pa., and the Academy of Natural Sciences, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

Subscription price, per yearly volume of 10 numbers: Domestic, $5.00; Foreign, $5.30; Canada, $5.15—U. S. Currency.

SUBSCRIPTIONS: Communications and remittances to be addressed to **Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

ADVERTISEMENTS: Rate schedules available on request. Address, **Fred B. Jacobson, Advertising Manager, Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

MANUSCRIPTS and all communications concerning same should be addressed to **R. G. Schmieder, Zoological Laboratory, University of Pennsylvania, Philadelphia 4, Pa.**

The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. Articles longer than eight printed pages may be published in two or more installments, unless the author is willing to pay the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

ILLUSTRATIONS: Authors will be charged as follows: For text-figures, the cost of engraving; for insert plates (on glossy stock), the cost of engraving plus printing. Size limit, when printed, 4 × 6 inches. All blocks will be sent to authors after printing. It is not advisable to print half-tones as text-figures.

TABLES: The cost of setting tables will be charged to authors.

SEPARATA: Members of the American Entomological Society may elect to receive, gratis, 25 offprints of their contributions. These will be "run-of-form," without removal of extraneous matter.

Those members desiring more than 25 separates, and all non-members, will receive no gratis copies. They must obtain all their separates (as reprints, with extraneous matter removed) from the printer at the prices quoted below. Authors must place their order for such separates with the editor at the time of submitting manuscripts, or when returning proof.

Copies	1–4 pp.	5–8 pp.	9–12 pp.	13–16 pp.	17–20 pp.	Covers
50	$3.95	$6.33	$ 9.89	$10.28	$13.44	$4.31
100	4.74	7.51	11.86	12.65	16.21	5.89
Add'l 100	1.58	2.36	3.94	4.74	5.54	3.16

Plates printed one side: First 50, $3.15; Additional 100's, $2.37.

Transportation charges will be extra.

ENTOMOLOGICAL NEWS

Vol. LXX JANUARY, 1959 No. 1

The First Hundred Years

This year the American Entomological Society has the distinction of celebrating its one hundredth anniversary. And it is indeed a distinction, for in 1859 no other society devoted exclusively to insect study had been formed in America.

There is a sort of magic in the phrase, "a hundred years old"; so much can happen in that time. But the three men who met in Philadelphia on the night of February 14 of that year—to form an entomological society—could hardly have imagined the progress that would be made in that field in the next hundred years. Science was on the move but no one knew the momentum it would achieve nor the mass of data it would compile.

These three conspirators, Ezra T. Cresson, James Ridings and George Newman, decided that before taking final action, they would invite a larger group to participate in their project. As a result, a second meeting was held on February 22nd, at which fifteen persons were present. They unanimously resolved to form a society, and appointed a committee to draft a constitution and by-laws and to propose a suitable name for the organization. At the next meeting, held on March 1, 1859, this committee made a full report, suggested the name, "The Entomological Society of Philadelphia," and presented a draft of a constitution and by-laws, all of which were accepted, after slight modifications.

It is almost always true that the historical researcher finds conflicting statements, or at least what seem to be uncertainties in recorded data. In this respect the founding date of the Society is no exception. The first record in its Minutes is of the original meeting of Cresson, Ridings and Newman on February 14, 1859. These three men were recorded in that place as the "founders," yet at the following meeting of February 22nd, the fifteen men present unanimously resolved to *form* such a society, and only on March 1 was it given a name, and a constitution adopted. One year later—February 27, 1860—a speaker referred to that meeting as "the anniversary of the organization of the Society." As this meeting was not on the same date as any meeting of the previous year we can only assume that he referred to the March 1st meeting, the nearest comparable date. For this and other reasons it seems logical to say that the Society was founded on March 1, 1859, though the writer is in no position to proclaim this as official.

The American Entomological Society has been a rather unique organization. The chief initial object of the members, as expressed in the constitution of 1859, was the advancement of entomological science by "ascertaining the name, locality, habits, time, etc., of insects found in the United States of America, and communicating the same to the Society." This is still an aim, though we would probably not so express it today.

The early members quite obviously thought of their meetings and other activities as a medium of self-instruction and mutual assistance. No course in general entomology was then taught in any American college, and knowledge in the field was of necessity largely acquired by observation and the reading of the few books on the subject which were available. Almost from its beginning, however, the Society developed for itself three main functions: the conduct and publication of research, the accumulation of a good library, and the building of a collection of insects. The two last were necessary to the accomplishment of the first, and the furthering of all three still remains the prime objective.

Society Publications

The publications as a whole have been outstanding in their field. While the bulk of them represent the results of taxonomic research, all closely related fields have been included. Less than two years after the founding of the Society, there was talk of producing a new entomological journal, and something was very quickly done about it. John Meichel, a member, had offered to do the type setting and press work if the Society would purchase a hand printing press. At the same meeting a resolution was adopted to establish a Publication Fund. Just six weeks later money had been raised, a press purchased and reported "in good condition to print anything the Society may order." This press is still in the possession of the Society and on it were printed most of the first six volumes issued.

The printing of the new journal was promptly started, and it was called the *Proceedings of the Entomological Society of Philadelphia.* Six volumes, now very rare, were printed from 1861 to 1867. In the latter year the name of the Society was changed to the *American Entomological Society,* and the name of the journal to the *Transactions of the American Entomological Society.* This journal, issued quarterly, has been continued to the present time, and the 1958 volume was the eighty-fourth.

In 1865 a new serial publication was undertaken. It was wished to diffuse information in popular form on insects which were destructive or beneficial to vegetation. The *Practical Entomologist,* designed particularly for farmers, was started. Only two volumes were produced, and though at first there was a great demand for it—when distributed gratuitously—the resources of the Society would not permit it to be continued. Though it contained much valuable information, this early venture into publication on economic entomology was of short duration.

In 1890 *Entomological News* first made its appearance, and the 69th volume of this serial was published in 1958. In its 69 years it has performed an extremely valuable function in publishing short articles, news notes, and for many years the most usable and complete record of current literature in the field.

The Memoirs of the American Entomological Society were begun in 1916 as a vehicle for the publication of monographic works. Fifteen numbers have appeared, and the sixteenth may have come from the press before this is printed.

Thus, in the hundred years of its existence the Society has issued 176 volumes of serial publications—in four different series—in addition to 30 or 40 separate pamphlets and volumes. This is no mean accomplishment for a private society with no public support, whose active membership has seldom exceeded 100. This large mass of publications was made possible only because of significant early gifts—some restricted to the Publication Fund—by Dr. Thomas B. Wilson, his brother Rathmel Wilson, and by Dr. George H. Horn. Also the careful handling of the Society's resources by its officers, and the gradual building up of its permanent publication funds contributed much to this end.

The Library

A library for the Society was begun in December, 1859. The first volume acquired was presented in that month by Prof. S. S. Haldeman. It was a copy of F. E. Melcheimer's Catalogue of the described Coleoptera of the United States, 1853. In the hundred years since then the Society's library has grown into one of the most important collections of systematic entomological literature in America, particularly in the older and rarer categories. There are now about 10,000 volumes and many thousands of separates and pamphlets. Many valuable journals have been acquired through exchange of Society publications for those of other organizations. The library is deposited in that of the Academy of Natural Sciences of Philadelphia.

The Insect Collection

An "Entomological Cabinet" or collection was started during the Society's first year. Cabinets for storing it were built by James Ridings, and the first gift of specimens was 100 species of Coleoptera, by Dr. T. B. Wilson. During the years since, many donations of specimens have been made and a considerable number purchased. The two largest single lots were presented by George H. Horn (Coleoptera) and by E. T. Cresson (Hymenoptera). These were each made up of over 60,000 specimens. The present collections, now deposited with those of the Academy of Natural Sciences, include a total of from three to five hundred thousand specimens. Many types are among them.

Association with Academy

About seventeen years after its founding the Society found itself quite pressed for space in the quarters it then occupied on South Thirteenth Street. As a consequence it made a move which has undoubtedly had a great deal of influence on its history and development. The Academy of Natural Sciences of Philadelphia was just moving into a newly completed building where it is still housed. Upon being approached the authorities at the Academy made an agreement with the Society, permitting it to occupy quarters in the new building, where, after over 80 years, it still remains. The arrangement has doubtless been of considerable advantage to both organizations, their libraries, collections and staff supplementing each other. Though maintaining its corporate identity the Society became the "Entomological Section" of the Academy in 1876, and so remained until 1924 when all Academy sections were dissolved.

Membership

The membership of the Society has never been large, but from the first has included the names of many men who stood high as research workers, particularly in taxonomic entomology. There have always been two classes of membership—resident and corresponding. Generally speaking, any one who has been sufficiently interested in entomology to associate himself with the Society—and pay his dues—has been welcomed to its rolls. As a result, there has always been a considerable number of members to whom the field represented an avocation rather than a profession, and a surprising number of significant contributions in research and publication has come from such sources. This was especially true in the earlier days when most of the members were amateurs rather than professionals.

The present resident members number about 115, and the correspondents 27. The latter are eminent entomologists scattered over the world.

The initial objects of the Society, as stated earlier, would certainly suggest that the members would be those interested fundamentally in insects themselves, their identification, classification and ecology. A hundred years ago that was about the only kind of entomologist there was. They have, through the years, done the great mass of basic work so necessary to the development of the army of economic entomologists whose activities today dominate the science. The members of the Society are still, for the most part, that kind of men—who do that kind of work. It will never be completed.

Though the organization has prospered and grown over the years, whatever eminence it has achieved may be laid largely at the doors of the many local members who loyally labored through the years to achieve such advances. They often sacrificed much in time, labor and personal funds. With regard to its finances the Society is in much the same position as a university. President Lowell of Harvard was once asked: "How much money can a university use?" He replied that the same answer applied to that as to the question: "How much whiskey can a Scotchman drink?—any given amount."

MAURICE E. PHILLIPS

Records of Chaetopsylla lotoris (Stewart) (Siphonaptera) from New Hampshire

By R. L. BLICKLE, New Hampshire Agricultural Experiment Station, Durham, N. H.

The following locality records for *Chaetopsylla lotoris* (Stewart) from New Hampshire are listed for the first time. One male, *ex Lynx rufus rufus,* Sullivan, N. H., January 23, 1955. Five males and five females, *ex Procyon lotor,* Strafford, Bow Lake, N. H., February 27, 1957. One male and one female, *ex Lynx rufus rufus,* Conway, N. H., January, 1958. All specimens collected by Dr. C. L. Stevens. This species has been recorded by Johnson, 1955 (Pan. Pac. Ent., XXXI (3): 93–104) from the following states: Maine, New York, Minnesota, Pennsylvania, Iowa, Illinois, and North Carolina.

Two New Species of Fireflies (Coleoptera: Lampyridae)

By Frank A. McDermott, Wilmington, Delaware

The two rather unusual lampyrids described below were found in the collection of Cornell University, and I thank Dr. Henry Dietrich for the privilege of describing them.

I

The insect described below is only the fourth species to be assigned to the genus *Lucernuta,* and the smallest of the four. *Lucernuta* was separated from the large Asian genus *Pyrocoelia* by E. Olivier (Revue Scientifique du Bourbonnais, 1911, Vol. 24, p. 65) by virtue of the 8th ventral abdominal segment being emarginate instead of mucronate as in the latter genus, a rather uncertain criterion in the absence of any other markedly different characters. In Pars 9 of the Coleopterorum Catalogus (1910) and previously, Olivier had combined *Pyrocoelia* under *Lucernuta.*

Lucernuta hammari n. sp.

Type locality, São Paulo, Brazil. No date or collector's name.

Source, Hammar Collection, Cornell University.

Type No. 3481, Cornell University.

Over-all dimensions, *ca.* 9.0 mm. long by 4.0 mm. broad.

Outline elliptical. Body flat (artifact?).

Pronotum 2.3 mm. long by 3.6 mm. broad; outline parabolic. Forward edge reflexed; base bisinuate. Anterior median third colorless and transparent, except for a narrow median brown discoloration which widens toward apical margin; eyes visible through the transparent areas. Disk convex, bearing two large, roughly elliptical, cream-colored spots separated by a triangular brown vitta, broadest at base where it darkens to black, and extending forward a little on the lateral margins of the cream-colored areas. Lateral extensions flat, translucent brown; these and the transparent areas coarsely and densely punctate; convex disk less pronouncedly so. Short, fine pubescence.

Scutellum dark brown, edged black; apex acute. Mesonotal plates dull dark brown. Central portion of scutellum and inside edges of mesonotal plates very dark red.

Elytra 6.65 mm. long by 2.05 mm. broad; widest at midlength; very flat (artifact?). Wide explanate margins, becoming evanescent at about apical 5th. Epipleura very wide, the interior ridge tapering rapidly to join the inner edge of the explanate margin. Lateral edges narrowly brown; explanate margins and nearly equal width on disk nearly transparent, darkening toward suture. On each elytron a dark brown vitta beginning at base and becoming fainter toward the apex. Elytra appear darker over wings and body. Brown portions coarsely rugose; transparent portions finely punctate; submarginal line of coarse punctures. Rather long, oblique pubescence, not dense but particularly marked at suture and lateral edges.

Frons very dark brown, slightly concave; 0.97 mm. across eyes, 0.56 mm. between them; eyes mediocre and head rather small. Maxillary palpi small, brown, outline conoidal. Mandibles very small and project ventro-posteriorly (artifact?); apical portions very slender.

Antennae 3.6 mm. long; 11 articles; brown, hairy, slightly compressed.

Ventral surface brown, including legs; hairy. Ventral abdominal segments 6 and 7 each about 1.5 times as long as 5th, and probably luminous in life; 8 very small, emarginate; 9 ogival, brown. Dorsal segments 6 and 7 with lateral lobes; pygidium trilobed, very dark brown, hairy.

Abdominal spiracles dorsal.

Aedeagus: The exposed portion of the aedeagus is a rather simple structure consisting of two lateral lobes the edges of which appear to form a continuous loop in the ventral view, but in lateral view the tip is turned downward. The dorsal aspect is that of a narrow V with the median lobe projecting between the sides. See accompanying sketch.

Habitus: The accompanying photograph shows the rather unusual appearance of the insect.

Female not known.

Lucernuta hammari n. sp.
Actual length 9.0 mm.

II

The genus *Pteroptyx* was established by E. Olivier (1902) for lampyrids of the general form of *Luciola* but the males having the apical portions of the elytra folded down over the end of the abdomen and the last ventral segment more or less strongly trilobed or trisinuate. The elytra of the female are described as normal. In 1907 Olivier described only two species in this genus, *P. malaccae* (Gorham) and *P. testaceum* (Motsch.). Gorham described the peculiar structure of the terminal abdominal segments of *malaccae*, which he regarded doubtfully as the female. Olivier's sketch of the abdomen of *testeceum* (1907, Pl. 3, fig. 11) does not show such a structure, the segments being of the form normal for *Luciola*. In 1910 Olivier listed nine species, four more being transferred from *Luciola*, and in 1911 he mentioned that one more new species had been described; since then three more have been described, from Indo-China and Sumatra. Five of the species are from New Guinea. *Pteroptyx* is obviously close to *Pyrophanes* in the structure of the terminal abdominal segments, although in the latter it is the pygidium that is involved in the structure, and the elytral apices are not deflexed.

In the collection of Cornell University there is a single specimen which represents a new species of *Pteroptyx,* and it is described below as *P. papuae.* It is somewhat difficult to decide whether this specimen is male or female. There is no partially extruded aedeagus, or ovipositor; the relatively large eyes indicate a male. Gorham notes that his Malacca specimens and one of his Madras specimens of *P. malaccae* had ventral abdominal segments much as described for the present species, while another Madras specimen had an abdomen normal for a female *Luciola.* He refers to the elytra as "obliquely truncate at the apex," which is the way they appear when viewed from above. In *P. cribellata* E. Oliv. the last ventral segment is described as trilobed and ciliate; in *P. microthorax* E. Oliv., with two deep oval emarginations separated by a long narrow lobe with a truncate apex; and in *P. pupilla* E. Oliv., as divided into three slender teeth or mucrons. All three of these species are from New Guinea. *P. antennata* E. Oliv., also from New Guinea, has the last ventral of the male medially aculeate, a description which would apparently apply also to *P. testaceum* (Motsch.) of the East Indies. The last ventral segment of the female of *P. cribellata* is described as being truncate triangular. From these descriptions it would appear that this specimen and also those of Gorham having a similar abdominal structure are males.

Pteroptyx papuae n. sp.

Type locality, Monda, Buna District, PAPUA. Collected by W. G. Bodenstein, December 28, 1943.

Type No. 3480, Cornell University.

Dimensions: 4.5 mm. long by 1.65 mm. broad. Outline probably parallel in life; in the specimen the elytra are slightly divergent.

Pronotum sub-rectangular, *ca,* 0.7 mm. long by 1.15 mm. broad. Densely and coarsely punctate; narrow longitudinal median channel; uniform dark brown except for four small, nearly circular, yellow spots, two near the middle of the disk and close to the median channel, and two, less distinct and somewhat more widely separated, near the basal edge; basal margin reflexed. Short, pale pubescence, especially pronounced on margins.

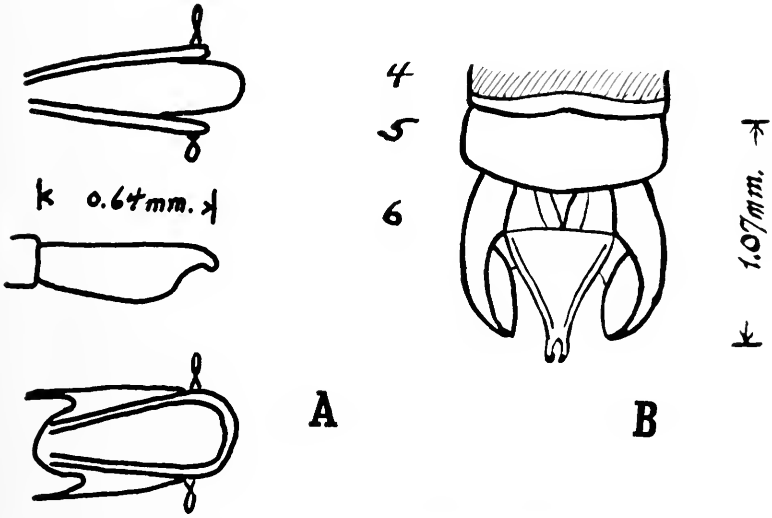


Fig. A. Aedeagus of *Lucernuta hammari* n. sp.

Upper: Dorsal view
Middle: Lateral view
Bottom: Ventral view

Fig. B. Terminal ventral segments of *Pteroptyx papuae* n. sp.

Scutellum brown; mesonotal plates dark yellow.

Elytra 3.83 mm. long by 0.82 mm. broad; divergent from scutellum (*vide supra*); coarsely punctate, the punctures tending to form longitudinal lines; fine, short, oblique yellow pubescence; translucent dark brown, appearing dull dark brown, almost black, over wings; very narrow explanate margins with a single row of coarse punctures; no evident costae. Terminal lobes of the elytra bent downward and forward as though in life they embraced the end of the abdomen.

Frons brown, concave; 0.9 mm. across the relatively large eyes; intraocular margins widely divergent. Mouth parts small; mandibles slender; maxillary palpi relatively large, outline conoidal, flat on inner surface. Clypeus apparently connate, the epistome ending in a semicircular white margin.

Antennae incomplete, but apparently *ca.* 1.5 mm. long; nearly black, hairy, not compressed; 2nd article about $\frac{1}{2}$ as long as 1st and $\frac{2}{3}$ as long as 3d; 4 to 6 (all present) subequal in length.

Thoracic sterna brown. Pygidium ogival, convex, translucent yellowish.

Ventral abdominal segments 2 and 3 brown; 4 white on posterior edge; 5 white, luminous; 6 remarkable in consisting mainly of two long, white, arcuate lobes, apparently luminous, between which projects a flat, triangular, very hairy, nearly transparent lobe with a bifurcate apex, these apices being curved, and bent dorsad. See accompanying sketch. Abdominal spiracles not visible on the ventral surface.

Legs short, dark brown; claws simple; no tibial spurs visible.

References

Gorham, H. S. 1880. Trans. Entomol. Soc. London, p. 101.
Olivier, E. 1902. Revue scientifique du Bourbonnais, Vol. 15, p. 72.
——. 1907. Wytsman's Genera Insectorum, Fasc. 53, p. 55.
——. 1910. Coleopterorum Catalogus, Pars 9, pp. 47–48.
——. 1911. Revue scientifique du Bourbonnais, Vol. 24, pp. 102–103.

Collembola from Colorado [1]

By Harold George Scott [2]

During recent systematic and distributional studies of the Collembola of New Mexico, seven collections were made in Colorado. These collections yielded one species new to science, one not previously recorded, and two already known from Colorado. All four are representatives of the Suborder Arthropleona, Family Entomobryidae. Most workers on the Collembola have not reported field data, so the ecological information presented is among the first to be published on these species. Collections were made by C. Clayton Hoff and Dwain R. Parrack,[3] Department of Biology, University of New Mexico, in connection with a study of the altitudinal distribution of insect and arachnid groups being directed by Dr. Hoff. The field work was aided by National Science Foundation Grant G-112. Specimens will be deposited at the Academy of Natural Sciences, Philadelphia, Pennsylvania.

Subfamily ISOTOMINAE Schaffer, 1896

Genus *Proisotoma* Borner, 1901

Proisotoma subsegmenta, sp. nov. Figure 1

Type Collection. Sifted from aspen litter, 9,200 feet, south of Cumbres Pass, ¼ mile north of the New Mexico state line, Conejos County, Colorado, 3 September 1952.

Description. Body elongate, not subglobose; segmentation distinct, without ankylosis; unique subsection between Abd II and Abd III; integument smooth; white marked evenly with blue; clothing of long and short setae; head prognathous; ratio

[1] A portion of a dissertation submitted to the Graduate Faculty of the University of New Mexico in partial fulfillment of the requirements for the Degree of Doctor of Philosophy.

[2] Training Branch, Communicable Disease Center, Bureau of State Services, Public Health Service, Department of Health, Education, and Welfare, Atlanta, Georgia.

[3] Present address: Zoology Department, University of Illinois, Urbana, Illinois.

of antenna to head as 4:3; antenna with five segments, ratio of antennal segments 4:4:4:3:4; postantennal organ of the simple isotomine type; eyes 8 and 8; eyepatches dark; mouthparts chewing; ratio of body segments approximately 10:40:35/20: 25:(10):20:35:15:20; tibiotarsus with indistinct distal subsegment; ratio of unguiculus to ungius 3:4; tenent hairs absent; unguis and unguiculus without teeth; furcula reaching far beyond collophore, exceedingly slender; ratio of manubrium to dens to mucro as 10:40:1; dental spines absent; dentes dorsally crenulate; mucro with three teeth, non-lamellate; anus terminal; anal spines absent; length 1.0 mm.

Discussion. This species is extremely unusual. It is the only known Collembola exhibiting more than six abdominal segments and the only known Isotominae with more than four antennal segments. Its furcula is remarkably long, reaching beyond the base of the head. It is suggested that the third abdominal section is not a true segment, but a subsegment of either the second or apparent fourth. This species was not taken in 41 samples from aspen in New Mexico.

Subfamily TOMOCERINAE Schaffer, 1896

Genus *Tomocerus* Nicolet, 1841

Subgenus *Pogonognathellus* Paclt, 1944

Tomocerus (Pogonognathellus) flavescens (Tullberg, 1871)

Diagnostic Characteristics. Postantennal organ absent; eyes 6 and 6; prostheca present; antenna shorter than body; unguis with 2–5 teeth; unguiculus with 0–1 teeth; tenent hairs 1; dental formula 0–II/4–9,11; length 5 mm.

New Colorado Records. From fir stump in woods, 10,000 feet; and from sifting woody debris of fir log, 10,000 feet, Cumbres Pass, Conejos County, 3 September 1952.

Recorded Distribution. Alaska, Cal., Colo., D. C., Ga., Ill., Ind., Iowa, La., Me., Md., Mass., Mich., Minn., Miss., Mo., N. H., N. J., N. M., N. Y., N. C., Ohio, Ore., Penna., Tenn., Tex., Utah, Va., Wash. Also Northwest Territories (Canada), Europe, and Asia. This species was recorded from Colorado by Mills (1934, p. 83).

Subfamily ENTOMOBRYINAE Schaffer, 1896

Genus *Entomobrya* Rondani, 1861

Entomobrya purpurascens (Packard, 1873)

Diagnostic Characteristics. Tibiotarsus with two rows of smooth hairs on inner surface; purplish to blue to tan to brown with varying amounts of yellow in different individuals; posterior parts of segments usually darker than anterior margins; antenna purplish, paler apically; legs and furcula usually dark.

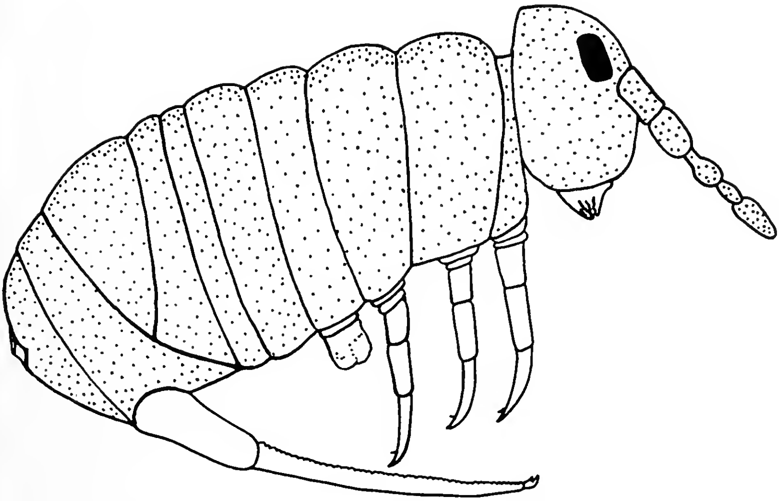


Fig. 1. *Proisotoma subsegmenta* sp. nov., lateral view of holotype.

Colorado Records. From beneath dung in open area of fir forest, 10,000 feet, at Cumbres Pass; and from old fir log, from beneath small log, and from beneath piece of wood, aspen grove, 9,200 feet, 5 miles south of Cumbres Pass, Conejos County, 3 September 1952.

Recorded Distribution. Colo., Del., Ill., Iowa, La., Me., Md., Mass., Minn., N. H., N. J., N. Y., N. D., Penna., Tenn., Tex., Utah, and Wisc. Also Ontario (Canada), and Europe. This species is recorded from Colorado by Christiansen (1958) as *Entomobryoides guthriei.*

Entomobrya marginata (Tullberg, 1871)

Diagnostic Characteristics. Tibiotarsus without two rows of smooth hairs on inner surface; body essentially unicolorous without well-developed spots or stripes; not conspicuously clothed with dense dark-brown setae; gray to live-green to bluish purple.

Colorado Records. From sifting aspen litter, 9,200 feet, south of Cumbres Pass, north of New Mexico state line, Conejos County, 3 September 1952.

Recorded Distribution. Colo., Ill., Iowa, Mass., N. Y., Ohio, Tenn., Utah, Wash. Also Ontario (Canada), Europe, and Australasia. This species has not been recorded previously from Colorado.

Summary

Four species of Collembola are recorded from Conejos County, Colorado: *Proisotoma subsegmenta* sp. nov., *Tomocerus flavescens, Entomobrya purpurascens,* and *Entomobrya marginata. Proisotoma subsegmenta* and *Entomobrya marginata* are new records for the state. The ecological information presented is among the first to be published on these species.

References Cited

Borner, C. 1901. Abh. naturw. Ver. Bremen 17: 1–141.

Christiansen, K. 1958. Systematic Zool. 7 (1): 8–15.

Mills, H. B. 1934. A monograph of the Collembola of Iowa. Ames: Collegiate Press, xii + 143 pp.

Nicolet, H. 1841. Nouv. Mém. Soc. Helv. Sci. Nat., 6: 1–88.

Packard, A. 1873. Ann. Rept. Trust. Peabody Acad. Sci., 5: 23–51.

Paclt, J. 1944. Folia Ent., 8: 3–4.

Rondani, C. 1861. Dipteriologicae Italicae Prodromus, 4: 40.

Schaffer, C. 1896. Mitt. naturh. Mus. Hamburg, 13: 147–216.

Tullberg, T. 1871. Ofv. K. Vet.-Akad. Forhandl., 28 (1): 143–155.

Biological Notes on Chrysis (Ceratochrysis) enhuycki Cooper, and its Host, Leptochilus republicanus zendaloides (Robertson) (Hymenoptera: Chrysididae, Vespidae)

By KARL V. KROMBEIN, Entomology Research Division, Agricultural Research Service, U. S. Department of Agriculture

In 1952 Cooper described the odd little *Chrysis enhuycki* from five specimens which he collected at Princeton, New Jersey, and near Tarrytown, New York. There are 12 additional specimens in the collection of the U. S. National Museum from Rosslyn and Barcroft, Virginia, Washington, D. C., St. Louis and Kirkwood, Missouri, and Ashfork, Arizona. The Rosslyn and Barcroft specimens were reared by J. C. Bridwell from borings in twigs of sumach, *Rhus glabra*. The two specimens from St. Louis (Rau Nos. 3396, 3525) and the one from Kirkwood (Rau No. 9024) were apparently reared. The Arizona specimen was reared by H. S. Barber, June 17, 1901. There are no associated hosts with any of these reared specimens.

Bridwell's success in rearing the chrysidid from sumach led me to gather some infested stems and twigs on January 4, 1958, at Dunn Loring, Virginia, along the right of way of the Washington and Old Dominion Railroad near State Road 698. Only ten wasp nests were found among the hundred or more terminal twigs examined. When I split these twigs, five of them aroused immediate interest because they contained either earthen cocoons similar to those described by Rau (1928) for *Leptochilus republicanus zendaloides* or silken chrysidid cocoons similar to those from which Bridwell reared *Chrysis enhuycki*. The architectural details of these nests were as follows:

DL 2—a slightly sinuous boring 52 mm. long and 4 mm. wide through the pith of a twig having an outside diameter of about 10 mm.; a chrysidid cocoon 7 mm. long at the inner end of the boring with an empty space of 8 mm. above the cocoon; then a plug 17 mm. long of fine pith fragments;

above this a space of 20 mm. filled with earthen particles and other debris.

DL 5—dimensions of twig and boring about the same; an earthen cocoon 18 mm. long at inner end; above this an earthen partition of 2 mm.; then a chrysidid cocoon 7 mm. long; above this a section of fine particles of pith 25 mm. long and then an earthen plug.

DL 6—a twig about 13 mm. in diameter, the boring about 3 mm. wide; two earthen cocoons about 11 mm. long in the boring separated by a partition of fine particles of pith 9 mm. long.

DL 7—a twig 10 mm. in diameter with a boring through the pith 3 mm. wide and 238 mm. long; probably not the entire nest because lower end of twig with 22 mm. partition of fine particles of pith; above this an earthen cocoon 18 mm. long, then an earthen plug 13 mm. long; above this 22 mm. of fine particles of pith; then another earthen cocoon 13 mm. long; above this an earthen plug 10 mm. long; and finally an empty space of 140 mm.

DL 9—twig 12 mm. in diameter with boring down center of pith 3 mm. wide; upper 110 mm. empty, then 5 mm. of fine pith particles; then 5 mm. of earth and 15 mm. empty space; then an earthen cocoon 12 mm. long; then 20 mm. partition of fine particles of pith; then empty space for 50 mm. and a dead *Ectemnius* wasp.

After making the notes above, I taped the split halves of each twig together and placed them out of doors against a masonry surface having a southern exposure. On April 21 I examined them again. The condition on that date and subsequent development in each nest are as follows:

DL 2—chrysidid pupa fully colored except appendages on April 21; male *Chrysis enhuycki* eclosed on April 23 and left cocoon on following day.

DL 5—chrysidid pupa entirely pale on April 21; entirely dark except appendages on April 24; female *Chrysis enhuycki* eclosed on April 28 and left cocoon on May 2; the earthen cocoon contained a pale vespid pupa with light tan eyes on April 21; on April 25 it was still pale with black eyes; on April 28 it was dark except appendages; on May 2 it was fully colored and ready to eclose, and the female *Leptochilus republicanus zendaloides* left the cell on May 5.

DL 6—dead prepupae in earthen cocoons on April 21.

DL 7—a pale, dark-eyed pupa of a parasite in each earthen cocoon on April 21; these pupae darkened very slowly; on May 5 a female *Epistenia coeruleata* Westwood [det. B. D. Burks] left one of the cocoons; the other pupa, also a female *Epistenia,* died during the pupal stage; the *Epistenia* larva feeds externally on the *Leptochilus* prepupa, sucking it dry.

DL 9—pale vespid pupa with light tan eyes in earthen cocoon on April 21; subsequent development as in vespid in DL 5 except that wasp failed to eclose entirely from pupal exuvia and died on May 7; it also was a female *Leptochilus republicanus zendaloides.*

The data given above do not definitely establish *Leptochilus republicanus zendaloides* as the host of *Chrysis enhuycki,* even though the two were reared from adjacent cells in one twig. The cells containing the chrysidids differed from those of *Leptochilus* in one important detail; they contained no earth, while the cells from which *Leptochilus,* or its prepupal parasite *Epistenia,* emerged held cocoons formed from earthen particles. There are two possible explanations for this difference in cell architecture. There may have been supersedure by another species of wasp in the one twig (DL 5) containing both the chrysidid and vespid or *Leptochilus* larvae may behave differently when starting to spin a cocoon than do those of the chrysidid. The architecture of two newly constructed, one-celled nests (82858 A, 9358 A) which I found in pith of sumach at Dunn Loring, Va., on August 28 and September 3, 1958, respectively, indicates that the latter conjecture is the more probable explanation.

One of these later nests (82858 A) was in a stem of smooth sumach (*Rhus glabra*) 10 mm. in diameter. The boring was

61 mm. long and 3 mm. in diameter. A few small particles of pith were packed at the bottom of the boring. Above this was a cell 7 mm. long containing five paralyzed, leaf-mining coleopterous larvae about 5 mm. long and a newly hatched chrysidid larva. Above this cell was a layer of fine particles of pith 9 mm. long, then a layer of earth 20 mm. long. The outermost 25 mm. of the boring contained three pieces of small twigs 10–12 mm. long. The beetle larvae consisted of one specimen of a species of *Brachys,* and four specimens of the leaf-mining cuculionid, *Prionomerus calceatus* (Say) [determined by W. H. Anderson]. The chrysidid larva died during the third instar.

The other nest (9358 A) was in a stem of staghorn sumach (*Rhus typhina*) 8–10 mm. in diameter. A boring 3 mm. wide and 20 mm. long terminated in an ovoidal cell 8 mm. long and 4 mm. wide. In the cell was a newly hatched vespid larva (injured when I opened the nest), eight last instar and two penultimate instar *Brachys* larvae belonging to the *ovatus* complex, 7 mm. long and four last instar leaf-mining chrysomelid larvae, *Chalepus* sp., probably *dorsalis* Thunb., of the same size [determined by G. B. Vogt]. The vespid egg shell was attached to the bottom of the cell by a short thread. The beetle larvae were rather lightly paralyzed, but were wedged in too tightly to move around. Above the cell was a partition of fine particles of pith only 1 mm. thick and then a layer of earth, most of which was lost during transport of the nest to the laboratory.

Apparently in a multi-celled nest the female *Leptochilus* lays an egg at the bottom of the boring and then stores a variable number of paralyzed leaf-mining larvae. Above this cell she constructs a partition of fine particles of pith and then an earthen plug, and then repeats this arrangement in succeeding cells, filling the uppermost part of the boring with a variety of debris. When the *Leptochilus* larva matures, it bores upward through the layer of fine pith particles and constructs a cocoon from the earthen plug above the pith, occasionally using all the earth in the cocoon or sometimes leaving the upper remnant of the earthen plug intact. However, in a parasitized cell the chrysidid larva merely spins its cocoon in the brood cell. This explanation would account for the resulting disposition of nest contents found in the cells containing vespid cocoons in DL 5, 7 and 9 as contrasted to the arrangement of nest contents found in the cells containing chrysidid cocoons in DL 2 and 5.

The only possible way of establishing a definite host-parasite relationship between these two species from the reared material would be a demonstration that the cells of both the chrysidid and vespid contained fragments of the same or closely related species of prey. In DL 2 there were eight head capsules of leaf-mining buprestid larvae belonging to *Brachys*[1] attached to the outer surface of the cocoon. The chrysidid cocoon in DL 5 had no adherent prey remains, but in the loose, fine particles of pith above the outer end of the cocoon was a mass of six head capsules of *Brachys* larvae, apparently compacted there by the chrysidid larva when it began to spin. The earthen cocoons of the *Leptochilus* from DL 5, 7 and 9 had no adherent prey fragments. Maceration in alcohol of the larval meconial plugs at the inner end of these earthen cocoons showed many minute sclerotized fragments of insects. Mr. Vogt found nothing but *Brachys* remains among these fragments as follows: the meconial plug of the *Leptochilus* in DL 5 contained four mandibles of *Brachys* and numerous fragments of stippled integument of *Brachys* species probably belonging to the *ovatus* complex; one meconial plug from DL 7 contained ten mandibles of *Brachys* and numerous similar integumentary remains as in DL 5; the meconial plug from DL 9 contained eight mandibles of *Brachys* and numerous fragments of integument similar to those found in DL 5. The findings of identical remains in both the chrysidid and vespid cells leaves no doubt that *Chrysis enhuycki* is parasitic on *Leptochilus republicanus zendaloides.*

Rau (1928, pp. 400–404, fig. 52) has some notes on the nest of *zendaloides.* His nests were found in elder or sumach and agree in architectural details with my nests of the same species. Some specimens of prey were identified for him as leaf-mining

[1] I am indebted to my colleague George B. Vogt for identification of the prey remains in these nests. He believes that *Brachys* larvae having head capsules of this size would have an over-all length of about 10 mm.

chrysomelid larvae belonging to *Chalepus,* possibly *scapularis* Oliv. I expect that *Leptochilus* probably preys on a rather wide variety of leaf-mining coleopterous larvae, storing whatever is abundant during its nesting periods. Undoubtedly there are two or more generations a year in the Washington metropolitan area, for I have collected adult *Leptochilus* at Dunn Loring on June 12, July 10, and August 28. George Vogt points out that *Brachys* larvae probably would not be large enough to serve as suitable prey until July. Consequently *Leptochilus* from the overwintering generation in the Washington area would have to provision their nests with other larvae, perhaps *Chalepus dorsalis* Thunb. in locust, which matures earlier and is stored by another solitary vespid nesting in June, *Symmorphus canadensis* (Sauss.).

Additional observations are required to establish whether the *Leptochilus* female excavates her own boring in the pith or merely takes over the abandoned boring of another insect. The finding of a dead *Ectemnius* wasp at the bottom of nest DL 9 suggests that *Leptochilus* may utilize pre-existing borings.

Rau lists *Toxophora amphites* Wlkr., *Rhydinofoenus tarsatorius* (Say), *Epistenia osmiae* Ashm., and *Chrysis* (*Olochrysis*) sp. as parasites of *Leptochilus,* but gives no details concerning them. However, there is evidence that Rau's specimens 3396 and 3525, referred to above, might have been the species of *Chrysis* (*Olochrysis*) reared from *zendaloides.* Reference to the Rohwer correspondence files in the Bureau of Entomology shows that 3396 and 3525 were reported to Rau as *Chrysis* (*Olochrysis*) sp. in letters dated December 13, 1917, and January 6, 1919, and, further, that 3395 [2] was reported as *Stenodynerus zendaloides* Robt. Rau did not include field note numbers in his published works and habitually destroyed the field notes

[2] The consecutive lot numbers 3395 and 3396 do not signify insects from adjacent cells of one nest. Apparently Rau numbered all specimens from one nest with the same number. His photograph of a nest of *Leptochilus* with several cells bears the number 4089 (Rau, 1928, fig. 52 b). However, consecutive lot numbers might indicate nests of the same species.

after publication of his observations. His specimens now can be associated with the articles by inference only.

It is possible that the Ashfork, Arizona, specimen of *enhuycki* was reared from *Leptochilus rufinodus* (Cresson). In the National Museum there is a specimen of *rufinodus* pinned with an earthen cocoon and bearing printed labels Ashfork, Arizona, June (H. S. Barber). Attached to the pin is a penciled note in Barber's handwriting indicating that the cocoon was found in a wild sunflower stem on June 18, that the wasp emerged on June 25, and then a cryptic phrase, "Chrysis probably parasitic on other." This note might refer to the Ashfork specimen of *C. enhuycki,* and would therefore indicate Barber's suspicion that the chrysidid had parasitized another specimen of *rufinodus.*

Addendum

I found an additional one-celled nest (103158 A) in a stem of staghorn sumach at Dunn Loring, Va., on October 31, 1958, after this manuscript had gone to the printer. On this date the *Leptochilus* larva was constructing its cocoon from earthen particles in the upper plug. Beneath the larva was a layer of particles of fine pith and then a brood cell containing a moribund *Brachys* larva and remains of several other *Brachys* larvae.

References Cited

Cooper, K. W. 1952. A Remarkable New Species and Subgenus of Chrysid Wasp from North America, with Notes on Related Forms. Trans. Amer. Ent. Soc., 78: 137–148, 11 figs.

Rau, P. 1928. Field Studies in the Behavior of the Non-social Wasps. Trans. Acad. Sci. St. Louis, 25: 325–489, pls. 22–32.

Re Insects Borrowed by the Late Dr. V. S. L. Pate

In late October 1958, officials of the Academy of Natural Sciences of Philadelphia learned of the death of Dr. V. S. L. Pate. Arrangements were made with the executor of his estate to secure the numerous specimens borrowed by Dr. Pate over the past quarter century and assemble them at the Academy. This has been accomplished. The collection fills 147 Schmidt type boxes, 7 large drawers and 76 smaller boxes. It consists of approximately 28,000 pinned specimens and between 1,000 and 2,000 unpinned specimens of Hymenoptera, all belonging to an estimated 30–40 different owners. Considerably less than one percent of the specimens bears a label indicating ownership. About five percent of the containers evidenced signs of dermestid infestation, but much less than one percent of the specimens is totally destroyed.

Mr. James A. G. Rehn and the undersigned are arranging these specimens by owner wherever the label bears data which will permit the specimen to be assigned to a particular institution or individual. Needless to say, the ownership of many thousands of specimens is in doubt. The purpose of this note is to request individuals and officials of institutions which had made loans to Dr. Pate to communicate with the undersigned supplying the following information: 1) number of specimens loaned; 2) distinguishing label data (collector, area collected from, approximate dates, etc.); 3) Family (or other systematic category) to which specimens belong. Material which can be identified with its owner will be shipped express collect as soon as it can be conveniently packed. Material unclaimed, or impossible to assign to an owner before the end of 1959, will be incorporated into the collections of the Academy of Natural Sciences of Philadelphia.

HAROLD J. GRANT, JR.

Reviews

CHECKLIST OF THE MILLIPEDS OF NORTH AMERICA, by Ralph V. Chamberlin and Richard L. Hoffman, Smithsonian Institution, Washington, D. C. 1958. 236 pp. $1.00.

This annotated checklist of the class Diplopoda in North America north of Mexico is very timely, for the last one was published 65 years ago and listed only 124 species under 29 genera. This one brings together some 749 species and subspecies under 200 genera, 35 families, and 11 orders. Keys to families are included. The senior author, who first published on the group in 1903, is the author of more than one-half of the species and the genera that are listed.

This is a carefully done piece of work, having been in preparation several years, but it has the faults of any checklist that is based by necessity on scattered and incomplete records. Our knowledge of the millipeds is still in the descriptive stage and lags at least 50 or 75 years behind that of the Insecta. Careful collectors, especially in the Western States, probably will find many species that are not listed, and critical students will find abundant evidence for questioning many entries. Information on small-bodied forms is still very meager, and the limits of many families are still undefined.

In general, genera and species have been recorded as they were published; a few synonyms have been indicated, some unwisely. In their choice of names for the superorders the authors have been governed by priority and have resurrected Brandt's (1833) awkward Pentazonia and Helminthomorpha; Verhoeff's (1926) more descriptive Opisthandria and Proterandria will be favored by most students. They have wisely based ordinal and subordinal names upon the oldest and best known of the included families. The twelve recognized orders are more than European workers usually recognize, but seem logical. The family Choctellidae wisely has been moved from the order Cambalida to the order Spirostreptida, and the lysiopetalids have been reduced from ordinal to subordinal rank.—NELL B. CAUSEY, University of Arkansas.

INSECT MIGRATION, by C. B. Williams. Pp. xiii + 235, with 11 color illustrations, 22 photographs, 49 maps and diagrams. The Macmillan Co., New York, 1958. Price: $6.00.

This book gives a broader and more summarized treatment of migration than does the author's earlier "The migration of butterflies" (Edinburgh, 1930). Of the present work the author says in the preface that it is ". . . an attempt to bring together both old and new information in a more easily readable form and to discuss many of the problems raised."

Perhaps there is many an entomologist who, like the reviewer, knows only of the more spectacular migratory flights of a few species of Lepidoptera, Orthoptera, and Odonata, and vaguely conceives of them as exceptional occurrences due to local overabundance. Here one learns that migration is characteristic of a good many species, including also some Coleoptera, Hymenoptera, Diptera, Homoptera, and Heteroptera, and that the flights are regular occurrences, directional and deliberate. Although ordinarily it is the following generation, there are species, such as the monarch butterfly, in which it is the same individuals that make the return flight. One is reminded, especially when examining some of the photographs of flights and of aggregations, that here is something amazing and wonderful, and that for all we have learned about anatomy, development, hormones, effect of DDT on nerve cells, etc., etc., our insects still hold some baffling mysteries, and that we are still very far from comprehending the whole insect.

The nature of the migratory flights, especially how the insect adheres to its flight direction, remains unexplained. Williams finds it hard to believe that the sun may be used as a compass—because of its continual change of position—and suggests that various theories require further investigation, including the one involving terrestrial magnetism. As to the origin and the meaning of migration, he feels the most likely explanation may lie in seasonally recurring food shortages or other unbearable conditions; migration is a means of escape from these, comparable thus to some form of diapause.

The book is very readable throughout, and the very fine color plates, the many black and white photographs, the maps and the diagrams all contribute greatly to its success.—R. G. SCHMIEDER.

DIE LARVALSYSTEMATIK EINIGER KLEINSCHMETTERLINGS-FAMILIEN (Hyponomeutidae, Orthoteliidae, Acrolepiidae, Tineidae, Incurvariidae und Adelidae). Abhandlungen zur Larvalsystematik der Insekten. No. 2, pp. 1–145, 212 figs. Akademie Verlag, Berlin. Price: DM 19.50 (paper).

This is part of the comprehensive study of larval systematics of the Microlepidoptera being carried out at the Zoological Institute of the University of Erlangen. One part on the tortricids, by Swatscheck, has already appeared.

Families, sub-families, and genera are characterized on the basis of chaetotaxy, while for some species other features such as the bristles on the labrum, and head sutures are also used. A key to all families of microlepidoptera based on the keys of Facker and Gerasimo, with improvements, is presented, and the larval-based system is compared with that based on adults. —R. G. SCHMIEDER.

Books Received

MIDDLEKAUFF, W. W. The North American sawflies of the genera Acantholyda, Cephalica, and Neurotoma (Hymenoptera, Pamphiliidae). University of California Publications in Entomology, Vol. 14, No. 2, pp. 51–174, pls. 1–3, 105 figs. Univ. of Cal. Press, Berkeley and Los Angeles, 1958. Price: $2.50.

FORSTER, W. and TH. A. WOHLFAHRT. Die Schmetterlinge Mitteleuropas. Lieferung 9 and 10 (pp. 65–128 of Vol. III, and color plates Nos. 8–15). Franckh'sche Verlagshandlung, Stuttgart—0. Price: DM 10, per Lieferung.

These installments complete the Notodontidae, and cover the Zygaenidae, Cochlidiidae, Sphingidae, Thyatiridae, and Drepanidae.

OLDROYD, H. Collecting, preserving and studying insects. Pp. 1–327, 135 text-figures and 15 plates. The Macmillan Co., New York, 1958.

NOTICE. The December, 1958, issue of ENTOMOLOGICAL NEWS was mailed at the Post Office at Lancaster, Pa., on December 11, 1958.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Conopidae of the World wanted. Will pay 10¢ to $1.00 for pinned and labelled specimens. S. Camras, 4407 N. Milwaukee Ave., Chicago 30, Illinois.

Anisoptera—Nearctic sp. wanted for exchange, espec. Ophiog., Arigom., Aeschna, Neurocor., Somatoc., Cordulia, Dorocor., Leucor. R. D. Cuyler, Dept. of Entomology, N. C. State College, Raleigh, N. C.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Tenebrionidae of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

Butterflies. Wish to exchange specimens for Japanese species. Please write to Ichiro Nakamura (Boy, age 16), 26 Aza-Nichiyama Obayashi Takarazuka-shi, Hyogo-Ken, Japan.

Phasmidae of nearctic area desired alive. Purchase or trade, drawing on large stock of major orders, worldwide. Domminck J. Pirone, Dept. Entomology, Cornell University, Ithaca, N. Y.

Nitidulidae and Rhizophagidae wanted in exchange for European beetles of all families. O. Marek, Zămberk 797, Czechoslovakia.

ENTOMOLOGICAL NEWS

FEBRUARY 1959

Vol. LXX **No. 2**

CENTENNIAL YEAR
THE AMERICAN ENTOMOLOGICAL SOCIETY
1859—1959

CONTENTS

PUBLISHED MONTHLY, EXCEPT AUGUST AND SEPTEMBER, BY
THE AMERICAN ENTOMOLOGICAL SOCIETY
PRINCE AND LEMON STS., LANCASTER, PA.
AND
1900 RACE STREET, PHILADELPHIA 3, PA.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada.
Second-class postage paid at Lancaster, Pa.

ENTOMOLOGICAL NEWS

ENTOMOLOGICAL NEWS is published monthly, excepting August and September, by The American Entomological Society at Prince and Lemon Sts., Lancaster, Pa., and the Academy of Natural Sciences, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

Subscription price, per yearly volume of 10 numbers: Domestic, $5.00; Foreign, $5.30; Canada, $5.15—U. S. Currency.

SUBSCRIPTIONS: Communications and remittances to be addressed to **Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

ADVERTISEMENTS: Rate schedules available on request. Address, **Fred B. Jacobson, Advertising Manager, Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

MANUSCRIPTS and all communications concerning same should be addressed to **R. G. Schmieder, Zoological Laboratory, University of Pennsylvania, Philadelphia 4, Pa.**

The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. Articles longer than eight printed pages may be published in two or more installments, unless the author is willing to pay the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

ILLUSTRATIONS: Authors will be charged as follows: For text-figures, the cost of engraving; for insert plates (on glossy stock), the cost of engraving plus printing. Size limit, when printed, 4×6 inches. All blocks will be sent to authors after printing. It is not advisable to print half-tones as text-figures.

TABLES: The cost of setting tables will be charged to authors.

SEPARATA: Members of the American Entomological Society may elect to receive, gratis, 25 offprints of their contributions. These will be "run-of-form," without removal of extraneous matter.

Those members desiring more than 25 separates, and all non-members, will receive no gratis copies. They must obtain all their separates (as reprints, with extraneous matter removed) from the printer at the prices quoted below. Authors must place their order for such separates with the editor at the time of submitting manuscripts, or when returning proof.

Copies	1–4 pp.	5–8 pp.	9–12 pp.	13–16 pp.	17–20 pp.	Covers
50	$3.95	$6.33	$ 9.89	$10.28	$13.44	$4.31
100	4.74	7.51	11.86	12.65	16.21	5.89
Add'l 100	1.58	2.36	3.94	4.74	5.54	3.16

Plates printed one side: First 50, $3.15; Additional 100's, $2.37.

Transportation charges will be extra.

ENTOMOLOGICAL NEWS

Vol. LXX FEBRUARY, 1959 No. 2

Herbert Simpson Parish (1870–1957) [1]

The well-known professional collector of tropical American insects, Mr. Herbert S. Parish, died in Toronto, Ontario, Canada, on July 26, 1957. Many entomologists of the past owe a great debt of gratitude to Parish for his efforts in making known the rich and, at that time, poorly collected insect fauna of the American tropics. In my own case, I began purchasing crane-flies from him during his first trip to Brazil in 1911–1912 and continued to secure from him very desirable materials from all of his succeeding expeditions. The following account of his life and activities is based primarily on a long series of letters from him, covering his principal expeditions since 1911, with some additional personal data supplied by him at my request in a letter dated March 8, 1934. I am particularly indebted to his daughter-in-law, Mrs. Robert Simpson Parish, of Toronto, for additional information required to complete this biographical account.

Herbert Parish was born in Toronto on July 17, 1870, the son of Robert Simpson Parish and Margaret Hornibrook Parish. The father was born in Yorkshire, England, coming to Canada in 1855, and residing in Toronto until 1895. At that time he moved to Sault Ste. Marie, Ontario, where he died in 1903 at the age of 74. The mother died in Toronto in 1917 at the age of 78, having been born in County Cork, Ireland; her family migrated to Canada in 1851. From this union five children were born, the sole survivor at the time of Parish's death being a brother, John Hornibrook Parish, presently living in Sault Ste. Marie. In 1900, Herbert Parish married Miss

[1] Contribution from the Entomological Laboratory, University of Massachusetts.

Lavina Taylor, of Toronto, who died on March 22, 1939. There was a single child, Robert Simpson Parish, presently residing in Toronto with his wife, Alice. They have two children, a daughter, Mrs. Davis W. Heffring, and a son, John Herbert, residing in Woodstock, Ontario, and having two children, the great grandchildren of the subject of this biography.

From his letters, Parish had indicated that he held an interest in insects even as a small boy. In 1896, at the age of 26, he understook his first collecting trip to the tropics, to Haiti, where he remained for nine months, specializing in the Lepidoptera but collecting in many other orders.[2] His second trip, to Cuba in 1898, was a failure due to financial difficulties. The next year he went to British Guiana, his first trip to South America. In 1902, two years after his marriage, Parish returned to Cuba, this time stressing Oriente State in the mountainous eastern part of the island. In 1908–1909 he again collected in British Guiana.

His first trip to Brazil was in 1911–1912. Parish arrived in Belém (Pará)[3] in December 1911, later moving easterly to the village of Igarape Açu (Igarape Assu) and finally to Prata, all such stations being in eastern Brazil just south of the Baía de Marajo. Students who may require additional information concerning his four major expeditions to South America (eastern Brazil, 1911–1912; British Guiana, 1912–1913; Colombia, Ecuador, and Peru, 1914; Amazonian region of Brazil and Peru, 1919–1920) will find some further account in my papers.[4]

On his 1912–1913 trip to British Guiana, Parish worked particularly at Bartica, on the Essequibo River, and at Malali

[2] While it was never so indicated by Parish, one might believe that he may have been influenced in going to Haiti by a book by Eugene Murray-Aaron, "The Butterfly Hunters in the Caribbees," that had appeared in print only two years before (pp. 269, 1 map, 8 plates; Scribners, 1894).

[3] Names in parentheses indicate alternative spellings at the time collections were made.

[4] Alexander, C. P. Proc. U. S. Nat. Mus., 44: 484; 1913 (*Brazil, 1911–1912*). Trans. Amer. Ent. Soc., 40: 223–225; 1914 (*British Guiana, 1912–1913*). Trans. Amer. Ent. Soc., 42: 1–4; 1916 (*Colombia, Ecuador, and Peru, 1914*). Proc. Acad. Nat. Sci. Philadelphia, 1921: 39–41; 1921 (*Amazonian Brazil* and *Peru, 1919–1920*).

(Mallali), on the Demerara. His 1914 expedition to the northern Andes of Colombia, Ecuador, and Peru was brought to an abrupt and disappointing end by the oncoming of World War I and the cutting off of his financial sources. He arrived in Buenaventura, Colombia, on May 5, 1914, moving to the mountains and collecting at Cisneros, Caldas, and La Cumbre, thence crossing the western cordillera to Cali, in the valley of the Cauca River (Magdalena system). Proceeding southward into Ecuador, he stressed particularly coastal Guayaquil and Duran, continuing into the mountains to Huigra and Alaousi (9450 feet). In Peru he collected at Callao and Lima, on the coast, and thence travelled into the higher Andes, collecting particularly at Oroya (12,178 feet), Jauja (11,878 feet), and Huancayo (10,636 feet).

Parish's longest and most important expedition was his second to Brazil in 1919–1920, when he spent approximately one year following the Amazon and some of its tributary streams. He arrived in Belém (Pará) in June 1919, at first collecting over the same ground that he had visited in 1911–1912. Continuing up the Amazon by river steamers, Parish made stops at Santarém, Óbidos (Óbydos of Henry W. Bates), and Oriximiná, the last on the Trombetas River, a tributary stream. Proceeding further up the Amazon he collected at Parintins, Ilha de Serpa (Itacoatiara), and Manaus (Manaos), visiting a nearby station, Flores, where unusually rich collecting was found. He then followed the upper Amazon, now called the Solimões, making various stops in Brazil, including Tefé (Teffé; Ega of Bates), Tonantins, Matura (Amatura), São Paulo de Olivenca, and finally Tabatinga, where Brazil, Colombia, and Peru meet. Continuing up the river, now the Marañon and in the Peruvian territory of Loreto, he visited successively Pernata, Mancallacta, Pebas, and Iquitos. He followed the river until it joins the Huallaga, advancing up the latter to Yurimaguas, his farthest point on the Amazonian system. His final trip to South America was in 1933, when he visited Paramaribo, Dutch Guiana, continuing into British Guiana. On this trip he contracted a case of blood poisoning that came very close to ending his career.

All of Parish's later years were spent in Ontario. For seventeen summers, from 1935 to 1952, the family had a cottage on Georgian Bay, Lake Huron, near Penetanguishene and Midland. Here, at Thunder Bay Beach, he collected many thousands of insects, these serving to make his brief label "T.B.B." very familiar to various entomological correspondents. Some ten years before his death, Parish became unable to do much active field collecting and he devoted more and more of his time to oil painting, in which art he became highly proficient. Many of his beautiful paintings, as well as his personal collection of insects—the latter consisting especially of showy butterflies and moths—remain in the possession of his son. It is believed that the insect collection eventually will become the property of the University of Toronto.

Charles P. Alexander

The Mystery of Entomobrya duolineata Solved (Collembola)

By K. Christiansen, Grinnell, Iowa

In 1939 Bueker described the species *Entomobrya duolineata* from the St. Louis area. This species has been unrecovered since that time and in my recent (1958) work on the genus *Entomobrya* I noted that this species could not be placed with any certainty. Recently Rev. John Ostdiek of Washington, D. C., sent me a number of specimens for identification. Among these were a number of specimens of *Entomobrya ligata* Folsom taken from the Patuxent Refuge, Laurel, Md. These included some very young specimens having a pattern almost identical with that figured by Bueker for *duolineata*. In view of this I am now synonymizing *duolineata* with *E. ligata* Folsom.

The Salivary Gland Chromosomes of Anopheles punctipennis Compared with Those of the Anopheles maculipennis Complex Diptera: Culicidae

By Dr. Guido Frizzi, Istituto di Zoologia, Universita di Pavia, Pavia, Italy

and

Dr. James B. Kitzmiller, Department of Zoology, University of Illinois, Urbana, Illinois

The occurrence of five sibling species within the complex formerly known as "*Anopheles maculipennis*" is now widely recognized. The demonstration of these biologically different but morphologically similar species grew out of the problem of "anophelism without malaria" in certain parts of Europe. The ultimate recognition of the biological differences was accompanied by a series of ecological and geographical observations, plus a series of crossbreeding experiments. The solution of this problem, with the consequent benefit to world health, is a tribute to the dedicated group of men who resolved it. (For a review of the *Anopheles maculipennis* speciation problem see Kitzmiller, 1953.)

In the palearctic region the complex which was formerly called "*Anopheles maculipennis*" is now considered to consist of the following sibling species:

Anopheles maculipennis
Anopheles labranchiae labranchiae
Anopheles labranchiae atroparvus
Anopheles messeae
Anopheles sacharovi
Anopheles melanoon melanoon
Anopheles melanoon subalpinus

Recognition of these species is difficult. Morphological characteristics are variable and, even when usable, are valid in a statistical sense only. Certain characteristics in the eggs may be used with more success for some of the forms.

Frizzi (1952) has clarified the identification of the palearctic members of the *maculipennis* complex by demonstrating that differences in the banding pattern of the salivary gland chromosomes are consistent among the various species. One species, *atroparvus,* can be reared in the laboratory; its chromosomal banding pattern was selected as the "standard." Comparing the other species with this standard pattern, it has been found that there are several different chromosomal rearrangements:

1) With the standard chromosomal pattern; *labranchiae* and *atroparvus.*
2) With a rearrangement in the right arm of chromosome III; *maculipennis, subalpinus* and *melanoon.*
3) With a rearrangement in the left arm of chromosome III and a small inversion in the X chromosome; *sacharovi.*
4) With a rearrangement in the right arm of chromosome III and an extensive complex rearrangement in the X chromosome; *messeae.*

A striking feature of natural populations has been that all specimens collected thus far have revealed only homozygous rearrangements. All characteristic chromosomal rearrangements have been found in appropriate areas—the Po valley, Sardinia, Sicily, Corsica, the southern coast of France and the Valencia region of Spain—but only as homozygotes. Only recently has it been possible to produce in a laboratory colony of *atroparvus,* an individual heterozygous for an inversion. The heterozygous arrangement has never been observed in material taken from the field.

The genetic affinity as determined by crossbreeding experiments, using males of *atroparvus* and females of other species, follows the following order: *labranchiae; subalpinus* and *melanoon; maculipennis; sacharovi; messeae.* The affinity ranges from a partial sterility in the crosses with *labranchiae* to a total sterility between *atroparvus* and *messeae.* When such genetic affinity is compared with the chromosomal rearrangements one sees that the degree of affinity is directly correlated with the extent of such rearrangements. That is, the greater the chromosomal diversity, the greater sterility among the species considered. The results obtained by cytogenetic research agree quite perfectly with those obtained by various taxonomists and malariologists. The pattern of the chromosomal structure suggests a common origin of these species, and suggests that in specific differentiation, the chromosomal rearrangements may have had quite an important role. The fact that in natural populations such chromosomal rearrangements are always found in a given species in the homozygous state, makes us think that such rearrangements in the chromosomes have not become stabilized merely accidentally but that they are the result of long selection in a population which formerly may have presented a high degree of chromosomal polymorphism. This polymorphism has probably been widely diffused in the heterozygous state and the various species have been differentiated by selection of the presumably advantageous homozygotes.

This knowledge of the cytogenetic structure of the palearctic species has permitted the comparison of these species with the nearctic group of species usually considered to belong to the *Anopheles maculipennis* complex; *Anopheles freeborni, occidentalis, quadrimaculatus, aztecus* and *earlei.* From the study of the chromosomal patterns of the salivaries, it is evident that *Anopheles freeborni* and *Anopheles aztecus* both have the same chromosomal pattern as the palearctic species, thus revealing the genetic affinity which unites them. *Anopheles quadrimaculatus* is notably different both in the karyotype and in the chromosomal structure of the salivary chromosomes. Several segments of the salivary chromosomes of *quadrimaculatus* show distinct homologies with the chromosomes of the other species of the palearctic and nearctic groups, and therefore a remote affinity is possible. A particularly evident homology exists in the ends of the chromosomes.

One obvious difference exists between the palearctic and the nearctic species. At least in laboratory strains, heterozygotes are much more frequent in the North American material. In *Anopheles freeborni* there are at least two paracentric inversions, both in chromosome III; the extensive inversion in the left arm is similar to that found in *sacharovi* and the other smaller one in the right arm is close to the centromere. In *aztecus* there is an inversion in the left arm of chromosome III, roughly similar to one of those found in *freeborni*. In *quadrimaculatus* inversions are also present, but a precise study of their localization has not as yet been carried out. With the possible exception of *quadrimaculatus,* therefore, the nearctic species usually considered to belong to the *maculipennis* group also show this affinity cytogenetically. The higher frequency of the heterozygous inversions seems also to be characteristic of the nearctic strains. All observations, however, of North American forms have been made upon laboratory strains, and therefore nothing is known concerning the situation in natural populations.

Of particular interest, therefore, has been the study of a natural population from a larval site at Muncie Pond near Urbana, Illinois. Of more than one thousand larvae captured, 287 were classified. This sample was found to consist of 99 *Anopheles quadrimaculatus* and 188 *Anopheles punctipennis.* A few *Anopheles quadrimaculatus* were examined and there was noted a certain grade of heterozygosity which was not classified further because of the reasons given above. Among the *Anopheles punctipennis* examined, the salivary gland chromosomal structure of 71 individuals, both males and females, was analyzed. In this small population, there were found 27 individuals with a chromosomal banding pattern identical to the "standard" pattern found in *Anopheles labranchiae atroparvus* and 44 individuals showing diverse chromosomal rearrangements as follows:

Left arm of chromosome III: 5 homozygous inversions and 15 heterozygous inversions, all involving zones 45–47 of the "standard" map.

Right arm of chromosome III: 7 homozygous inversions and 12 heterozygous inversions, involving zones 30–35.

Right arm of chromosome II: 7 heterozygous inversions involving zone 7.

Left arm of chromosome II: 5 heterozygous inversions involving zone 23.

Most individuals showed only one of these inversions, but several contained two, and one individual contained three heterozygous inversions in III D, II D, and II S. The map areas involved above are stated only approximately at this time.

The inversions in the third chromosome were most numerous, and therefore we have been able to observe the type of inversion arrangement with more exactness. The rearrangement in the left arm of the third chromosome corresponds to that found in *Anopheles sacharovi* while in the right arm the arrangement corresponds to that found in *messeae*. Although *Anopheles punctipennis* has for several reasons been considered to be outside the *maculipennis* group, it clearly may be considered to belong to this group in terms of the structure of the chromosomes.

The inversions found in *punctipennis* are interesting for three principal reasons:

1) The rearrangements found in the third chromosome are very similar to those found in several species of the *maculipennis* group, both nearctic and palearctic.
2) The high frequency of homozygous third chromosome inversions in this sample, as compared with the rarity of their occurrence in the laboratory strain of *freeborni*.
3) The presence of inversions in chromosome II. No second chromosome inversion has ever been found in any species of the *Anopheles maculipennis* group.

These observations indicate that from a cytogenetic point of view, *Anopheles punctipennis* shows clear affinities with the *maculipennis* complex. For several reasons it has been considered to be distinct from this group, but the cytological evidence, at least, would argue for reexamination of its taxonomic position. On the other hand, *quadrimaculatus*, which has often been included with the nearctic *maculipennis* complex, is clearly more distant, cytogenetically, than *punctipennis*.

The frequency of the inversions found in *punctipennis* suggests a high incidence of chromosomal polymorphism. The specific inversions observed are remarkably similar to those found in *sacharovi* and *messeae*. Most surprising was the finding of second chromosome inversions, which have never been seen in the palearctic material.

To draw any definite conclusions from these observations is, of course, premature but it is certainly legitimate to ask some pertinent questions. Here is a case of a natural population in North America presenting a chromosomal polymorphism much higher than that which characterizes the group of species in the palearctic zone. What can be expected from the other species such as *freeborni, aztecus* and *earlei* which we know now only from laboratory strains? What is the significance of such an elevated polymorphism in the nearctic species in comparison with the palearctic species? Should we consider the palearctic species as derived from polymorphic populations whose polymorphism in this zone has been lost under heavy selection pressure, while the polymorphism has been maintained in the nearctic zone perhaps because of more diverse environmental conditions? On the other hand, is it possible to think that the chromosomal polymorphism of the nearctic species may be the original polymorphism and that the palearctic species may be derived from the nearctic populations? Is it possible that the inversion heterozygotes found in the species of *maculipennis* demonstrate the same kind of selective advantage as has been shown for *Drosophila?* If, in fact, such inversions have diverse selective advantage, the question would now assume not only a theoretical value but also a practical one. It is not known at the present time how a polymorphic population behaves with respect to various kinds of insecticides and, therefore, the recognition of such polymorphism may be indeed an advantage in the resolution of the problem of resistence to insecticides. Without question, the need for further investigation of the natural polymorphism of nearctic anophelines is clearly indicated.

LITERATURE CITED

FRIZZI, G. 1952. Nuovi contributi e prospettive di ricerca nel gruppo *Anopheles maculipennis* in base allo studio del dimorfismo cromosomico (ordinamento ad X invertito e tipico nel messeae). Symposia Genetica, 3: 231-265.

KITZMILLER, J. B. 1953. Mosquito genetics and cytogenetics. Rev. Bras. Mal. doen. trop., 5: 285–359.

The Relationships of Three New Species of Triaenodes from Illinois and Florida (Trichoptera)

By HERBERT H. ROSS, Illinois Natural History Survey, Urbana

The discovery of a puzzling new caddisfly belonging to the genus *Triaenodes* in a small southern Illinois spring drew attention to the possibility that members of this genus might contribute suggestions concerning faunal movements associated with Pleistocene events. Efforts to establish the relationships of the species led to the unraveling of the phylogeny of the entire branch of the genus to which it belongs, and to a better understanding of the evolution of certain characters in members of the branch. The new species proved to be not only local in distribution but a primitive member of its branch, hence it may well be both a phylogenetic and geographic relict.

The 20 nearctic species of *Triaenodes* comprise about six separate phyletic branches: (1) *frontalis* Banks and *grisea* Banks having lamellate male claspers and auriculate female cerci; (2) *helo* Milne, *ochracea* (Betten and Mosely), and *perna* Ross having simple triangular male claspers; (3) a cluster of three or four apparently closely related lines, characterized by the differentiation of mesal and lateral lobes on the male clasper but lacking sclerotized subanal invaginations in the terminal female structures, including *aba* Milne, *nox* Ross, *tridonta* Ross, *melaca* Ross, *phalacris* Ross, *ignita* (Walker), *taenia* Ross, and *florida* Ross; and (4) the *flavescens* and *injusta* complexes of nine species in which the male clasper is divided into mesal and lateral lobes and the female terminal structures have a sclerotized, invaginated structure *a*, shown in figures 2, 4, 7, 8, and 9. The species treated in this paper belong to these latter two complexes.

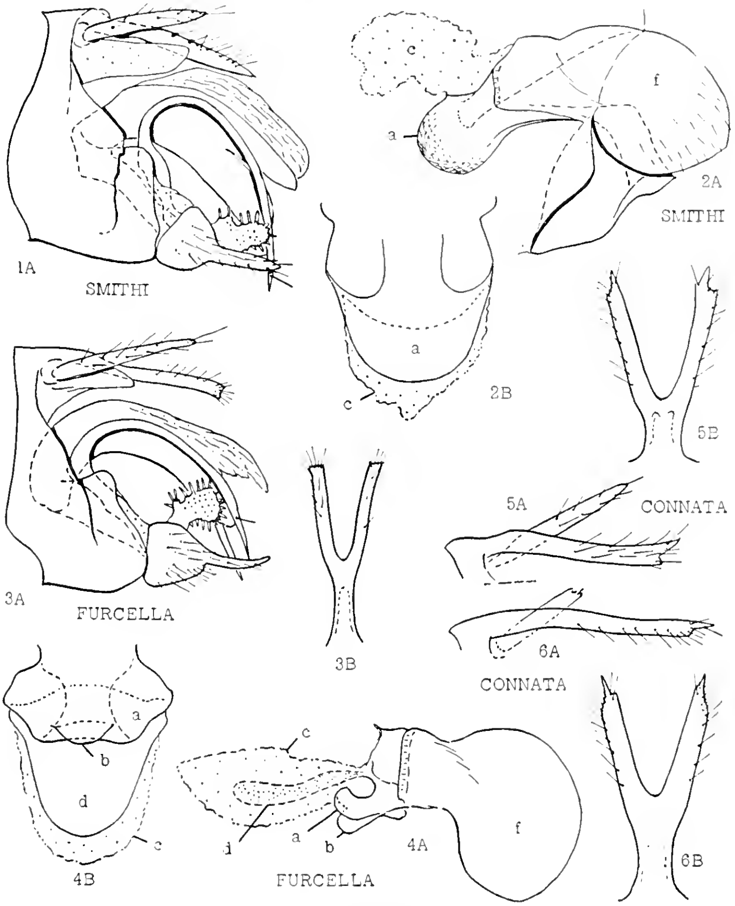
The flavescens complex

The members of this complex have the tenth tergite single whereas those of the *injusta* complex have the tenth tergite forked, figs. 3*B*, 5*B*, 6*B*. The four previously described members of the *flavescens* complex for which females are known form two pairs, (1) *marginata* Sibley and *tarda* Milne in which the lateral process of the male clasper is unusually long (a specialized condition) and the female pouch *a* is small (presumably a primitive condition), and (2) *flavescens* Banks and *baris* Ross in which the lateral process of the male clasper is short (a primitive condition) and the female pouch *a* is larger and convoluted (a specialized condition). The new species *smithi* from southern Illinois combines in the one species both of these primitive conditions and would appear to represent a little-changed survivor of the species which was ancestral to the entire complex.

Triaenodes smithi new species

Length 12 mm. Color tawny with cream and brown striping on the front wing. Male genitalia as in fig. 1. Tenth tergite elongate, clavate, and with setae almost to apex. Clasper with lateral process longer than clasper base, finger-like; mesal process well set off from remainder of clasper and having peglike setae around its edge and on its mesal face; sclerotized process arising from base of clasper and recurved beside the aedeagus moderately long, those of the right and left sides almost identical. Aedeagus large and extending to tip of claspers. Terminal structures of female as in fig. 2. Ovipositor flaps (*f*) and the apical structures between them typical for the complex. Internal invaginations associated with the internal base of the ovipositor flaps consisting of a broad, rounded sclerotized pouch *a* and a dorsal irregular membranous structure *c*.

Holotype ♂ and *allotype* ♀.—Wolf Lake, Illinois, at McCann School Spring, June 6, 1951, at light, Ross and Richards. *Para-*



FIGS. 1-6. Terminal parts of *Triaenodes*. 1, 3, 5, 6, male genitalia; *A*, lateral aspect; *B*, dorsal aspect of tenth tergite. 2, 4, ovipositor flaps of female with associated internal invaginations; *a, b, c, d,* internal structures explained in text; *f*, external part of ovipositor flap.

types.—All from the same locality; same data as holotype, 10 ♂, 6 ♀; October 6, 1947, Ross and Smith, 1 ♂, 2 ♀; May 14, 1948, Smith and Stannard, 1 ♂, 1 ♀. These and other types described in this paper are in the collection of the Illinois Natural History Survey.

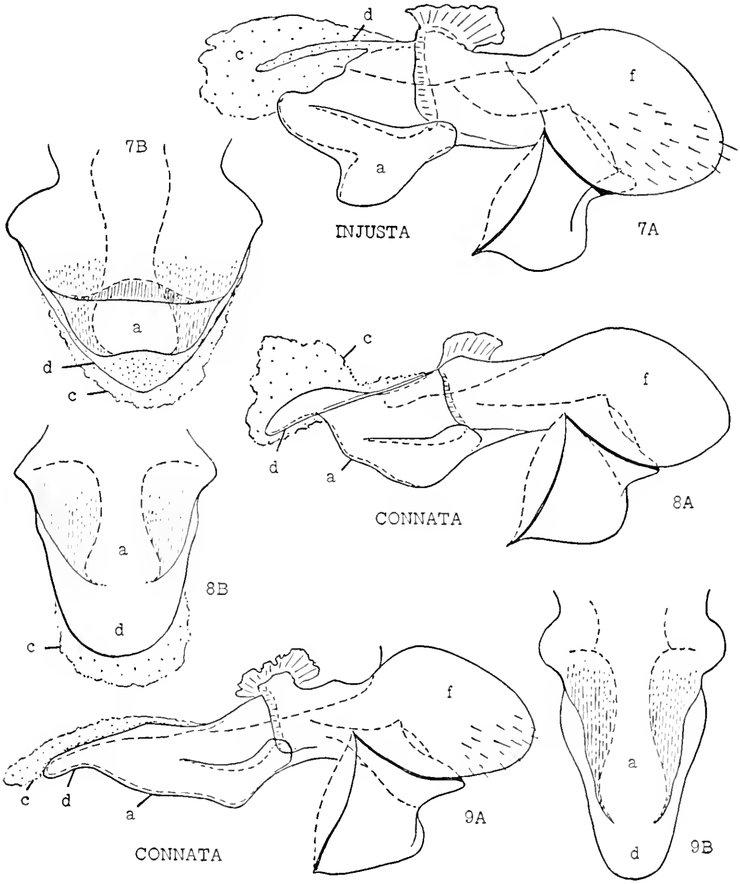
In existing keys the male of this species will run to *dipsia* Ross and will approach *flavescens*. From these two *smithi* may be distinguished by the evenly curved ventral margin of the aedeagus (notched in *dipsia*) and the clavate tenth tergite which is widest not far from the apex (sinuate and widest near base in *flavescens*). The female may be distinguished from related species by the shape of invaginated pouch *a*.

The **injusta** complex

The ancestral form of this complex almost certainly arose from a species of the *flavescens* complex having a male much like that of *smithi* or *baris*, but in which the long mesal projection of the tenth tergite simply doubled. In all species of the *flavescens* complex the tenth tergite is angled slightly to right or to left, usually one way or the other throughout a particular species, but occasionally a right-handed specimen will occur in a normally left-handed species. Perhaps as a consequence of this type of variation a double-handed individual arose and set the stage for the forked condition now found throughout the *injusta* complex.

Formerly only one species, *injusta* (Hagen), was recognized in the complex but detailed study of many series demonstrates the presence of at least three. Probably the most primitive species is *furcella* n. sp. in which the female internal pouch *a* is unattached to flap *d*, fig. 4. The next evolutionary development occurs in *injusta*, fig. 7, in which flap *d* is joined to the upper edge of the base of pouch *a*, and the next is found in *connata* n. sp. in which pouch *a* and flap *d* have fused into a single, evenly sclerotized structure. A single female specimen from Arkansas may represent a still greater specialization of this structure but to solve this question more material is needed.

The ranges of these species are of great interest, *furcella* occurring only in Florida, *injusta* distributed from southern Quebec westward through Minnesota (occurring principally in marshes, lakes, and large rivers), and *connata* in the hilly country from Connecticut westward to at least Illinois. Thus it would appear that the progenitor of the *injusta* complex origi-



FIGS. 7–9. Ovipositor flaps and associated internal structures of *Triaenodes* females. *A*, lateral aspect, *B*, ventral aspect; *a*, *c*, *d*, internal structures explained in text; *f*, external part of ovipositor flap.

nally divided into a southeastern form now represented by *furcella* and a more northern species, and that the latter subsequently divided into a more northern species (*injusta*) and a more southern species (*connata*). If the Arkansas specimen does indicate the presence of another species, it is an offshoot of *connata*, and would imply a more recent division of that species. The ranges of these forms have certainly been affected by Pleistocene events, and there is the definite possibility that more data about the ranges themselves would give us valuable hints concerning these past happenings.

Triaenodes furcella new species

Length 12 mm. Color tawny with cream and brown pattern on the front wings. Male genitalia as in fig. 3. Tenth tergite forked, fig. 3*B*, each arm slender and almost transverse at the apex. Clasper with lateral process slender, slightly longer than base; mesal lobe well set off from base and with the usual peglike setae; basal sclerotized processes recurved alongside the aedeagus, the two curved laterad almost equally at their tips. Aedeagus large and extending to the tips of the claspers. Ovipositor flaps of the female and associated internal structures as in fig. 4. Sclerotized pouch *a* short and wide, with an apical indentation and a ventral lip *b*. Above this arises a large semi-sclerotized U-shaped flap *d* surrounded dorsally and laterally with membranous folds *c*.

Holotype ♂, *allotype* ♀.—Georgetown, FLORIDA, April, 1948. *Paratypes.*—All from Florida; same as for holotype, 4 ♂, 11 ♀; Orlando, May 5, 1944, Frison and Ross, 1 ♀.

This species is readily separated from its closest relative *injusta* by the truncate arms of the tenth tergite (pointed in *injusta*) and the short sclerotized internal pouch *a* of the female (large and fused with the dorsal edge of *a* in *injusta*).

Triaenodes connata new species

Length 12 mm. Color tawny with a cream and brown pattern on the front wings. Male genitalia as previously illustrated for *injusta* (Ross 1944), much as in fig. 3*A* but with tenth tergite otherwise and lateral process of clasper at most half as long as in fig. 3*A*. Tenth tergite, figs. 5, 6, with lateral arms stout and produced at apex into a point; laterally there is sometimes an angular shoulder at the base of the point. Terminal structures of female as in figs. 8, 9. Ovipositor flaps and associated external structures typical for this and the *flavescens* complex. Of the internal structures, pouch *a* is fused solidly with flap *d,* the two forming a uniformly sclerotized continuous structure. In the specimens seen considerable variation occurs in the exact shape of this compound structure, both laterally and ventrally; the extremes are illustrated by fig. 9, the holotype, and fig. 8, a paratype from Mt. Carmel, Connecticut.

Holotype ♀, *allotype* ♂.—Wilmington, ILLINOIS, along Kankakee River, July 1, 1935, DeLong and Ross. *Paratypes.*—Mt. Carmel, CONNECTICUT, July 27, 1938, K. M. Sommerman, 1 ♀, September 15, 1944, A. H. Sommerman, 4 ♂, 1 ♀; Livingston, KENTUCKY, June 16, 1935, H. H. Ross, 1 ♀; Pineville, Kentucky, June 24, 1938, T. H. Frison and T. H. Frison, Jr., 1 ♂, 2 ♀; Oakwood, Illinois, June 14, 1935, C. O. Mohr, 1 ♀; Wilmington, Illinois, same as for holotype, 1 ♀.

This species is closest to *injusta,* from which it can be distinguished by the fused confluent structure of the internal sclerotized pouch of the female, figs. 8, 9, in contrast to the deeper pouch found in *injusta,* fig. 7, and the semi-membranous condition of flap *d* which is fused only with the basal part of pouch *a.* To date characters have not been found to separate with certainty the males of these two species.

LITERATURE CITED

Ross, H. H. 1944. The caddisflies or Trichoptera of Illinois. Ill. Nat. Hist. Surv. Bull., 23: 1–326.

An Unusual Swarming of a Stinkbug near Wasilla, Alaska

By Richard H. Washburn, Alaska Experiment Station, Palmer, Alaska

A stinkbug, *Elasmostethus interstinctus* (L.), was swarming near the shores of several lakes in the Matanuska Valley in the vicinity of Wasilla, Alaska in June, 1958. During most of the day they rested on vegetation, mainly the quaking aspen, *Populus tremuloides*. The heaviest concentrations were on the catkins and bark.

From approximately 6 to 8 p.m. each evening they flew in a circular haphazard pattern, occasionally alighting on any convenient surface before taking off again. In an area near Wasilla Lake they were especially annoying by alighting on heads and shoulders, in considerable numbers, of patrons of a lodge as well as the laundry that was hung up to dry in the vicinity. They were present in large numbers from June 1 to June 20 and disappeared from the area after a heavy rain shower. Although mating was observed, no eggs were found nor were nymphal forms observed later in the summer in the area. No evidence of feeding injury was found. Fortunately this species is not characterized by the objectionable odor so common to many of this group. This species has been noted in the Palmer vicinity previously but only as an individual specimen.

The species was determined by R. I. Sailer of the Entomology Research Division, Agricultural Research Division, U.S.D.A.

Undescribed Species of Crane-Flies from the Western United States and Canada (Dipt.: Tipulidae). Part XIX

By Charles P. Alexander, Amherst, Massachusetts *

The preceding part under this general title was published in Entomological News, 69: 215–221, 1958. Most of the species discussed herewith were taken in California in 1957 and 1958, the types of the novelties being preserved in the Alexander Collection of Crane-flies.

Limonia (Dicranomyia) ypsilon new species

Allied to *gracilis;* general coloration of mesonotal praescutum light brown with three darker brown stripes; wings subhyaline, stigma slightly darker; male hypopygium with the proctiger dark brown, Y-shaped, very conspicuous in slide mounts.

♂. Length about 6–6.5 mm.; wing 6.5–7 mm.

Rostrum yellow; palpi brownish black. Antennae black throughout; flagellar segments oval to long-oval, verticils relatively inconspicuous. Head grayish brown, the narrow orbits more yellowed, sparsely pruinose.

Pronotum dark brown. Mesonotal praescutum with the ground light brown, with three more or less distinct darker brown stripes, the lateral pair continued across the suture onto the scutal lobes; scutellum light brown, paler apically; mediotergite dark brown, sparsely pruinose, pleurotergite paler. Pleura obscure yellow to brownish yellow, variegated with darker, especially on the anepisternum and ventral sternopleurite. Halteres elongate, stem dusky, narrowly yellowed at base, knob dark brown. Legs with the coxae and trochanters testaceous yellow; remainder light brown to brown, the outer tarsal segments darker. Wings subhyaline, stigma only slightly darker, inconspicuous; veins pale brown. Venation: Sc_1 ending

* Contribution from the Entomological Laboratory, University of Massachusetts.

I am deeply indebted to the National Science Foundation for financial aid to cover travel expenses in Western North America in 1956, 1957 and 1958.

about opposite origin of *Rs*, Sc_2 far retracted, Sc_1 alone subequal to or longer than *Rs; m-cu* at or close to fork of *M*.

Abdominal tergites dark brown, the posterior borders narrowly obscure yellow, most evident on the intermediate segments; sternites paler brown, posterior borders yellowed; hypopygium obscure yellow to brownish yellow. Male hypopygium generally as in *gracilis,* including the large tergite, straight dorsal dististyle, and unequally bifid rostral prolongation. The most evident difference, which has suggested the specific name, is the dark brown Y-shaped proctiger, very conspicuous in slide mounts. In *gracilis,* the proctiger appears as two pale and inconspicuous divergent lobes or blades. The tergite differs in shape and structure in the two species, being more nearly oval, with heavily thickened margins, in *gracilis;* in *ypsilon* the cephalic border is strongly convex, the posterior margin nearly straight to subtruncate. Both species have the aedeagus conspicuously hairy.

Habitat. Pacific States. *Holotype:* ♂, Coldwater Creek, Mammoth Lakes District, Mono Co., CALIFORNIA, 9,000 feet, July 16, 1957 (C. P. Alexander). *Paratopotypes:* ♂♂. *Paratypes:* Numerous specimens from various localities, as follows: ♂ from the type series of *particeps* Doane, Keyport, Kitsap Co., WASHINGTON, July 1905 (R. W. Doane); Stevens Pass, Chelan Co., Washington, 4,000 feet, July 8, 1948 (C. P. Alexander); Peavine Ridge, Yamhill Co., OREGON, March 26, 1946, July 1, 1946 (K. M. Fender); Silver Creek Falls, Marion Co., Oregon, May 9, 1948 (K. M. Fender); State Line Brook, Del Norte Co., California, July 27, 1958 (C. P. Alexander); Prairie Creek State Park, Humboldt Co., California, July 23, 1958 (C. P. Alexander); Burney Falls State Park, Shasta Co., California, August 4, 1958 (C. P. Alexander); Lost Creek, north of Lassen Volcanic National Park, Shasta Co., California, 5,000 feet, August 10, 1958 (C. P. Alexander); Helfer's Ranch, Mendocino Co., California, July 19, 1958 (C. P. Alexander & Jacques Helfer); Russian Gulch State Park, Mendocino Co., July 20, 1958 (C. P. Alexander & Jacques Helfer); Cleone Lake, MacKerricher State Park, Mendocino Co., July 20, 1958 (C. P.

Alexander & Jacques Helfer); Lagunitas Creek, Samuel P. Taylor State Park, Marin Co., California, in redwood forest, July 16, 1958 (C. P. Alexander); Pinecrest, Tuolumne Co., California, July 29, 1947 (Paul H. Arnaud); Kings Canyon National Park at Swale Camp, Tulare Co., California, 6,400 feet, July 19, 1957 (C. P. Alexander); Sequoia National Park, Tulare Co., California, June 6–8, 1948 (Otto Degener), July 18, 1957 (C. P. Alexander); Chiricahua Mts., Cochise Co., ARIZONA, 6,000 feet, June 4, 1942 (C. P. Alexander). This also includes all published records for *particeps* Doane between 1920 and 1958 with the exception of the actual types from Keyport, Washington.

The present fly has been confused under the name *particeps* Doane (ENT. NEWS, 19: 7–8; 1908). In the type series of the latter, all from Keyport, Washington, collected in July 1905 by Doane and including nine males and six females, it is now evident that two species are confused. In an exchange of specimens with Doane I received a paratype male which naturally was considered as being conspecific with the holotype. However an examination of this latter specimen in San Francisco in July 1946 clearly showed that this was a different species from the paratype that I had received earlier. The actual type of *particeps* is identical with the species later described as *Limonia* (*Dicranomyia*) *uinta* Alexander (AMER. MIDL. NAT., 39: 38–40, figs. 13, 17; 1948) and true *particeps* is at present known only from Utah and Washington. I am greatly indebted to Drs. Edward S. Ross and Edward Kessel for preparing the genitalic mount of the holotype of *particeps* and in this manner finally clearing up a confusing situation in our study of the Western North American Tipulidae.

The nearest relatives of *ypsilon* are *L.* (*D.*) *particeps,* as discussed, and *L.* (*D.*) *gracilis* (Doane). The latter is a larger more yellowish fly, with the hypopygial structure distinct, as discussed above. It is widely distributed in the west and likewise occurs in the White Mountains, New Hampshire (Headwall of Tuckerman's Ravine, Mount Washington, 5,000 feet, in late August). Moreover, the northern European *L.* (*D.*) *hal-*

terella Edwards appears to be conspecific and would become the valid name for the fly in case the name *gracilis* is ever considered to be invalidated by prior use in *Limonia* (*Limnobia*), as by *Limnobia gracilis* Wiedemann (1828) and *Limnobia gracilis* Zetterstedt (1838).

Limnophila (Phylidorea) brevifilosa new species

General coloration of thorax brownish yellow, the praescutum darker medially, pleura reddish; femora yellow, the tips narrowly darkened; wings tinged with yellow, stigma dark brown, oval; male hypopygium with the three branches of the aedeagus elongate but distinctly shorter and stouter than in all related regional species; gonapophysis appearing as an exceedingly narrow blade that is extended into an acute spine.

♂. Length about 9.5 mm.; wing 8.5 mm.; antenna about 1.6 mm.

♀. Length about 10–12 mm.; wing 10–12 mm.

Rostrum plumbeous; palpi black. Antennae with scape black, pedicel and flagellum light brown; flagellar segments passing through oval to elongate. Head light gray.

Pronotum brown, paler laterally. Mesonotal praescutum dark brown medially, the sides broadly brownish yellow; scutal lobes darkened, especially on the mesal parts; scutellum and mediotergite obscure yellow, narrowly darkened medially; pleurotergite reddish yellow. Pleura reddened, vaguely pruinose; meron and metapleura yellowed. Halteres with stem pale yellow, knob infuscated. Legs with coxae reddish yellow; trochanters yellow; femora yellow with a narrow vaguely indicated darkening at or close to the tip; tibiae brownish yellow, narrowly darkened at tip; tarsi obscure yellow, terminal segments darker. Wings tinged with yellow, the prearcular and costal fields clearer yellow; stigma oval, dark brown; very narrow pale brown seams over the cord, fork of M_{1+2} and along vein *Cu*, the latter chiefly in cell *M*; veins pale brown, slightly brightened in the yellowed fields. Venation: *Rs* relatively short, a little longer than cell *1st* M_2, weakly angulated near origin; cell M_1

longer than its petiole; *m-cu* at or close to midlength of M_{3+4}.

Abdomen obscure brownish yellow, in the male the subterminal segments blackened to form a broad ring, hypopygium yellow; in the female, subterminal ring narrower, genital shield fulvous. Male hypopygium with the median tergal lobes oval, separated from one another by pale membrane. Terminal point of outer dististyle slender; outer half of inner style strongly narrowed, subcylindrical. Aedeagus a little longer and stouter than the lateral branches, all three elements distinctly shorter and relatively stouter than in other regional members of the adusta group. Gonapophysis appearing as an exceedingly narrow blade that is extended into an acute spine.

Habitat. California. *Holotype:* ♂, Intake Camp, Bishop Creek, Inyo Co., 8,000 feet, July 8, 1957 (C. P. Alexander). *Allotopotype:* ♀, pinned with type. *Paratopotype:* 1 ♀, pinned with type. *Paratypes:* 4 ♀♀, Big Pine Creek, Inyo Co., 9,000 feet, July 11, 1957 (C. P. Alexander).

There are four regional species of the *adusta* group that have the male hypopygium much as in the present fly. Of these, *Limnophila* (*Phylidorea*) *æquiatra* Alexander and *L.* (*P.*) *olympica* Alexander are black species while *L.* (*P.*) *pacalis* Alexander and *L.* (*P.*) *snoqualmiensis* Alexander are colored more as in the present fly but with the details of structure of the hypopygium distinct. The most similar species is *snoqualmiensis.* The relatively short stout branches of the aedeagus provide the strongest hypopygial characters in the present fly.

Molophilus (Molophilus) gracilipes new species

Belongs to the *gracilis* group, *pubipennis* subgroup; allied to *kulshanicus;* size large (wing of male almost 6 mm.); general coloration of thorax reddish brown; legs extensively brownish black; wings weakly tinged with brown, without a darkened seam along vein *Cu;* vein R_{2+3} oblique at origin; male hypopygium with the dorsal lobe of the basistyle slender and pointed; dististyles slightly narrower than in *kulshanicus.*

♂. Length about 5 mm.; wing 5.9 mm.; antenna about 1.5 mm.

Rostrum and palpi black. Antennae black; basal flagellar segments elongate-oval, with long verticils and a dense white pubescence; outer segments smaller with shorter verticils. Head dark brownish gray.

Pronotum clear light yellow, dark brown on sides; pretergites narrowly obscure yellow. Mesonotum almost uniform medium brown or reddish brown, without distinct pattern. Pleura concolorous, dorsopleural membrane slightly more yellowed. Halteres yellow. Legs with the coxae and trochanters obscure brownish yellow; femora brownish black, bases obscure yellow; tibiae and tarsi dark brown; legs long and slender, especially the fore and hind pairs; posterior tibia a trifle shorter than the femur, slender. Wings weakly tinged with brown, prearcular and costal fields more yellowed; no darkened seam along vein *Cu* as in *kulshanicus;* veins very pale brown, macrotrichia darker. Venation: R_2 lying distal to *r-m;* R_{2+3} more oblique at origin than in *kulshanicus;* petiole of cell M_3 about twice *m-cu;* vein *2nd A* ending shortly beyond the level of origin of petiole of cell M_3.

Abdomen, including hypopygium, dark brown. Male hypopygium, as compared with *kulshanicus,* with the dorsal lobe of the basistyle slender and more pointed; spicules of ventral lobe less numerous but similarly crowded. Both dististyles slightly narrower; phallosomic plate less obtuse at apex.

Habitat. CALIFORNIA. *Holotype:* ♂, West side of Sonora Pass, along Middle Fork of the Stanislaus River, Tuolumne Co., 8,600 feet, June 27, 1957 (C. P. Alexander).

The most similar regional species is the more northern *Molophilus* (*Molophilus*) *kulshanicus* Alexander, which differs in the dark body coloration, details of pattern of the legs and wings, and in slight differences in structure of the male hypopygium.

Molophilus (Molophilus) unispiculatus new species

Belongs to the *gracilis* group, *pubipennis* subgroup; size medium (wing of male 4.5 mm.); mesonotum grayish brown, lateral borders and pleura yellow; knobs of halteres dark brown; legs chiefly brownish black; wings whitish, veins and macrotrichia darkened; R_2 in virtual transverse alignment with *r-m;* male hypopygium with the spicules of ventral lobe of basistyle extended into hairlike points; outer dististyle long and straight, its distal third curved to an acute point, spicules very reduced, restricted to the outer third; inner style smaller, strongly curved to the subacute point, surface with spicules, the more basal ones small.

♂. Length about 4 mm.; wing 4.5 mm.; antenna about 1.1 mm.

Rostrum dark brown; palpi brownish black. Antennae with scape and pedicel testaceous, flagellum black; flagellar segments suboval, with elongate verticils. Head brownish gray.

Pronotum and pretergites yellow. Mesonotal praescutum grayish brown, humeral and lateral borders yellow; posterior sclerites of notum chiefly infuscated. Pleura and pleurotergite yellow, ventral sternopleurite vaguely more darkened. Halteres with stem whitened, knob dark brown. Legs with coxae and trochanters yellow; femora brownish black, the color produced chiefly by dark vestiture, only the bases restrictedly paler; tibiae brownish black; tarsi black. Wings whitish, prearcular field restrictedly more yellowed; veins brown, macrotrichia still darker. Venation: R_2 virtually in transverse alignment with *r-m;* petiole of cell M_3 about two and one-half times *m-cu;* vein *2nd A* ending about opposite *m-cu.*

Abdomen dark brown, hypopygium yellowed. Male hypopygium with the dorsal lobe of the basistyle relatively slender, its apex obtuse; ventral lobe with about 16 to 18 spicules that are extended into hairlike points and a marginal series of elongate setae. Outer dististyle long and straight for about two-thirds the length, thence curved into a long acute spine, on outer margin before tip with a single projecting spicule, with smaller ones back from the tip, all restricted to the outer third, surface of outer half with scattered weak setae; inner style smaller, strongly curved to the subacute tip, with spicules over virtually the whole surface, the basal ones very small. Phallosomic plate obtuse at tip.

Habitat. CALIFORNIA. *Holotype:* ♂, Coldwater Creek, Mammoth Lakes District, Mono Co., 9,000 feet, July 28, 1957 (C. P. Alexander).

The present fly is most similar to species such as *Molophilus* (*Molophilus*) *rainicrensis* Alexander, differing especially in the coloration of the body and wings and in the structure of the male hypopygium.

Insects captured in black-painted and unpainted light traps [1]

By S. W. FROST, The Pennsylvania State University

During the summer of 1957, two identically-constructed Pennsylvania insect traps were operated adjacent to each other. One was a standard bright aluminum trap, the other was painted entirely dull black. The traps were hung six feet from the ground and so arranged that the lamps of the two traps were 3 feet apart. The positions of the traps were reversed every three days.

Many of the records have been combined to condense the table. The midges include Chironomidae, Cecidomyiidae, Mycetophylidae and Psychodidae. Miscellaneous Coleoptera include Phyllophaga, Aphodius, elm leaf beetles and several groups which were taken in small numbers.

An analysis of the catches is given in tables 1 and 2. The results indicate that the unpainted trap was approximately twice as effective as the black-painted trap. The moths, especially Pyralidae, Crambidae, Arctiidae and Geometridae, seemed less

[1] Authorized for publication on August 1, 1958, as paper No. 2282 in the journal series of the Pennsylvania Agricultural Experiment Station.

affected. Catches of four common species of economic importance are given in table 2.

TABLE 1. Insects Captured in Black-painted and Unpainted Light Traps State College, Pa., June 30-July 20

Insects	Unpainted	Painted black	Insects	Unpainted	Painted black
Culicidae	23	33	Elateridae	63	53
Rhyphidae	65	28	Misc. Coleoptera	3002	1529
Tipulidae	78	51	Pyralidae	64	61
Simuliidae	4	1	Crambidae	405	338
Midges	6569	3416	Geometridae	68	70
Anthomyiidae	205	75	Noctuidae	1221	874
Drosophilidae	239	107	Tortricidae	411	267
Lonchopteridae	75	21	Arctiidae	886	831
Boboridae	212	70	Other Macros.	132	115
Misc. Diptera	689	199	Microlepidoptera	1429	1020
Aphididae	104	50	Macrotrichoptera	1915	973
Cicadellidae	30257	14513	Microtrichoptera	843	344
Miridae	1000	598	Formicidae	71	55
Misc. Homop. Hemiptera	244	106	Hymenoptera	989	700
			Misc. insects	221	118
Carabidae	514	422			
Staphylinidae	1167	442	Totals	53325	27574
Scarabaeidae	112	55			
Curculionidae	48	39	Per cent	65.9	34.1

TABLE 2. Catches of Some Moths*

Insect	Unpainted	Painted black
Carpocapsa pomonella (L)	61	31
Agrotis ypsilon (Rott.)	96	85
Amathes c-nigrum (L)	27	17
Pseudaletia unipuncta (Haw.)	726	457

* These species are included under Noctuidae and Tortricidae in table 1.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Conopidae of the World wanted. Will pay 10¢ to $1.00 for pinned and labelled specimens. S. Camras, 4407 N. Milwaukee Ave., Chicago 30, Illinois.

Anisoptera—Nearctic sp. wanted for exchange, espec. Ophiog., Arigom., Aeschna, Neurocor., Somatoc., Cordulia, Dorocor., Leucor. R. D. Cuyler, Dept. of Entomology, N. C. State College, Raleigh, N. C.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Tenebrionidae of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

Butterflies. Wish to exchange specimens for Japanese species. Please write to Ichiro Nakamura (Boy, age 16), 26 Aza-Nichiyama Obayashi Takarazuka-shi, Hyogo-Ken, Japan.

Phasmidae of nearctic area desired alive. Purchase or trade, drawing on large stock of major orders, worldwide. Domminck J. Pirone, Dept. Entomology, Cornell University, Ithaca, N. Y.

Nitidulidae and Rhizophagidae wanted in exchange for European beetles of all families. O. Marek, Zămberk 797, Czechoslovakia.

Publication scheduled for January 1959

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 are 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

THE AMERICAN ENTOMOLOGICAL SOCIETY

1900 Race Street, Philadelphia 3, Penna., U.S.A.

ENTOMOLOGICAL NEWS

MARCH 1959

Vol. LXX **No. 3**

CENTENNIAL YEAR
THE AMERICAN ENTOMOLOGICAL SOCIETY
1859—1959

CONTENTS

PUBLISHED MONTHLY, EXCEPT AUGUST AND SEPTEMBER, BY
THE AMERICAN ENTOMOLOGICAL SOCIETY
PRINCE AND LEMON STS., LANCASTER, PA.
AND
1900 RACE STREET, PHILADELPHIA 3, PA.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada
Second-class postage paid at Lancaster, Pa.

ENTOMOLOGICAL NEWS

ENTOMOLOGICAL NEWS is published monthly, excepting August and September, by The American Entomological Society at Prince and Lemon Sts., Lancaster, Pa., and the Academy of Natural Sciences, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

Subscription price, per yearly volume of 10 numbers: Domestic, \$5.00; Foreign, \$5.30; Canada, \$5.15—U. S. Currency.

SUBSCRIPTIONS: Communications and remittances to be addressed to **Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

ADVERTISEMENTS: Rate schedules available on request. Address, **Fred B. Jacobson, Advertising Manager, Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

MANUSCRIPTS and all communications concerning same should be addressed to **R. G. Schmieder, Zoological Laboratory, University of Pennsylvania, Philadelphia 4, Pa.**

The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. Articles longer than eight printed pages may be published in two or more installments, unless the author is willing to pay the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

ILLUSTRATIONS: Authors will be charged as follows: For text-figures, the cost of engraving; for insert plates (on glossy stock), the cost of engraving plus printing. Size limit, when printed, 4 × 6 inches. All blocks will be sent to authors after printing. It is not advisable to print half-tones as text-figures.

TABLES: The cost of setting tables will be charged to authors.

SEPARATA: Members of the American Entomological Society may elect to receive, gratis, 25 offprints of their contributions. These will be "run-of-form," without removal of extraneous matter.

Those members desiring more than 25 separates, and all non-members, will receive no gratis copies. They must obtain all their separates (as reprints, with extraneous matter removed) from the printer at the prices quoted below. Authors must place their order for such separates with the editor at the time of submitting manuscripts, or when returning proof.

Copies	1–4 pp.	5–8 pp.	9–12 pp.	13–16 pp.	17–20 pp.	Covers
50	\$3.95	\$6.33	\$ 9.89	\$10.28	\$13.44	\$4.31
100	4.74	7.51	11.86	12.65	16.21	5.89
Add'l 100	1.58	2.36	3.94	4.74	5.54	3.16

Plates printed one side: First 50, \$3.15; Additional 100's, \$2.37.

Transportation charges will be extra.

ENTOMOLOGICAL NEWS

Vol. LXX MARCH, 1959 No. 3

The Larvae of the Ampulicidae (Hymenoptera)

By Howard E. Evans, Cornell University, Ithaca, N. Y.

The Ampulicidae form a small complex of wasps belonging to the superfamily Sphecoidea. They are variously regarded as forming a family close to the Sphecidae (Krombein, 1951), a subfamily of Sphecidae close to the Sphecinae (LeClercq, 1954), or a tribe of the sphecid subfamily Nyssoninae (Pate, 1938). Now that there has been a general review of the larval characters of the Sphecidae (Evans and Lin, 1956; Evans, 1957–59), it is appropriate to ask what light the larvae of the ampulicids may shed upon their relationships.

The Larva of Ampulex

To my knowledge no larva of this genus has ever been described in detail, and I therefore present a description of the larva of the North American species *canaliculata* Say. Terminology is the same as that employed in the recent study of sphecid larvae cited above.

Ampulex canaliculata (Say)

The following description is drawn from a single full-grown, non-diapausing specimen collected by K. V. Krombein at Kill Devil Hills, Dare Co., N. C., Aug. 12, 1958.

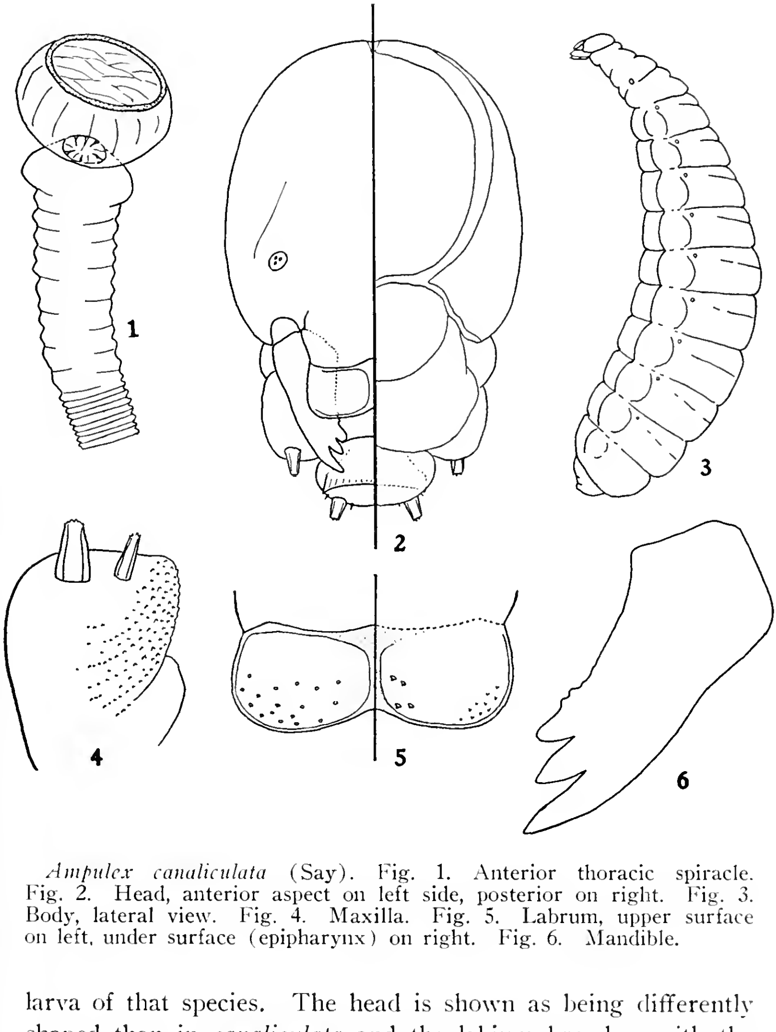
Body.—Length 7.5 mm.; maximum width 2 mm. (fig. 3). Fusiform, more gradually tapered anteriorly than posteriorly. Pleural lobes moderately strong; each segment divided dorsally into an anterior and a posterior annulet; anal segment small, slightly produced apically, the anus situated on the ventral side of this apical process. Body setae apparently absent; integument smooth. Spiracles relatively large, the peritreme narrowly but darkly pigmented; walls of the atrium only very weakly sculptured; opening into the subatrium small, armed with a few spines; subatrium elongate, leading directly into the trachea (fig. 1).

Head.—Distinctly higher than wide; width .43 mm.; height (exclusive of labrum) .46 mm. (fig. 2). Virtually unpigmented except for the mandibles. Coronal suture forming a small notch at the top of the head; parietal bands faintly indicated; epistomal suture absent; punctures and setae apparently absent. Antennal orbits widely separated, circular, 40 μ in diameter, each with three small sensory cones set in the membrane of the orbit.

Mouthparts.—Labrum .25 mm. wide, broadly emarginate apically, with a narrow border and a lightly pigmented median band; disc with numerous punctures, some of which bear very short setae; epipharynx weakly spinulose on the sides, with four conspicuous sensory cones on each side of the midline (fig. 5). Mandibles .22 mm. long, .11 mm. wide at the base, without any setae or sensory pores, the apex with three teeth and two small denticles basad of the basal tooth (fig. 6). Maxillae weakly spinulose on the inner margin; palpi large, about 40 μ long; galeae more slender, about 30 μ long; sides of maxillae without noticeable setae or punctures (fig. 4). Labium fairly broad apically; spinneret a transverse slit .16 mm. long, its lips more prominent laterally than medially; labial palpi stout, about 30 μ long.

A second specimen, from Ithaca, N. Y., July 24, 1954 (C. M. Yoshimoto) resembles the North Carolina specimen closely but is not as well preserved. It is slightly larger, the head capsule measuring .48 mm. in width; the mandibles measure .23 mm. long and have a single sharp denticle basad of the basal tooth.

Williams (1929) has presented an excellent account of the biology of *canaliculata,* including a sketch of the larva feeding on a cockroach. Williams (1942) has also studied *A. compressa* (Fabr.) and presented some notes and sketches of the



Ampulex canaliculata (Say). Fig. 1. Anterior thoracic spiracle. Fig. 2. Head, anterior aspect on left side, posterior on right. Fig. 3. Body, lateral view. Fig. 4. Maxilla. Fig. 5. Labrum, upper surface on left, under surface (epipharynx) on right. Fig. 6. Mandible.

larva of that species. The head is shown as being differently shaped than in *canaliculata* and the labium broader, with the spinneret a long slit with the lips uniformly raised throughout. The mandibles bear a close resemblance to those of *canaliculata*.

The Larva of Dolichurus

Maneval (1939) has provided a description and series of figures of the diapausing larva of *Dolichurus corniculus* (Spinola). The head is broader than in *Ampulex* and the parietal bands longer, although very pale; the antennal orbits each bear five sensory cones rather than three. The labrum bears some strong setae and apparently lacks the marginal and median bands of *Ampulex*. The mandibles are bidentate apically and have two small denticles basad of the second tooth. The maxillae bear conspicuous setae laterally and the surface is covered with minute spinules; the palpi and galeae are about as in *Ampulex*. The labial palpi are unusually short, the spinneret a transverse slit with the lips much more prominent laterally than medially.

Discussion

The larvae of the Ampulicidae clearly have many characters in common with the Sphecinae: the body form is similar and the integument lacks setae; the spiracular peritreme is narrow and pigmented, the opening into the subatrium armed with spines; antennal papillae are absent; the labrum is broad, emarginate, and in *Ampulex* has a pigmented margin much as in the Sphecini; the mandibles are strongly dentate apically and lack basal setae; the galeae are large, the lacinial area spinulose and directed mesad; the spinneret is a transverse slit with raised lips. They bear less resemblance to the larvae of other Sphecidae, but they do have certain characters in common with the Pemphredonini: the antennal orbits are large and widely separated; the labrum has a pigmented median band and a thickened, non-bristly margin; the epipharynx has a few sensory cones but is otherwise bare except for a few lateral spinules. I consider the Sphecinae and the Pemphredonini the most primitive groups of Sphecidae, in that order (Evans, 1959).

The larvae of the Ampulicidae may be separated from those of the Sphecinae on the following characters: the integument is devoid of spinules; the parietal bands are weak; the epipharynx is spinulose only on the sides, and there very weakly; the mandibles lack basal pores; the inner margin of the maxillae bears only short spinules; and the lips of the spinneret generally project farther laterally than medially.

Larval characters suggest that the relationship between the ampulicids and the Sphecinae is very close indeed. Like many Sphecinae, the ampulicids use orthopteroids as prey, and their nesting behavior, although primitive, is not notably different from that of some Sphecinae. Only on adult structure do the ampulicids stand sharply apart from the Sphecinae, for it is impossible to reason away the forked process on the mesosternum of the ampulicids or the great reduction (or complete loss) of the anal lobe of the hind wing. Whether to regard the group as a separate family or as a subfamily close to the Sphecinae will remain a matter of opinion. Clearly the group has no close relationship to the Nyssoninae.

References

Evans, H. E. 1957–59. Trans. Amer. Ent. Soc., 83: 79–117; 84: 109–139, and in press.

—— and Lin, C. S. 1956. Trans. Amer. Ent. Soc., 81: 131–153; 82: 35–66.

Krombein, K. V. 1951. U. S. Dept. Agri. Monogr. no. 2, pp. 937–938.

Leclercq, J. 1954. Monographie systématique . . . des hyménoptères crabroniens. Liège. P. 21.

Maneval, H. 1939. Ann. Soc. Ent. France, 108: 55–57.

Pate, V. S. L. 1938. Trans. Amer. Ent. Soc., 64: 119.

Williams, F. X. 1929. Proc. Hawaiian Ent. Soc., 7: 318–329.

——. 1942. Proc. Hawaiian Ent. Soc., 11: 221–233.

Notes on Neodiprion swainei Middleton in Minnesota (Hymenoptera: Diprionidae)

By Rudolph T. Franklin, Division of Plant Industry, State of Minnesota, University of Minnesota, St. Paul 1, Minnesota

Wallace and Sippell (1958) reported believing Swaine's jack pine sawfly, *Neodiprion swainei* occurs throughout the range of jack pine, *Pinus banksiana* Lamb.

The author, John Kroeber, and Jacob Liche, on August 19, 1958, while examining jack pine stands in the Chippewa National Forest, near Cass Lake, Minnesota, collected a sawfly with which we were not familiar. It was later determined by D. R. Wallace to be *N. swainei*. This is the first record of this sawfly in Minnesota.

Later surveys extended the area of known distribution to Hubbard County (Nevis) and Crow Wing County (Brainerd), Minnesota. We can assume from this rather extensive distribution and its occurrence in Ontario that the sawfly is present throughout much of the jack pine area of Minnesota.

References

Wallace, D. R., and W. L. Sippell. 1958. Jour. Econ. Ent., 51 (2): 125.

Ethological Observations on Some Bees of Southeastern Arizona and New Mexico (Hymenoptera: Apoidea)

By E. G. Linsley and P. D. Hurd,[1] University of California, Berkeley

Bees Associated with *Mentzelia pumila*

Among the more striking cases of physiological and ethological adaptations of bees to their pollen source, is the synchronization of their diurnal activity with special times of pollen availability. Linsley (1958) has reviewed some examples among the crepuscular, nocturnal, and matinal bees, especially those associated with flowers of Onagraceae and Cucurbitaceae. He also records the observations of P. H. Timberlake that *Perdita* species of the *wootonae* group collect pollen from *Mentzelia* (Loasaceae) near sundown in Arizona and New Mexico during the fall, in the middle of the afternoon at Blythe, California, in April, when the flowers apparently open earlier in the day.

In the first week of September, 1958, we had an opportunity to observe the behavior of bees associated with *Mentzelia pumila* (Nutt.) T. & G.[2] growing along the roadway, six miles east of Portal, Cochise County, Arizona. At this season, the *Mentzelia* plants were coming into bloom at about 3:40 p.m. MST. Subsequently they were visited for pollen by at least 10 species of bees.[3] The majority of these, although present on each of several evenings, were not numerous, and probably took advantage of the available *Mentzelia* pollen after working other sources during the remainder of the day. Included in this group were: *Anthophora urbana* Cresson, *A. californica* Cresson, *Agapostemon angelicus* Cockerell, *Lasioglossum pruinosiforme* (Craw-

[1] The authors are indebted to M. A. Cazier, Director, Southwestern Research Station, Portal, Arizona, for making the facilities of the Station available as a base for the studies here reported and for other related projects.

[2] The plant identifications used in this paper were kindly made by Helen K. Sharsmith, University of California Herbarium, Berkeley.

[3] Identifications of the bees were made or confirmed by P. H. Timberlake, Citrus Experiment Station, University of California, Riverside.

ford), *L. microlepoides* (Ellis), *L. sisymbrii* Cockerell, *Melissodes paroselae* Cockerell, *M. tristis* Cockerell, etc. Two species of *Bombus, B. sonorus* Say and *B. nevadensis nevadensis* Cresson, although polylectic like some of the other bees mentioned, did show a special interest in *Mentzelia* and were observed trying to force the flowers open at various times of day. However, three species of solitary bees appeared to have a definite association and synchronization in their diurnal activity with the daily blooming period of the *Mentzelia* flowers. These were *Anthophora montana* Cresson, *Anthidium porterae* Cockerell, and *Perdita mentzeliae* Cockerell. Observations on the behavior of each of these were made as follows:

Anthophora montana Cresson, in early September was represented at the flowers only be females. These were occasionally seen during the day taking nectar from *Asclepias, Monarda, Helenium,* and other flowers but were not observed gathering pollen from any plants but *Mentzelia.* These bees begin to arrive in the area shortly before the *Mentzelia* flowers open, pausing for nectar on other plants while waiting, and begin to gather *Mentzelia* pollen as soon as it is available. They are aggressive toward the other bees, especially *Anthidium* and *Bombus* and chase them off and away from the flowers with physical contact and sometimes pursuit. They also flew up about the head and face of the observer but did not attack. When approaching a flower they do so with the tongue extended. They tend to poise, hovering in front of a flower, work it two or three times from this position, and then move to another blossom. They are very active and produce a humming sound while flying and collect pollen until after sunset.

Anthidium porterae Cockerell was represented by both sexes, and since the flowers were the site of mating, males arrived before the flowers opened and waited for the females. The latter were about equally abundant with the *Anthophora* and were active about equally long. Mating took place while the females were gathering pollen and usually lasted for about half a minute with the female remaining quiescent. Mating pairs were seen throughout the period of female activity, suggesting that individuals may mate more than once. Males not only pounced upon female *Anthidium,* but also upon *Anthophora* and *Bombus* and appeared to exert a disturbing influence on pollen collecting activities but probably no more so than the aggressiveness of female *Anthophora.* The nesting habits of this species have been described by Hungerford and Williams (1912), Hicks (1926), and Custer and Hicks (1927).

Perdita mentzeliae Cockerell, appeared among the *Mentzelia* flowers considerably later than the larger bees and were more difficult to observe. Both sexes were present on the flowers but no mating pairs were seen.

The activity observed about the flowers on the afternoon of September 2, 1958, was as follows:

3:35 p.m.	Scattered clouds but warm and bright. Flowers closed.
3:41 p.m.	Few *Anthidium* and *Anthophora* flying among the plants. First flowers beginning to open.
3:48 p.m.	Large numbers of *Anthidium* and *Anthophora* flying among the flowers and making a clearly audible hum as a group. Many flowers now opening and first females of *Anthidium* and *Anthophora* taking pollen along with workers of both species of *Bombus.*
4:10 p.m.	Approximately 20 per cent of flowers open, remainder mostly flaring. Bees about same level of abundance.
4:15 p.m.	*Perdita* evident. Female *Anthophora* noted chasing *Anthidium* away from flower being visited by former. *Anthophora* appear more numerous.
4:20 p.m.	Approximately 40 per cent of flowers open. Activity of *Anthophora* and *Perdita* increased.
4:22 p.m.	Open flowers increasing in number. Mating pair of *Anthidium* commenced with buzz at union, remained quiescent and in copulo for 40 seconds during which female cleaned mouthparts, then separated rapidly and flew in opposite direction.

4:25 p.m.	Approximately 60 per cent of flowers open and some individual plants with all flowers open. *Anthophora* very abundant.
4:27 p.m.	*Anthidium* pair mated on flower for 35 seconds from union to separation, the female cleaning mouthparts as noted previously.
4:35 p.m.	Thin overcast partially obscuring sun. *Anthidium* pair mating in same pattern for 29 seconds.
4:45 p.m.	Female *Anthophora* chased off female *Anthidium* from flower several times. Another mating pair of *Anthidium* observed—the time 36 seconds, the female taking nectar.
4:50 p.m.	Mating of *Anthidium* initiated on flower but pair fell to ground and completed act in 30 seconds.
4:52 p.m.	*Anthophora* female pursued *Bombus* for from 25 to 30 ft. Another seen chasing a female *Anthidium*, a male of the latter not pursuing *Bombus*.
5:00 p.m.	First female *Agapostemon* seen taking pollen, another at 5:03 p.m. *Anthophora* flew up to investigate observer. Male *Anthidium* contacted *Bombus* then took off to pursue female *Anthidium*. Several mating pairs seen, one timed at 31 seconds. One female *Anthidium* followed observer for from 35 to 40 seconds.
5:03 p.m.	Sun almost completely hidden by overcast.
5:08 p.m.	Male *Anthidium* pounced on back of female *Anthophora* but took off again quickly.
5:15 p.m.	Male *Anthidium* knocked large *Bombus sonorus* worker to ground twice, another pounced on a female *Melissodes*.
5:22 p.m.	Clouds break but sun nearly setting. Female of *Zodion obliquefasciatum* seen in pursuit of *Anthophora*. Male *Anthidium* pounced on female *Anthophora*, another knocked *Bombus* to ground but latter returned to same plant and resumed collecting pollen. A second male *Anthidium* struck the same bumblebee without chasing it away from the plant.

5:30 p.m. *Melissodes* now also taking pollen as is *Agapostemon* and numerous *Perdita*. Male *Anthidium* attempted copulation with female on flower but was frightened away. Female lay on her side in flower for several seconds, then flew off.

5:40 p.m. Sun setting. *Anthidium* mating, *Bombus, Agapostemon, Melissodes, Anthophora* all taking pollen, but latter in smaller numbers than earlier. Some new flowers beginning to open near tips of branches.

5:45 p.m. Another *Anthidium* pair mating.

5:47 p.m. Large flurry of *Anthophora* activity. Wind gusty and light growing weaker. Thunderclouds building up.

5:52 p.m. New flowers still opening. Mating *Anthidium* observed. *Perdita* becoming scarce.

5:56 p.m. No *Perdita* evident.

6:00 p.m. *Anthidium* still abundant. *Bombus* active.

6:07 p.m. Mating *Anthidium*.

6:08 p.m. Beginning to rain but *Anthidium* and *Anthophora* still taking pollen in spite of large drops falling.

6:12 p.m. Bees left flowers suddenly as intensity of storm increased.

Matinal Bees at Granite Pass, New Mexico

On August 22, 1958, Granite Pass, Hidalgo County, New Mexico, was visited in search of bees active at dawn. When we arrived it was still dark and a cold wind was blowing. There had been a heavy rain during the night and the ground was soaked and the vegetation wet. Nevertheless, we could hear bees noisily flying about. When it was light enough to see, these proved to be females of *Centris caesalpiniae* Cockerell visiting *Kraemeria* for nectar, and males of *Caupolicana yarrowi* (Cresson) and females of *Martinapis luteicornis* (Cockerell) visiting *Larrea divaricata* Cav. for nectar and pollen respectively. In spite of the cold temperature the bees were very active, flying fast, and difficult to capture.

Mating Habits of *Dianthidium*

Dianthidium ulkei perterritum Cockerell was very abundant near Portal, Cochise County, Arizona on flowers of *Haplopappus gracilis* (Nutt.) Gray, *Aster tanacetifolius,* HBK., *Helianthus* and *Heterotheca subaxillaris.* Mating pairs were observed on the flowers throughout the day on August 17, 1958, between 9:55 a.m. MST and 3:20 p.m. when it clouded up for a thunderstorm. One pair was timed at 163 seconds from contact to separation. During copulation the female stopped collecting pollen but rotated slowly extracting nectar from each nectary. The male performed a continuous pumping motion with the abdomen and as soon as this ceased the pair separated and flew off in opposite directions. The mating habits of *Dianthidium curvatum sayi* Cockerell have been described by Custer and Hicks (1927). This species mates for a somewhat shorter period of time (60–65 seconds), at both the nest site and on flowers, and one female was seen to mate twice in three days.

Literature Cited

Custer, C. P., and C. H. Hicks. 1927. Nesting habits of some anthidiine bees. Biol. Bull., 52: 258–277.

Hicks, C. H. 1926. Nesting habits and parasites of certain bees of Boulder County, Colorado. Univ. Colorado Studies, 15: 217–252.

Hungerford, H. B., and F. X. Williams. 1912. Biological notes on some Kansas Hymenoptera. Ent. News, 23: 241–260, pls. 14–16.

Linsley, E. G. 1958. Ecology of solitary bees. Hilgardia, 27: 543–599.

Undescribed Species of Crane-Flies from the Western United States and Canada (Dipt.: Tipulidae). Part XX

By Charles P. Alexander, Amherst, Massachusetts *

The preceding part under this general title was published in Entomological News, 70: 47–54. The majority of the species considered at this time were taken by the writer, chiefly in California. A few further species from other sources are acknowledged in the text. All types of new species and subspecies are retained in my personal collection.

Tipula (Yamatotipula) tenuilinea new species

Allied to *albocaudata;* mesonotal praescutum grayish brown, with four scarcely differentiated grayish brown stripes that are very narrowly margined by medium brown to form six narrow lines; wings weakly tinged with brown, stigma dark brown, conspicuous; abdominal tergites with two pale brown stripes, very narrowly separated by a yellow median line, outer segments darkened; male hypopygium with the apex of the outer dististyle truncated, the lower margin dilated at near midlength; inner style with the beak and outer basal lobe subequal in size and appearance.

♂. Length about 17–19 mm.; wing 16.5–19 mm.; antenna about 5.5–6.5 mm.

Frontal prolongation of head obscure yellow, including the elongate nasus; palpi light brown, terminal segment darker. Antennae relatively long, as shown by the measurements; scape, pedicel and basal half of first flagellar segment yellow, remainder of organ brownish black; flagellar segments moderately incised. Head gray, more whitened on front and anterior part of vertex; posterior vertex with a brown central area, the sides, with the genae, clouded with darker.

* Contribution from the Entomological Laboratory, University of Massachusetts.

I am greatly indebted to the National Science Foundation for financial assistance in conducting field studies in California in 1957.

Pronotum pale, vaguely patterned with darker. Mesonotal praescutum with the ground light gray or grayish brown, with four scarcely differentiated gray or grayish brown stripes that are very narrowly margined with medium brown, forming six narrow lines, with indications of a still further central vitta; scutum gray, the lobes patterned with brown, the smaller anterior area darker; scutellum buffy, parascutella testaceous; postnotum pale gray. Pleura almost uniformly light gray; dorsopleural membrane pale yellow. Halteres with stem brownish yellow, knob infuscated. Legs with coxae light gray; trochanters yellow; femora yellow, tips narrowly but conspicuously blackened, the amount subequal on all legs; tibiae yellowish brown, tips very narrowly and inconspicuously darker; tarsi brown, claws simple. Wings weakly tinged with brown, prearcular and costal fields, especially cell *Sc*, more yellowed; stigma large, dark brown, conspicuous; anterior cord, *m-cu* and distal section of *Cu* narrowly seamed with brown; central part of disk, especially cell *M*, paler than remainder of ground; veins brown, more yellowed in the brightened fields. Venation: Petiole of cell M_1 variable in length, in cases very short.

Abdominal tergites chiefly covered by two broad pale brown stripes that are very narrowly separated by a yellow median line; sternites more yellowed; outer segments, especially eight and nine, more darkened. Male hypopygium with the posterior border of the ninth tergite produced into an elongate median lobe that is split for approximately one-half its length into two lobules, their apices with blackened points. Outer dististyle elongate, pale, truncated at apex, lower margin beyond midlength strongly dilated; base and posterior margin on more than the proximal half with very long and conspicuous black setae, these pale and inconspicuous on outer half. Inner dististyle complex, the beak and outer basal lobe of somewhat similar shape and size, the latter somewhat longer, densely covered with setulae; dorsal crest forming an irregular obtuse lobe, not appearing as a spinous point, as in *edmundsi*, outer part with a row of short setae, near base with a row of short setae, still nearer base with several longer setae from strong basal tubercles.

Habitat. Western United States. *Holotype:* ♂, Castle Crags State Park, Shasta County, California, 2,000 feet, July 5, 1953 (Alexander). *Paratypes:* ♂, Pullman, Washington, June 6, 1907 (Melander), determined as *cognata* by Melander; ♂, Odell Lake, Klamath County, Oregon, August 6, 1948 (Alexander); ♂, Intake Camp, Bishop Creek, Inyo County, California, 8,000 feet, July 8, 1957 (Alexander); ♂, Zion National Park, Washington County, Utah, May 13, 1936 (B. E. Rees).

The Utah record had previously been recorded as being *cognata* (Alexander, Amer. Midl. Nat., 39: 20; 1948); the Oregon specimen also as being *cognata* (Alexander, l.c., 51: 27; 1954). In the 1948 paper, the male hypopygium had been figured, under the name *cognata.* It can be seen that the present fly has been confused under the name *Tipula (Yamatotipula) cognata* Doane, 1901, to which it is closely allied. Of the four most similar regional species, *T.* (*Y.*) *cognata* and *T.* (*Y.*) *edmundsi* Alexander, have the praescutal pattern generally alike, differing markedly from that of *T.* (*Y.*) *albocaudata* Doane and the present fly, which are approximately similar to one another in this respect. All four flies differ further from one another in the details of structure of the male hypopygium.

Tipula (Oreomyza) cylindrata barda new subspecies

♂. Length about 13 mm.; wing 14 mm.; antenna about 4 mm.

Close to typical *cylindrata* Doane, differing in slight details of the male hypopygium. Ninth tergite with the lateral lobes much more broadly truncate, the median notch wider, on either side produced into a low blackened lobe, so that the general outline of the posterior emargination appears as shallow lateral notches and a deeper central one. In *cylindrata,* the lateral tergal lobes are narrow, the posterior emargination shallow, with a deep and narrow median notch, the lateral lobes on sides of the median notch lacking. Vestiture of outer basal lobe of inner dististyle relatively short and dense, black; in the typical race longer and yellow.

Habitat. California. *Holotype:* ♂, Tub Canyon, Borrego State Park, San Diego County, 1,100 feet, March 23, 1947 (Crickmer).

I am indebted to my long-time friend, Noël Crickmer, for many interesting crane-flies from Borrego.

Tipula (Lunatipula) filamentosa new species

Belongs to the *unicincta* group; size large (wing of male 22 mm.); mesonotal praescutum brownish gray with four conspicuous dark brown stripes, the humeral and lateral borders broadly paler brown; tips of femora narrowly blackened; wings grayish brown, vaguely patterned with darker brown and subhyaline; male hypopygium with the tergite produced into two narrow lobes, the divergent tips subacute; phallosome with a small unpaired gonapophysis that divides at apex into two slender needlelike points, the paired apophyses appearing as longer simple rods; eighth sternite conspicuously ornamented with hair brushes and groups, including a major fasciculate seta at apex of each lateral lobe; median area with an anterior central cushion with relatively few setae that are expanded at tips into pale blades, each further produced into five or six hairlike filaments.

♂. Length about 20 mm.; wing 22 mm.

Frontal prolongation of head elongate, fully equal to remainder of head, dark brown above, including the short nasus, obscure yellow or brownish yellow at base and sides; palpi black. Antennae with scape and pedicel obscure yellow, basal flagellar segments bicolored, brownish black on proximal ends, the outer half obscure yellow, on about the fourth segment becoming uniformly darkened; basal enlargements small; verticils subequal to the segments. Head brownish gray, clearer brown behind; vertical tubercle low and inconspicuous; sides of vertex with conspicuous setae, the posterior ones more delicate.

Pronotal scutum light brown, with conspicuous black setae; scutellum light yellow. Mesonotal praescutum brownish gray, with four conspicuous dark brown stripes, the intermediate pair narrower than the central interspace; lateral stripes narrow, widely separated from the intermediate pair; humeral region and lateral borders broadly paler brown; pseudosutural fovea a small circular depression; scutum brownish gray, restrictedly more yellowed at midline, each lobe patterned with brown; scutellum brownish gray; mediotergite obscure brownish yellow behind, vaguely more darkened in front. Pleura chiefly brown, darker on the anepisternum, paler on the meron. Halteres with stem brown, narrowly yellow at base, knob darker, obscure yellow at tip. Legs with the coxae light brown; trochanters obscure yellow; femora obscure yellow, tips narrowly but conspicuously black, the amount subequal on all legs; tibiae obscure yellow, tips more narrowly dark brown; tarsi brownish yellow, outer segments passing into dark brown; claws of male conspicuously hairy, toothed. Wings with the ground pale grayish brown, vaguely patterned with darker brown and subhyaline; darker areas include the very small stigma and a seam over *m-cu* and adjoining parts of vein *Cu*; less evident darkenings at arculus and at outer end of vein *2nd A*; the pale marks include the obliterative area, costal field, narrow seams along veins *R and M*; narrow pale streams at and near the Anal veins; veins brown to brownish yellow. Venation: Petiole of cell M_1 subequal to *m*; M_{3+4} subequal to basal section of M_{1+2}.

Abdomen obscure brownish yellow, tergites with very interrupted median and lateral stripes, on the intermediate segments almost restricted to the basal rings; hypopygium obscure brownish yellow. Male hypopygium with the elongate tergite narrowed posteriorly, the caudal margin with a narrow U-shaped median notch and two narrow lobes with slightly divergent subacute tips; a conspicuous dorsal furrow. Ninth sternite with a short massive lobe, its outer dorsal part produced into a knob that is tipped with a brush of reddish setae. Outer dististyle spatulate at outer end. Inner style with the beak more slender than the obtuse blackened lower beak; dorsal crest conspicuous, greatly produced backward, ending opposite or beyond the level of the obtuse outer basal lobe. Phallosome with a pair of simple elongate gonapophyses and an unpaired median one that is only about one-half as long, appearing as a depressed-flattened blade that divides at apex into two slender needlelike points, the apical notch U-shaped. Eighth sternite large and sheathing; lateral lobes stout, each tipped with a very powerful fasciculate bristle; inner margin of lobe with numerous tubercles that bear strongly recurved simple setae; median area with a more cephalic densely setiferous area that is provided with long simple reddish bristles and a low outer central cushion that bears relatively few long modified setae, each dilated at apex into a pale triangular blade that is farther produced into five or six long hairlike filaments.

Habitat. CALIFORNIA. *Holotype:* ♂, Glacier Lodge, Big Pine Creek, Inyo County, 7,800 feet, July 10, 1957 (Alexander). On dry sage-covered hillsides, associated with *Tipula* (*Lunatipula*) *leiocantha* Alexander and *T.* (*L.*) *mono* Alexander.

Allied species having an unpaired expanded or forked gonapophysis in the male phallosome include *Tipula* (*Lunatipula*) *bigeminata* Alexander, *T.* (*L.*) *diacanthophora* Alexander, *T.* (*L.*) *sagittifera* Alexander, and *T.* (*L.*) *spatha* Doane, all distinct from the present fly in the shape of the gonapophysis and armature of the eighth sternite.

Limonia (Dicranomyia) melanderi tharpiana new subspecies

♂. Length about 6–6.5 mm.; wing 6–6.5 mm.

Characters as in the typical form, from Idaho, differing chiefly in characters of the male hypopygium. Basistyle with the outer fingerlike lobe stronger. Apex of rostrum of ventral dististyle short, narrowed outwardly, subequal to or only a little longer than the rostral spine. Gonapophysis with mesal apical lobe short, more or less triangular in outline, quite different from the condition in the typical race where they are long and sinuous.

Habitat. CALIFORNIA. *Holotype:* ♂, Sequoia National Park, Log Meadow, Tulare County, July 19, 1946 (Alexander). *Paratopotypes*, ♂♂, Dorst Camp Ground, Sequoia National Park, 6,800 feet, July 19, 1946, July 18, 1957 (Alexander); Hatchet Pass, Burney, Shasta County, 4,000 feet, July 9, 1947 (Alexander); Eureka Valley Forest Camp, Middle Fork of Stanislaus River, Tuolumne County, 6,100 feet, June 28, 1957 (Alexander).

The subspecies is dedicated to Hale Tharp, who discovered and named the "Giant Forest" of Sequoia National Park in 1858.

Dicranota (Plectromyia) reducta tehamicola new subspecies

♂. Length about 4.5–5 mm.; wing 0.8–1.5 mm.

♀. Length about 4.5–5.5 mm.; wing 0.8–1.5 mm.

Fully-winged individuals—Length 4.5–5 mm.; wing 6–6.5 mm. Intermediate stenopterous specimens—Wing 2–2.3 mm.

Generally similar to *reducta* Alexander and considered as representing a race of the same. General coloration of thorax yellow, more or less pruinose, the mesonotum infuscated medially. Wings greatly reduced in both sexes, as shown by the measurements; in a small proportion of individuals, fully-winged specimens and others with wings intermediate in length occur. Male hypopygium generally as in typical *reducta*. Ninth tergite with the median lobe parallel-sided, its apex weakly emarginate; lateral tergal arms projecting caudad beyond the level of the apex of the median lobe, expanded into a weak head. Basistyle with both apical spines of the interbases slender, slightly unequal in length. Dististyle with basal half narrower than in reducta.

Habitat. CALIFORNIA. *Holotype:* ♂, Kings Creek Meadows, Lassen Volcanic National Park, Shasta County, 7,500 feet, July 7, 1947 (Alexander). *Allotopotype:* ♀. *Paratopotypes:* Several of both sexes, July 6–7, 1947, July 21–23, 1950 (Alexander).

The subspecific name is derived from Tehama, the Indian name for Mount Lassen.

Hexatoma (Eriocera) dayana new species

Allied to *velveta;* size small (wing of male less than 10 mm.); antennae short, outer two segments reduced, their combined length less than one-half the stouter antepenultimate segment; mesonotal praescutum with four black stripes, the intermediate pair narrowly separated; praescutal vestiture sparse and pale; legs black, femoral bases broadly yellow; wings brownish yellow, patterned with darker brown, including the costal border and wing tip; *Rs* relatively short, inner end of cell *1st* M_2 not arcuated; outer radial branches with macrotrichia; abdomen black, lateral borders narrowly brownish yellow; hypopygium small, dark reddish brown.

♂. Length about 10 mm.; wing 9.5 mm.; antenna about 3 mm.

Rostrum and palpi black. Antennae of male short, as shown by the measurements, black throughout; 8-segmented, outer two segments reduced, the ultimate a little longer, the two combined less than one-half the length of the stouter antepenultimate; vestiture of the four enlarged flagellar segments consisting of strong setae, those of the lower face more numerous than in *dorothea*. Head brownish black, sparsely pruinose; vertical tubercle small; vestiture including stouter black proclinate bristles and pale slender setae.

Pronotum black, sparsely pruinose. Mesonotal praescutum light gray, with four conspicuous black stripes, the intermediate pair narrowed posteriorly, not reaching the suture, lateral stripes polished; praescutum with very sparse pale setae on the interspaces only; scutum gray, scutal lobes extensively brownish black, bordered by paler brown, suture polished black; posterior sclerites of notum sparsely pruinose, the posterior half of mediotergite black. Pleura and ventral half of pleurotergite heavily light gray pruinose; dorsopleural membrane brown. Halteres with stem yellowish brown, knob dark brown. Legs with coxae light gray; trochanters yellowish brown; remainder of legs black, the femoral bases conspicuously yellow, involving about the proximal three-fifths of the segment. Wings with the ground brownish yellow, conspicuously patterned with darker brown, including cells *C* and *Sc*; other dark areas include the stigma, seams at origin of *Rs*, cord and outer ends of anal veins; other paler darkenings include the broad wing tip and seams over most of the veins, restricting the ground to the centers of the cells; veins dark brown. Outer radial branches with macrotrichia, including both sections of R_5, more numerous at near midlength of the sections, lacking at the outer ends. In *dorothea,* the trichia of veins beyond cord very sparse, occurring as short series on both sections of R_5. Venation: *Rs* evidently shorter than in *dorothea,* only a little longer than vein R_4; inner end of cells *1st* M_2 not arcuated, the cell subequal to the distal section of vein M_{1+2}: *m-cu* and distal section of Cu_1 subequal.

Abdomen black, subnitidous, lateral borders narrowly brownish yellow; hypopygium small, dark reddish brown.

Habitat. CALIFORNIA. *Holotype:* ♂, Waddell Creek, Santa Cruz County, May 19, 1951 (W. C. Day).

This distinct fly is named for the collector, Mr. William C. Day, student of the Ephemeroptera. It is readily told from other species that are allied to *Hexatoma* (*Eriocera*) *velveta* (Doane) by the pattern of the wings, including the darkened costal border. The most similar species, in nature of leg pattern, is *H.* (*E.*) *dorothea* Alexander, of Oregon, which differs in details of size, structure of the antennae, trichiation of the wing veins, and in other characters that are indicated in the description.

Rhabdomastix (Sacandaga) megacantha new species

General coloration yellow: mesonotal praescutum, scutum and pleura patterned with brown, antennae short, flagellum black; legs pale brownish yellow; wings subhyaline, outer veins with conspicuous macrotrichia; vein R_3 perpendicular; *m-cu* only a short distance beyond the fork of *M*; abdomen yellow, the segments with basal brown rings; male hypopygium with the apical spine of the outer dististyle large, decurved; gonapophysis with outer end slightly expanded, the tip subacute.

♂. Length about 5.5 mm.; wing 6.5 mm.; antenna about 1 mm.

Rostrum yellow; palpi brownish black. Antennae with scape yellow, pedicel testaceous, flagellum brownish black to black; basal two flagellar segments fused, succeeding ones oval, the outer segments more elongate, a little shorter than the verticils. Head clear light yellow.

Pronotum yellow. Mesonotal praescutum almost covered by three reddish brown stripes, the ground color yellow, interspaces narrow; pseudosutural foveae reddish brown, inconspicuous; posterior sclerites of notum yellow, scutal lobes extensively reddish brown. Pleura chiefly yellow, variegated on ventral sternopleurite and meron by reddish brown areas. Halteres pale, knob clear light yellow. Legs with coxae yellow, trochanters more obscure yellow; remainder of legs pale brownish yellow to light brown, the outer tarsal segments slightly darker. Wings subhyaline, prearcular and costal fields more yellowed; veins pale brown. Macrotrichia on veins beyond cord, including R_4, all of distal sections of R_5 and M_{1+2}, more restricted on M_3 and M_4. Venation: *Sc* long, Sc_1 ending about opposite two-thirds the length of the long *Rs*, Sc_2 apparently atrophied; vein R_3 perpendicular, separated from R_{1+2} at margin by a distance a little less than its own length; vein R_4 nearly as long as R_{2+3+4}, very gently arcuated; cell *1st* M_2 gently widened outwardly; *m-cu* unusually far basad, about one-third to one-fourth its length beyond the fork of *M*; cell *2nd A* pointed at outer end.

Abdomen yellow, segments with a narrow but conspicuous brown basal ring; hypopygium yellow. Male hypopygium with the spines of outer margin of outer dististyle relatively few but conspicuous, the terminal spine very large, decurved; inner style strongly narrowed at tip. Gonapophysis relatively stout, the slightly expanded elongate apical blade subacute at tip.

Habitat. California. *Holotype:* ♂, South Fork of Kings River, Kings Canyon National Park, Fresno County, 4,500 feet, July 20, 1957 (Alexander).

The most similar regional species is *Rhabdomastix* (*Sacandaga*) *trichophora* Alexander, which differs especially in the venation and in the structure of the male hypopygium, particularly the dististyles. Associated crane-flies along the Kings River included *Pedicia* (*Tricyphona*) *aperta* (Coquillett), *Dicranota* (*Rhaphidolabis*) *querula* Alexander, *Erioptera* (*Arctoconopa*) *cinctipennis* Alexander, *E.* (*Psiloconopa*) *bisulca* Alexander, and *Molophilus* (*Molophilus*) *perflavcolus* Alexander.

Biting Midges (Culicoides spp.) from Catbird Nests at London, Ontario

By W. W. Judd, Department of Zoology, University of Western Ontario, London, Ontario

In two communications recently published (Judd, 1954, 1957) accounts were given of the occurrence of biting midges, *Culicoides* spp., in nests of catbirds, *Dumetella carolinensis,* at London, Ontario. The presence of these flies in two separate nests in two different years, 1953 and 1955, indicated that there might be an habitual relationship between *Culicoides* and the catbird, especially in view of the fact that the flies in one nest (Judd, 1954) were engorged with blood. Accordingly, an opportunity was taken in 1958 to examine more nests of catbirds in London to see if *Culicoides* occurred in them.

The site in which the catbirds nested in 1958 was an abandoned brickyard in northeast London about three miles east of the localities in which *Culicoides* were found in nests previously. The brickyard is about twelve acres in area and is bounded by Cheapside, Taylor, Victoria and Adelaide Streets, all these streets having houses on them with their backyards extending toward the interior of the brickyard. The brickyard is overgrown with trees, weeds and shrubs which provide nesting sites for birds and at its lowest point, near the centre, there is a small cat-tail marsh occupied by *Typha angustifolia* and fed by a meagre stream which flows sluggishly through black muck into the marsh. Three catbird nests were found in the brickyard and after the succession of egg-laying and hatching had been followed and the young birds had left the nests, the nests were collected and insects were removed from them.

1. This nest was four feet from the ground in a raspberry bush. Four eggs were laid successively on May 19, 20, 21 and 22. By June 9 there were four young birds in the nest and they had left by June 16. No flies were found in the nest.

2. This nest was four feet from the ground on top of the stub of a willow tree about 5 inches in diameter and was sheltered

by overarching vines. Four eggs were laid successively on May 20, 21, 22 and 23. There were four young birds by June 9 and they had left by June 16. No flies were found in the nest.

3. This nest was four and a half feet from the ground in a bush of twin honeysuckle. Three eggs were laid successively on May 22, 23 and 25. There were three young birds by June 9. One bird left the nest on June 16 and the other two on June 17. When the nest was collected on June 17 two biting midges, engorged with blood, were found in the debris in the bottom of the nest. The two midges are retained in the collections of the Department of Zoology, University of Western Ontario.

The midges were identified by Dr. W. W. Wirth, Entomology Research Branch, U. S. Department of Agriculture, one as *Culicoides haematopotus* Mall. and the other as *C. biguttatus* (Coq.). Both these species occur commonly in eastern North America (Foote and Pratt, 1954; Coher *et al.,* 1955). A likely breeding place for the flies was the mud along the stream which passed a few yards west of the bush in which the nest yielding the midges was built. Wirth and Bottimer (1956) report rearing *C. haematopotus* in particular from mud at pond and stream margins.

References

Coher, E. I., W. W. Wirth and H. Knutson. 1955. Mosquito News 15: 153–155.

Foote, R. and H. D. Pratt. 1954. Public Hlth. Monogr. No. 181: 1–53.

Judd, W. W. 1954. Can. Field-Nat. 68: 122–123.

——. 1957. Entomol. News 68: 32–34.

Wirth, W. W. and L. J. Bottimer. 1956. Mosquito News 16: 256–266.

Collembola from Pennsylvania

By Harold George Scott [1]

Between December 1948 and August 1959, observations were made on two species of springtail insects occupying soil at the base of a locally potted commercial *Poinsettia pulcherrima* at Philadelphia, Pennsylvania. The plant was heavily infested with the citrus mealybug, *Planococcus citri* (Risso) (Hemiptera, Coccidae). The Collembola involved were both from the suborder Arthropleona, family Entomobryidae. Specimens will be deposited at the Academy of Natural Sciences, Philadelphia, Pennsylvania.

Subfamily Isotominae Schaffer

Spinisotoma (Frisonia) veca Wray, 1952

The Pennsylvania specimens agree with the description by Wray (1952) except that they are larger. Wray reports 0.8 mm. length, but many of the Pennsylvania specimens reach 1.0 mm.

Distribution. Ill., Penna. This species has not been recorded previously from Pennsylvania.

Subfamily Entomobryinae Schaffer

Entomobrya atrocincta Schott, 1896. Figure 1

A great deal of confusion has existed regarding the species of this genus for many years. For this reason the following diagnosis is presented.

Diagnostic Characteristics. Elongate, segmentation distinct; setae present, scales absent; integument smooth; white to yellow with brown, blue, purple or black dorsal and lateral spots, bands or both; antenna $2\frac{1}{2}$ times length of head; eyes 8

[1] Training Branch, Communicable Disease Center, Bureau of State Services, Public Health Service, U. S. Department of Health, Education, and Welfare, Atlanta, Georgia.

and 8 on dark eyepatches; prothorax reduced, naked dorsally; without double row of smooth bristles on inside of tibiotarsus; 1 tenent hair; inner edge of unguis split longitudinally; unguis with 1 outer, 2 lateral, and 6 marginal teeth; unguiculus slender, lanceolate, untoothed; Abd IV 4–5 times III; dentes dorsally crenulate; mucro with apical teeth, anteapical spine, and basal spine; length 2 mm.

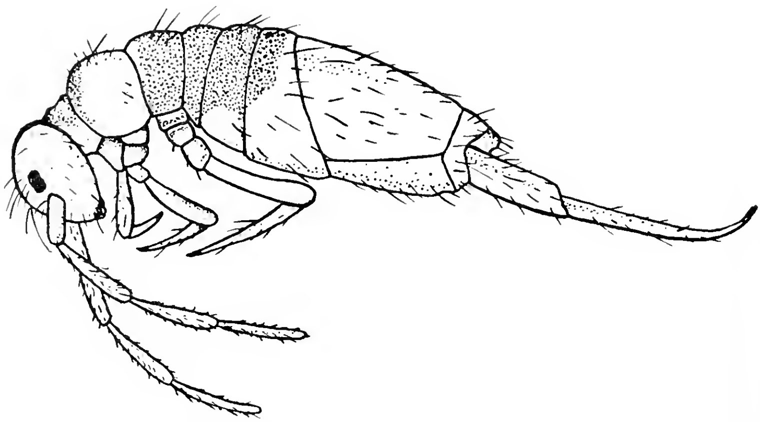


Fig. 1. *Entomobrya atrocincta* color form *clitellaria*.

Distribution. Cal., Ill., Iowa, Md., Mass., Minn., N. Y., Penna., Utah, Ontario (Canada), Europe, South America, Australasia.

Discussion. This species, a common household insect, is divided into seven color forms by Maynard (1951, pp. 145–155). The Philadelphia specimens approximate Maynard's *Entomobrya atrocincta* f. *clitellaria* (= *Entomobrya clitellaria* Guthrie, 1903) (Fig. 1). This form has not been reported previously from Pennsylvania, but Maynard (1951) took three other forms of the species (f. *albicollis*, f. *atrocincta*, and f. *nigrocincta*) by sweeping honeysuckle in July at Heidlersburg, Adams County.

SUMMARY

Two Collembola, *Spinisotoma veca* and *Entomobrya atrocincta* color form *clitellaria*, are reported from soil at the base of a commercial *Poinsettia pulcherrima* at Philadelphia. Both are new records for Pennsylvania.

REFERENCES CITED

GUTHRIE, J. E. 1903. Geol. Nat. Hist. Surv. Minnesota, zool. ser. no. 4, vi + 173 pp.

MAYNARD, E. A. 1951. The Collembola of New York State. Ithaca: Comstock Pub. Co., xxii + 339 pp.

SCHOTT, H. 1896. Proc. California Acad. Sci., ser. 2, 6: 169–196.

WRAY, D. 1952. Bull. Brooklyn Ent. Soc., 47: 95–106.

Centennial Celebration

The celebration of the one hundredth anniversary of the founding of the American Entomological Society will be held on Thursday, March 26th. On that day the Society will have open house at the Academy of Natural Sciences, from 10 o'clock until noon. At one o'clock an informal luncheon will be served in the library of the Academy to members and invited guests, and in the afternoon, at 2:45, there will be a panel discussion, also in the library, on the Rôle of the Smaller Entomological Societies. Participating panelists will be: Mr. Curtis W. Sabrosky, Moderator, Dr. Charles P. Alexander, Dr. Ross H. Arnett, Jr., and Dr. John B. Schmitt.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Conopidae of the World wanted. Will pay 10¢ to $1.00 for pinned and labelled specimens. S. Camras, 4407 N. Milwaukee Ave., Chicago 30, Illinois.

Anisoptera—Nearctic sp. wanted for exchange, espec. Ophiog., Arigom., Aeschna, Neurocor., Somatoc., Cordulia, Dorocor., Leucor. R. D. Cuyler, Dept. of Entomology, N. C. State College, Raleigh, N. C.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Tenebrionidae of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral. San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

Butterflies. Wish to exchange specimens for Japanese species. Please write to Ichiro Nakamura (Boy, age 16), 26 Aza-Nichiyama Obayashi Takarazuka-shi, Hyogo-Ken, Japan.

Phasmidae of nearctic area desired alive. Purchase or trade, drawing on large stock of major orders, worldwide. Domminck J. Pirone, Dept. Entomology, Cornell University, Ithaca, N. Y.

Nitidulidae and Rhizophagidae wanted in exchange for European beetles of all families. O. Marek, Žamberk 797, Czechoslovakia.

ENTOMOLOGICAL NEWS

ENTOMOLOGICAL NEWS is published monthly, excepting August and September, by The American Entomological Society at Prince and Lemon Sts., Lancaster, Pa., and the Academy of Natural Sciences, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

PHILIP P. CALVERT, Editor Emeritus. R. G. SCHMIEDER, Editor. Editorial Staff: H. J. GRANT, JR., E. J. F. MARX, M. E. PHILLIPS, and J. A. G. REHN.

Subscription price, per yearly volume of 10 numbers: Domestic, $5.00; Foreign, $5.30; Canada, $5.15—U. S. Currency.

SUBSCRIPTIONS: Communications and remittances to be addressed to **Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

ADVERTISEMENTS: Rate schedules available on request. Address, **Fred B. Jacobson, Advertising Manager, Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

MANUSCRIPTS and all communications concerning same should be addressed to **R. G. Schmieder, Zoological Laboratory, University of Pennsylvania, Philadelphia 4, Pa.**

The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. Articles longer than eight printed pages may be published in two or more installments, unless the author is willing to pay the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

ILLUSTRATIONS: Authors will be charged as follows: For text-figures, the cost of engraving; for insert plates (on glossy stock), the cost of engraving plus printing. Size limit, when printed, 4 × 6 inches. All blocks will be sent to authors after printing. It is not advisable to print half-tones as text-figures.

TABLES: The cost of setting tables will be charged to authors.

SEPARATA: Members of the American Entomological Society may elect to receive, gratis, 25 offprints of their contributions. These will be "run-of-form," without removal of extraneous matter.

Those members desiring more than 25 separates, and all non-members, will receive no gratis copies. They must obtain all their separates (as reprints, with extraneous matter removed) from the printer at the prices quoted below. Authors must place their order for such separates with the editor at the time of submitting manuscripts, or when returning proof.

Copies	1–4 pp.	5–8 pp.	9–12 pp.	13–16 pp.	17–20 pp.	Covers
50	$3.95	$6.33	$ 9.89	$10.28	$13.44	$4.31
100	4.74	7.51	11.86	12.65	16.21	5.89
Add'l 100	1.58	2.36	3.94	4.74	5.54	3.16

Plates printed one side: First 50, $3.15; Additional 100's, $2.37.

Transportation charges will be extra.

ENTOMOLOGICAL NEWS

Vol. LXX | APRIL, 1959 | No. 4

The Stings of the Harvesting Ant, Pogonomyrmex occidentalis (Cresson), with a Note on Populations (Hymenoptera)

By Neal A. Weber, Swarthmore College, Swarthmore, Pennsylvania

The painful effects of the stings of the harvesting ants of the Western United States have been well known in a general way since the days of the Rev. H. C. McCook, who published an extensive account in 1879 (The natural history of the agricultural ant of Texas. Lippincott's Press, Philadelphia, 311 pp.). Specific records are less common and allergic reactions must always be considered in evaluating the results on any particular human being. Personal effects of the stings of an entirely different ant, *Paraponera clavata* Fabr., have been noted (Amer. J. Trop. Med., 1937, 17: 765–768; Science, 1939, 89, 127–128). There is no evidence at this or any time that I have been allergic to insect venom.

Reactions of the stings of *Pogonomyrmex occidentalis* on six people are given below and were determined from colonies taken at the confluence of the Cannonball and Missouri Rivers, North Dakota, on August 16, 1942. The ants were personally collected and one stung me at 11:05 A.M. on the knee, after climbing up under the trousers. It probably injected a full dose of venom.

A purplish spot was immediately noticed at the site of the sting, doubtless representing a local hemorrhage. A pale edema followed on an erythematous halo. Fifty minutes later, after having kept the knee largely immobilized while driving a car, the edema was elliptical, 20 mm. in maximum diameter, and was in the center of an erythematous halo 37 mm. in diameter. Both disappeared by 1:30 P.M.

That afternoon four people, ages 22 to 28 years (three female, one male), volunteered to try the effects of the stings.

D. C. W. was stung at 2:28 P.M. on the medial surface of the left forearm 2–3 cm. from the wrist. The ant was allowed to sting several seconds. No edema developed by 2:41 but during this period she could feel the pain spreading. A faint erythema developed quickly which at 2:43 was 5 mm. in diameter and pinkish. At 2:58 the whole arm to the fingertips pained in a throbbing fashion and a maculate erythema extended 77 mm. to the base of thumb. At 3:02 wet baking soda (sodium bicarbonate) was placed on the erythema which cooled but did not stop the pain. At 3:09 she described her sensations as an intensely painful throbbing. By 3:35 the soda had dried and the sting "just plain hurts." During the night she felt the sting paining intermittently but by the following noon this had disappeared. A red spot marked the site of the edema.

B. B. C. was stung at 2:53 P.M. on the right third digit of the hand next to the cuticle at the base of the nail. At 2:56 the medial border of the distal joint became edematous and erythematous. It felt "very painful and hot." At 3:01 the entire finger pained and a maculate erythema had appeared over the dorsum. At 3:03 wet baking soda was applied and cooled the finger but the throbbing pain persisted. It was very painful at 3:09. At 3:12 the soda was washed off and concentrated household ammonia applied. This gave temporary relief but only when freshly applied. By 3:21 continuous dull pain to the axilla on the medial surface was felt. The circumference of the distal joint at 3:43 was 54 mm., at 4:00, 57 mm. and by the following noon 52 mm., the normal condition. The sting was described as "throbbing and paining very much" at 4 P.M. and at 9:40 as still paining. By the following noon there was no pain and no external indication of the sting.

M. W. was stung repeatedly on the skin opposite the medial aspect of the right gastrocnemius muscle towards the middle of the leg at 3:06 P.M. The stinging apparatus finally stuck in the skin for two minutes and the ant could not remove it although free to do so. Consequently all available poison must have been injected. A flesh-colored edema 3 mm. in diameter had appeared by 3:12 on the tanned skin. Intermittent pain was felt during the interval. By 3:17 the edema had mostly disappeared. By 3:23 minute edemae had appeared where the stinging apparatus had momentarily pierced the skin and an erythematous halo had developed about all. At 3:33 an area with a diameter of 40 mm. was erythematous only at the bases of hairs but without edema. A "burning sensation" was apparent during the entire period and this became a sharper pain when the area was exposed freely to the air. At 9:20 P.M. the lesion was still paining and the erythematous halo was reported still visible. By noon of the following day an area 30 mm. in diameter was reported erythematous but pain had disappeared.

The reactions of A. M. C., the male and the fourth person, were comparable to those of the others.

The physiologist, Dr. R. V. Brown, later used some of the ants in an experiment on me. His observations follow:

"Five ants were allowed to sting the subject: the locations of the stings formed an approximate circle around the patella. The first sting was given after the following normals were determined: pulse 70, temperature 98.1°, blood pressure 106/76.

Each ant was allowed to sting for about one minute, so as to allow complete injection of its poison. The first ant was applied at 10:26 A.M. The last was removed at 10:33 A.M. Each sting was numbered. The circumference of the knee was 37 cms. at 10:35 A.M.

Diameter of the wheals at 10:38–40: #1—0.6 × 0.6 cm.; #2—0.5 × 0.4 cm.; #3—0.6 × 0.4 cm.; #4—0.6 × 0.8 cm.; #5—0.7 × 0.6 cm. (Two stings were given here, close together.)

The erythematous areas were confluent for all but #4; the area here was 3.0 × 3.5 cms. Diameter of erythematous area was 10.5 cms., measured from the outer edge of the area on #1 to the outer edge of #4.

Diameter of wheals at 10:50 A.M.: #1—2.1 × 1.1 cm.; #2—1.0 × 0.7 cm.; #3—1.4 × 0.8 cm.; #4—1.0 × 0.9 cm.; #5—1.1 × 1.0 cm.

Temperature at 10:50 A.M.—98.2°. At 10:59 A.M. the area of erythema surrounding the two stings of #5 began to sweat profusely. The pulse was 74. At 11:30 A.M. the erythematous area measured 12.0 cms. maximum diameter. By 11:45 A.M. all evidence of wheals had disappeared from all the stung regions except #5. At 12:06 P.M. the pulse was 74."

The circumference of the knee remained the same during an afternoon of moderate exercise. It remained feverish and painful, however, and seemed swollen at times. The following morning (7 A.M.) the circumference of the knee was 38 cm. and at 10:10 A.M. it was 39.8 cm. Twenty-four hours later it was normal.

Dr. Brown allowed one worker to sting him with the following notes as recorded by him:

"One sting on the anterior aspect of the arm, over the tendon of the biceps at 11:01 A.M.

11:03.5 Diameter of erythema—3.5 × 3.5 cms. Diameter of wheal—0.3 × 0.5 cm. (Minute blood-point at the point of entrance of the sting.)

11:16 Diameter of erythema—4.5 × 6.0 cms. Diameter of wheal—0.7 × 0.6 cm.

11:29 Diameter of erythema—5.0 × 5.0 cms.

11:45 Diameter of erythema—5.0 × 5.0 cms.; the wheal had disappeared.

The stung area remained red and painful all afternoon. The sensation was one of a dull throbbing ache, repeating the feeling of the original sting with diminished intensity; there was some slight itching."

It is clear from the reactions of the above six subjects that the sting of one ant is sufficient to cause a marked reaction, whose duration and magnitude depend on the site of stinging and the subject. It is also clear that multiple stings could cause a systemic reaction of some severity.

In a search of the world literature on stinging ants, numerous records have been found which show that various genera and species are involved. Holarctic major genera include *Myrmica* and *Manica,* cosmopolitan genera include particularly *Solenopsis,* pantropical genera are *Leptogenys* and *Odontomachus.* Tropical Asia and Africa have *Tetraponera* and *Dorylus* and Africa has also *Megaponera.* The Neotropical Region has *Eciton, Paraponera, Neoponera* and *Pseudomyrmex.* Australia is noted for its *Myrmecia.* It has been my experience to be stung by all of these.

A Note on *Pogonomyrmex* Populations

The agricultural and general importance of the species of *Pogonomyrmex* in the Western United States have caused them to be the subject of numerous studies and the present monographic treatment by Dr. A. C. Cole. The population of a colony of *barbatus* had been found to be 12,358 adults by Wildermuth and Davis (1931, U.S.D.A. Farmers Bull. 1668).

The nests are sufficiently prominent on the western plains that they may easily be seen from the propeller-type airplanes that are now passing out of the long distance transportation picture. On a flight south from Salt Lake City, Utah, towards Los Angeles on February 17, 1946, the ground, lightly dusted with snow, appeared in places pock-marked by the ant nests. The nests had in previous years been noted from the ground in the same regions and determined as *Pogonomyrmex*, probably *occidentalis.* From something like 5000 feet above the ground the nests appeared in the early morning sunlight as small, dark spots near the centers of many of the bare clearings in the vegetation. Roads laid out on section lines, thereby forming grids of one square mile, were also conspicuous. From the airplane the nests along a mile of road could be seen and at a glance the general distribution of the nests in the square mile could be determined. Over several square miles, particularly between Salt Lake City and Sevier Lake, the nest clearings were from two to five diameters distant from one another. Previous observations from the ground had shown the clearings to be of the order of magnitude of five feet in diameter. Where the nests were fairly uniformly distributed over the square mile, the count of nests along one side was all that was necessary to estimate the numbers of nest in the square mile. Squaring the count would give a rough approximation of this number. The highest concentration was on level or rolling sagebrush flats and somewhat less on gentle slopes at the bases of small mountain masses. The nests were often abundant down to the southwest corner of Utah.

From these rough data, if each nest clearing was about five feet in diameter and 25 feet apart there would be a nest every 30 feet or 176 to the mile. Were the square mile to be evenly populated, there would be more than 30,000 nests (30,976) and, at a conservative figure of 10,000 adults to the nest, a population of at least 300 million ants. It would seem inescapable that these ants would be the dominant animal in such areas.

For a History of Entomology

Professor J. J. DAVIS is interested in compiling a History of Entomology and in particular, at the present time, a history of amateur insect clubs which flourished seventy-five years ago. Will you who have knowledge of early insect clubs or societies please advise Professor Davis, giving such facts as time of existence, members, etc., which you may have. Address: Dr. J. J. Davis, Department of Entomology, Purdue University, Lafayette, Indiana.

New Reared Species of Lygocerus Foerster (Hymenoptera: Ceraphronidae)

By C. F. W. Muesebeck, United States National Museum

Species of *Lygocerus* are most commonly associated with sternorrhynchous Homoptera, especially aphids and mealybugs, and to a lesser extent chermids and psyllids. They develop either as hyperparasites through other Hymenoptera that are primary, or as parasites of predatory larvae such as those of Syrphidae (various genera) and Chamaemyiidae (especially *Leucopis* and *Cremanifania*). Other recorded hosts include Coniopterygidae and species of the dipterous genera *Phytophaga* and *Meromyza*.

Although specimens have been reared abundantly the Nearctic species have never been critically studied taxonomically. Apparently most of them are undescribed. Five species for which names are desired are described here. Two of these were reared from *Leucopis*, two as hyperparasites of aphids and one from a hemerobiid.

Lygocerus leucopidis, new species

In some respects this is very similar to *pacificus* Ashmead but it is immediately distinguished by the relatively short scape of the female antenna which does not nearly attain the vertex of the head, whereas the scape of female *pacificus* extends conspicuously above the vertex. It differs further in the stouter antennal flagellum, and in having the petiole of the abdomen closely, longitudinally striate. In *pacificus* the petiole is nearly smooth, with only a few weak striae.

Female.—Length 1.5 to 2 mm. Head seen from above twice as broad as long; frons gently convex and at its narrowest point narrower than eye height, strongly shagreened and dull; width of temple at narrowest point less than length of antennal pedicel; first segment of antennal flagellum a little longer than pedicel and much less than half as long as scape; at least some of the flagellar segments less than twice as long as broad; vertex sculptured like frons; ocellocular line at least one and one-half times the diameter of an ocellus.

Thorax stout, slightly narrower than head; mesoscutum nearly or quite twice as broad as long and, together with scutellum, sculptured like frons and vertex; notaulices and median furrow of mesoscutum complete and sharply impressed; mesopleuron coriaceous and dull.

Abdomen at widest point slightly wider than thorax; petiole of abdomen coarsely, longitudinally striate, the middle striae more than half as long as scutellum.

Black; basal half of scape and, in the larger specimens, all legs reddish yellow, with the hind coxae, femora and tibiae more or less piceous or blackish; in the small specimens the legs more extensively black; anterior wing hyaline with a fuscous cloud below stigmal vein.

Male.—Differs from the female in its broader frons, clear hyaline wings and very different antennae, which are as illustrated.

Type.—U. S. National Museum No. 64574.

Type-locality.—Albany, CALIFORNIA.

Described from 11 females and 12 males reared by Fred D. Bennett from purparia of *Leucopis* sp. in June and July, 1958. The host larvae were preying on aphids living on *Cotoneaster, Pyracantha* and *Salix*.

Lygocerus pinicola, new species

This is rather similar to *leucopidis,* but it may be readily distinguished from that species by its more slender form, and especially by its much narrower head.

Female.—Length 1.5 to 2 mm. Head relatively long and narrow, much less than twice as wide as long viewed from above; frons evenly convex, and at narrowest point distinctly narrower than eye height; frons and vertex strongly shagreened and subopaque; ocellocular line barely longer than longest diameter of an ocellus; scape attaining level of vertex; first flagellar segment about one-third as long as scape; flagellar segments 2 to 8 shorter, less than twice as long as broad; width of temple at narrowest point less than length of antennal pedicel.

Mesoscutum only a little broader than long, sculptured like the head, and with sharp, complete notaulices and a narrow but sharply impressed median groove; scutellum and mesopleuron sculptured like mesoscutum. Abdomen not wider than thorax, the petiole coarsely, longitudinally striate.

Black; antenna, including scape, entirely black; anterior wing hyaline with a very faint cloud below radius; legs piceous to black, the anterior pair sometimes brownish yellow in front.

Male.—Like the female except that the wings are entirely clear hyaline, the frons is relatively broader, and the basal flagellar segments are deeply serrate as illustrated.

Type.—U. S. National Museum No. 64575.

Type-locality.—Berkeley, CALIFORNIA.

Described from 3 females and 1 male reared at the type locality from *Leucopis atrifacies* Aldrich on Monterey pine, by Fred D. Bennett, June 20, 1958, and 1 male taken on foliage of Monterey pine at San Rafael, Marin Co., California, in June, 1958.

Lygocerus latifrons, new species

This species differs strikingly from the two species described above in its relatively much wider frons and its long malar space, which is much more than half as long as an eye.

Female.—Length 2 to 2.3 mm. Head more than twice as wide as long viewed from above; frons at narrowest point conspicuously wider than eye height and slightly concave below middle of eyes; frons and vertex finely granulose and mat; width of temple at narrowest point greater than length of antennal pedicel; antennae longer than head and thorax combined; scape extending far above level of vertex; first flagellar segment twice as long as pedicel and half as long as scape, much longer than any of the following segments, but all flagellar segments at least twice as long as broad.

Thorax stout but a little narrower than head; mesoscutum finely granular, three-fourths as long as wide; notaulices and median groove sharply impressed and complete; scutellum flattened medially and finely granulose except at sides where it is more or less rugulose; mesopleuron coriaceous, shining. Abdomen at widest point slightly wider than thorax; petiole strongly longitudinally striate.

Black; antennae more or less brownish; wings clear hyaline, no fuscous cloud in anterior wing; legs largely yellowish brown, with coxae, femora and tibiae sometimes more or less piceous.

Male.—Like the female but with the frons even relatively wider, and with the antennae a little more slender and the scape much shorter. Unlike the male antennae of most species of *Lygocerus* those of this species do not have the basal flagellar segments serrate.

Type.—U. S. National Museum No. 64576.

Type-locality.—Escondido, California.

Described from 6 females and 4 males reared from hemerobiid cocoons by D. W. Clancy in June, 1936.

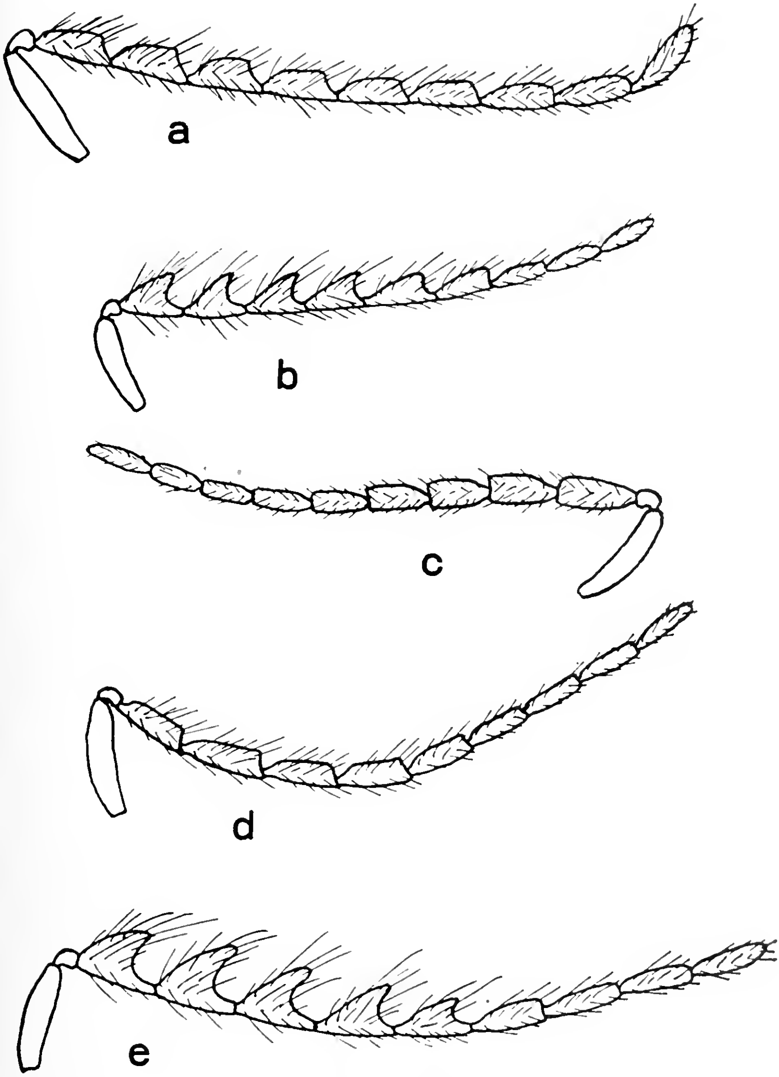
Lygocerus attentus, new species

In the structure of the female antennae and in the color of the legs this species resembles *floridanus* (Ashmead), but it differs widely in other respects, especially in the decidedly narrower frons, in the clouded anterior wing of the female, and in the more weakly serrate male antennae.

Female.—Length about 1.7 mm. Head seen from above more than twice as wide as long; frons at narrowest point not wider than eye height; frons and vertex coriaceous and subopaque; scape of antenna extending a little above vertex; first flagellar segment longer than pedicel or second flagellar segment; width of temple at narrowest point much less than length of pedicel.

Thorax slightly narrower than head; mesoscutum about twice as wide as long, with notaulices and median groove sharply impressed and complete; mesoscutum and scutellum coriaceous and subopaque; mesopleuron finely coriaceous and shining. Abdomen a little wider than thorax; base (petiole) of second tergite with short and coarse striae.

Black; base of scape brownish yellow; anterior wing with a conspicuous fuscous cloud across middle; legs yellowish brown,



Male antenna of: a, *Lycocerus attentus,* new species; b, *L. leucopidis,* new species; c, *L. latifrons,* new species; d, *L. incompletus,* new species, and e, *L. pinicola,* new species.

with coxae, hind femora and hind tibiae more or less blackish.

Male.—Antennae slender, flagellar segments 1 to 6 very weakly serrate; frons wider than eye height; all coxae, trochanters and femora black; otherwise essentially like the female.

Type.—U. S. National Museum No. 64577.

Type-locality.—Aroostook County, MAINE.

Described from 8 females and 3 males reared from *Macrosiphum solanifolii* (Ashmead) by W. A. Shands in 1953.

Lygocerus incompletus, new species

Distinguished from all described North American species by its incomplete notaulices. In that character it approaches *Dendrocerus* Ratzeburg, but in other details and in habitus it is like *Lygocerus* and I believe its correct placement is in this genus.

Female.—Length about 1.4 to 1.7 mm. Head twice as wide as long viewed from above; frons at narrowest point slightly wider than eye height; frons and vertex coriaceous and shining; width of temple at narrowest point much less than length of pedicel; scape of antenna extending noticeably above vertex; all flagellar segments at least twice as long as broad, the first and last the longest.

Mesoscutum and scutellum sculptured like frons; median groove of mesoscutum sharply impressed and complete; notaulices impressed only anteriorly, not attaining middle of mesoscutum; mesopleuron weakly coriaceous and shining. Abdomen wider than thorax; petiole with short and strong striae.

Black; antennal scape brownish yellow at extreme base; wings entirely clear hyaline; legs brownish yellow, with coxae, hind femora and hind tibiae more or less infuscated.

Male.—Antennae long and slender, basal flagellar segments weakly serrate; all femora somewhat infuscated; otherwise essentially like the female.

Type.—U. S. National Museum No. 64578.

Type-locality.—Aroostook County, MAINE.

Described from 26 females and 8 males reared from *Macrosiphum solanifolii* (Ashmead) by W. A. Shands in 1953.

The Neotropical Species of the Ant Genus Strumigenys Fr. Smith: Group of emeryi Mann (Hymenoptera)

By William L. Brown, Jr., Museum of Comparative Zoology, Harvard University

This paper is a continuation of my series on the New World fauna of the dacetine ant genus *Strumigenys* Fr. Smith. Earlier parts, containing keys to the abbreviations for measurements and proportions, may be found in Jour. New York Ent. Soc. 61: 53–59, 101–110 (1953). In addition to these, other parts have been published or are being published in the same journal and in Studia Entomologica, Petropolis, Brazil. Figures of the species here described have been prepared, but are being reserved for a final summary with keys to the New World *Strumigenys*, to be published after the groups have all been dealt with.

The *emeryi* group includes a number of species intermediate between the *louisianae* group and the series of groups about *S. mandibularis* Fr. Smith. The species are more or less like *S. louisianae* Roger, but most of them are larger, with longer mandibles. Several of the species have oval pits, one in each lateral face of the propodeal lamellae, which may or may not be filled with a light-colored incrustation, probably representing a hardened secretion. I call these pits the *propodeal lacunae*. In *emeryi* and close relatives in this and adjacent groups, there is frequently present on each inner mandibular border a minute denticle, probably homologous with the proximal preapical tooth of species such as *mandibularis*. This denticle is often very difficult to see except at high magnifications in silhouette against a bright background; often the view must be oblique.

Strumigenys emeryi Mann

Strumigenys (*Strumigenys*) *emeryi* Mann, 1922, Proc. U. S. Nat. Mus. 61 (13): 37, fig. 18, worker, female. Type loc.: La Ceiba, Honduras, by present selection. Other orig. loc.: San Juan Pueblo, Honduras. Syntypes in USNM, MCZ.

Worker (6 syntypes, and 4 specimens representing the Mexican localities listed below): TL 2.6–2.9, HL 0.59–0.64, ML

0.38–0.40, WL 0.65–0.69, CI 80–82, MI 61–64. Resembling in general habitus *S. louisianae,* but larger, more elongate, and with different sculpture, pilosity and mandibular dentition.

Mandibles depressed, their insertions close together and the shafts parallel at full closure; external borders sharply drawn in at their bases. Inner borders straight to apical fifth, and then becoming slightly concave, with a small, acute preapical tooth set approximately its length or very slightly more away from the dorsal apical tooth, which is three or four times as long as the preapical tooth. Apical fork of two stout subequal spiniform teeth forming a broad U in which is set a single small triangular, acute intercalary denticle. Dorsal ridge of inner mandibular border with a minute proximal preapical denticle (occasionally broken off) at or near the apical third of the exposed mandibular length; this denticle best seen in silhouette against a bright white background; it was overlooked by Mann.

Antennal scapes (of three syntypes) similar to those of *elongata;* L 0.40–0.41; funiculus L 0.56–0.57; apical segment slightly longer than remainder of funiculus. Segment IV slightly longer than I and much longer than II plus III; II slightly longer than broad; III as broad as or slightly broader than long.

Pronotum with rounded anterior border, humeri not or only weakly subangulate, with small tubercles. Posterior half of dorsum of alitrunk weakly concave in profile; metanotal groove depressed only feebly. Propodeal teeth short, acute, moderately elevated and each subtended below by a concave translucent lamella that is slightly broadened ventrally, subangulate, with narrow lateral lacuna.

Petiole and postpetiole much as in *elongata,* but the disc of the postpetiole is less convex; petiole with a fairly well developed ventral spongiform strip. Both nodes also with luxuriant spongiform appendages otherwise. Postpetiolar disc with a cultrate border; its surface smooth and shining, with a few short, fine longitudinal costulae along its anterior margin. Basigastric costulae 10–14, usually occupying about $\frac{1}{5}$ or slightly less of the basal tergite.

Head with the usual punctulate sculpture, but this overlain by a stronger, more or less longitudinal rugulation on the dorsum posterior to the clypeus. Alitrunk with punctulation partly effaced, dorsum rather loosely and indefinitely longitudinally striato-rugulose, sides mostly smooth. Median carinula of promesonotum strong and distinct. Petiolar node rugulose loosely over punctulation. Mandibles, legs and antennae finely and densely punctulate-granulose.

Pilosity much as in *elongata*, but the cephalic ground hairs slightly smaller and less conspicuous. Flagellate hairs arranged as in *elongata*, but usually slightly finer. Dorsum of head with 2 pairs of stiffly erect clavate or narrowly spatulate hairs, the shorter pair on the vertex and the longer pair on the occiput as in *elongata;* ground hairs of alitrunk inconspicuous and few in number. Color variable. Types light to medium ferruginous, with gaster slightly darker. The Tehuantepec specimens are slightly larger, darker and less strongly rugulose. The Guerrero specimen is largest, very strongly rugulose, and its color is a very dark mahogany, approaching black, with mandibles and appendages ferruginous. Dark specimens of normally light-colored *Strumigenys* species often seem to come from moist upland areas, but the exact locality for the Guerrero specimen is unknown.

Female: I have seen no specimens of this caste, but Mann states that it has shorter mandibles than does the worker, and also thicker propodeal spines and coarser sculpture. Judging from his measurements of the workers, the length of the female in terms of the present TL would approach 3.0 mm. Male unknown.

Localities for material studied (in addition to the syntypes from Honduras): Mexico: St. Lucrecia, Tehuantepec (W. M. Mann). Laredo, Texas, from orchid plants originating in Guerrero (U. S. Plant Quarantine).

Strumigenys nevermanni new species

Holotype worker: TL 2.68, HL 0.61, ML 0.36, WL 0.67, CI 79, MI 59. Close to *emeryi*, but differing slightly in proportions, in lacking a proximal preapical denticle on the mandible, and as follows:

(1) Propodeal teeth a little longer and more slender, about as long as the distance between the centers of their bases, with very narrow concave infradental lamellae bearing no appreciable lacunae on their outer faces.

(2) Head a bit less strongly, alitrunk more strongly, longitudinally rugulose, the rugulae spaced, regular and straight on the pronotum. Distinct median carinula extending onto mesonotum. Petiolar node densely punctulate, not strongly rugulose as in *emeryi*, and with distinctly less well developed spongiform appendages. Postpetiolar disc convex, shining, nearly smooth, with indistinct outlines of longitudinal striation appearing at high magnification. Only a part of the posterior sides and lower propodeal declivity of alitrunk smooth and shining.

Color ferruginous yellow, gaster more brownish.

Holotype, a worker selected from a type series of 8 workers and one dealate female, taken at Hondura, 1050 m. altitude, COSTA RICA (F. Nevermann leg.; deposited in USNM). Paratypes (from this series; USNM, MCZ), 7 workers: TL 2.59–2.82, HL 0.61–0.63, ML 0.36–0.38, CI 77–80, MI 58–60.

Dealate female *paratype:* TL 3.1, HL 0.63, ML 0.38, WL 0.77, CI 84, MI 60. Mesonotum rugulose, with a few erect tapered hairs. Known only from the type series.

Strumigenys micretes new species

Holotype worker: TL 2.99, HL 0.71, ML 0.45, WL 0.73, CI 72, MI 63. Close to *emeryi*, but larger, more slender and with narrower head. Also the following differences in detail from *emeryi:*

(1) Distal preapical tooth slightly smaller than that on mandible of *emeryi* (ca. ¼ as long as dorsal apical tooth), slender and very acute. Proximal preapical denticle extremely minute, difficult to see, distant from distal preapical tooth by not more than twice the length of the latter and situated at about the apical fifth of the ML.

(2) Dorsal borders of scrobes with a narrow laminar margin (present but vestigial in *emeryi*) having a slight bend or convexity at about the level of the eyes.

(3) Rugulation not quite as distinct as in most *emeryi* workers. Median carinula of alitrunk distinct, but weak anteriorly on pronotum. Postpetiolar dorsum with low, indistinct longitudinal striation, running its whole length, only weakly shining, subopaque in some lights. Lower half of sides of alitrunk, but not fore coxae, more or less smooth and shining; sculpture otherwise as in *emeryi*.

(4) Lacunae of propodeal lamellae larger and more distinct than in *emeryi*.

Color reddish ferruginous, gaster lightly infuscated; mandibles, antennae, legs and postpetiolar dorsum yellow.

Holotype from a nest series taken by W. M. Mann at Colombiana Farm, Santa Clara Province, Costa Rica, in 1924 (USNM).

Paratype workers from the same series: TL 2.9–3.1, HL 0.70–0.74, ML 0.45–0.47, WL 0.72–0.76, CI 71–74, MI 62–65 (USNM, MCZ, Borgmeier Coll.).

A series received belatedly from the University of Michigan Museum of Zoology through the courtesy of Dr. Paul Kannowski was collected by F. M. Gaige at Progreso, Chiriqui Prov., Panama, April 15, 1923. These workers are slightly larger and have the mandibles a bit longer proportionately: HL 0.75–0.76, ML 0.50–0.51, MI 66–68. CI about as in the type series. Proximal denticle more remote from apex.

Strumigenys lacacoca new species

Holotype worker: TL 3.17, HL 0.75, ML 0.47, WL 0.75, CI 69, MI 62. Closely similar to *micretes*, but still more slender and with narrower head, and lacking preapical mandibular teeth or denticles of any kind. Other differences in detail, as compared to *micretes:*

(1) Propodeal teeth shorter, acute, involved to their apices in the infradental lamellae. Secretory lacunae in the sides of

the lamellae large and conspicuous, with shining bottoms (no secretion present in holotype or paratypes).

(2) Petiolar node with a rather abrupt anterodorsal angle falling off through a steep anterior slope; posterodorsal face straight in profile and gently sloping posteriad.

(3) Postpetiolar disc small, weakly convex, only very slightly broader than the petiolar node and broader than long; largely smooth and shining, but with weak longitudinal costulae along anterior border.

(4) Almost the entire sides of alitrunk smooth and shining, more extensively so than in *micretes*. Rugulation of head distinct. Basigastric costulae similar, but perhaps a bit longer.

(5) Pilosity basically as in *micretes,* but the two pairs of hairs on the verticocciput flagelliform instead of narrowly spatulate.

(6) Color ferruginous yellow, gaster slightly more brownish.

Holotype worker (in USNM) one of a series of 7 from the type nest series, taken by T. E. Snyder on the Rio Chinillo, PANAMA CANAL ZONE. The six *paratype* workers from this series (USNM, MCZ): TL 2.8–3.2, HL 0.70–0.75, ML 0.45–0.48, WL 0.72–0.75, CI 67–71, MI 60–66. Female and male not seen.

Because of its complete lack of mandibular preapical teeth, this species might be confused with *ludia* or other members of the *elongata* group, but the very different proportions of head and mandibles, different propodeal lamellae, and many other features will serve to separate *lacacoca* from such species.

The four species *emeryi, nevermanni, micretes* and *lacacoca* are very close, and seem, from the limited material available, to replace one another in a chain extending from Mexico to Panama, and perhaps beyond. So far as I can see now, the differences are complex enough and strong enough to indicate that each form is a distinct species, perhaps together one superspecies. However, it is also not beyond possibility that one or more of these forms intergrades with a neighbor. More material is needed.

Strumigenys boneti new species

Holotype worker: TL 2.1, HL 0.50, ML 0.30, WL 0.50 mm., CI 82, MI 60. In general habitus closely similar to smaller workers of *mixta*, but lacking the distal spiniform preapical tooth present in *mixta*. The minute denticle on the dorsal ridge of the inner mandibular border, however, is present and situated slightly basad of the apical third of the ML; this corresponds to the proximal denticle of *mixta* and *emeryi*. Apical fork of two approximately equal spiniform teeth, with an extremely small, inconspicuous intercalary tooth. Posteriorly, the occipital excision is rather broad and deep. Eyes not greatly reduced, moderately convex, visible from perfect full-face view of head. Scape L 0.32, funiculus 0.42 mm., size, shape and segmental proportions as in *mixta*, but scape perhaps very slightly more slender, with slender spatulate hairs forming a very regular row of 7 or 8 on the anterior border, all directed decumbently toward the apex.

As compared to *mixta*, the only other difference seen is in the paired lateral occipital, humeral and mesonotal hairs, which in *boneti* are rather short, stiffly erect and slender subclavate or truncate. On alitrunk, ground pilosity reduced to 6 or 8 very slender, short inconspicuous hairs, one small pair stiffly erect on the posterior mesonotum. Pilosity, sculpture, spongiform appendages, etc., otherwise identical to those of *mixta*.

Holotype, a unique worker taken in a Berlese funnel (Sample No. 1109) at Palmillas, Tabasco, Mexico, by Dr. Frederico Bonet, in MCZ.

Paratypes: A larger worker, but with shorter mandibles, from the ridge between Antiguo Morelos and Nuevo Morelos, Mexico (E. S. Ross leg.). TL 2.3, HL 0.56, ML 0.28, WL 0.57 mm.; CI 80, MI 50. Two workers, intermediate in size and proportions between the holotype and the Morelos paratype, from Cozumel, Quintana Roo, Mexico (L. J. Stannard leg.). Paratypes in California Academy of Science and MCZ.

I received the holotype specimen in 1949, and the basic description was composed at that time. Since *boneti* was so close to *mixta*, it seemed best to hold the manuscript until further material might come to light. That material has now arrived in the form of the paratypes cited above, stemming from widely separated Mexican localities, and the diagnostic characters have remained consistent. *S. boneti* is obviously rather close to *mixta*, and may well have arisen directly from *mixta*. The retention of the proximal (submedian) mandibular denticle with the loss of the distal preapical tooth is rare in *Strumigenys*, and *boneti* is the only New World species so far shown to have this dentitional pattern.

Ichneumon canadensis Cress. Selection of New Lectotype

By Gerd H. Heinrich, Dryden, Maine

According to Cresson's original description (Trans. Ent. Soc. Phila., 1867, p. 308) the tibiae I and II of this species are yellow banded, the tibiae III yellow with black apex; the 3rd and 4th tergite have a black band at the base; the antennae are "short, joints thick set." The original description mentions four female specimens as material.

The present lectotype No. 940 of the species *Ichneumon canadensis* Cress. (designated in Mem. Amer. Ent. Soc., number 1, 1916) does not at all match the description. This specimen has reddish colored tibiae without any yellow tint, its tergites 3 and 4 are uniformly red without any black band and the antennae are long and slender. It therefore cannot be considered as the type.

The series of four paratypes in the Cresson collection is composed of 2 females belonging to yet another species, which does not match the original description and also 2 females which exactly match the description in every regard. I have selected one of the latter as the true lectotype of the species *Ichneumon canadensis* Cress.

Two New Typhlodromus from Florida. (Acarina: Phytoseiidae)

By Donald De Leon, Pensacola, North Carolina

The two species described below are of particular interest because the females are practically the same in appearance, but the males can be readily separated by their distinctive spermatophoral processes and by the different number of preanal setae. They belong to the species group with four pairs of anterior lateral setae and fit most closely the characterization of *T. cucumeris* Oud. as given by Chant (1958); they differ chiefly from the characterization of that species in that in the females the pair of pores on the ventrianal shield is in line with the posterior pair of preanals instead of being posterior of them, and in the males the ventrianal shield bears a pair of pores instead of lacking them.

All measurements are in microns. I have followed Evans (1957) in the use of metatarsus in place of basitarsus and, as in previous papers, the system suggested by Garman (1948) for distinguishing the setae of the dorsal shield.

Typhlodromus dentilis, n. sp.

Female: Dorsal shield imbricate, 295–329 long, 180–199 wide (five specimens) with nine lateral, two median and six dorsal pairs of setae. The lengths of these setae follow: L1 29, L2 19, L3 21, L4 29–34, L5 27, L6 27, L7 16, L8 13, L9 75 (pectinate); M1 13, M2 44 (pectinate); D1 24, D2 11, D3 13, D4 14–20, D5 20, D6 8. L1 and L4 are about as long as or somewhat longer than the distance between the bases of L1–L2 and L3–L4, respectively, L2 and L3 distinctly shorter than the distance to the seta next behind; the six setae of the dorsal hexagonal area shorter than the distance between their bases. S1 and S2 present. Peritremata extending forward to D1. Sternal shield with three pairs of setae; two pairs of metapodal shields, the primary one oval, 21 long and about 5.5 wide, the accessory linear, 10 long and about 2.5 wide. Ventrianal shield with three pairs of preanal setae and a pair of half-round pores between the posterior pair of preanals and in line with them or very slightly anterior of a line between them; ventrianal shield 109 long, 92 wide, practically pentagonal in shape, but widest by a small amount at about the middle pair of preanals and slightly constricted caudad beginning at a point about in line with the posterior pair of preanals; four pairs of interscutal setae including VL1 which is 47 long bordering ventrianal shield. Movable digit with three teeth; fixed digit with *pilus dentilis* and 10 teeth including the subapical tooth. Legs rather short and heavy; genua I–IV each with a macroseta 18, 15, 22, and 37 long, respectively; tibia IV and metatarsus each with a macroseta 18 and 61 long, respectively; all macrosetae slightly enlarged at tips.

MALE: Resembles female; dorsal shield 231–248 long, 144–163 wide (three specimens). Ventrianal shield with three pairs of preanals and a pair of pores. Spermatophore bearer roughly L-shaped with a large triangular process extending from "heel"; length of foot, including process, 23, length of shank 15. Fixed digit with *pilus dentilis* and with six teeth extending basad from subapical tooth, the first tooth about half the height of the others; subapical tooth greatly enlarged, the terminal hook (or tooth) appearing merely as a small spur.

Holotype: Male, Miami, FLORIDA, May 24, 1956 (D. De Leon), from *Rhus copallina*. *Paratypes:* four females, same data as for holotype; two males, two females, S. Miami, Fla., November 24, 1954 from *Centradenia* sp.; one male, one female, Ft. Lauderdale, Fla., October 23, 1954, from *Jussiaea peruviana;* one male, Key Largo, Fla., September 27, 1958, from *Callicarpa americana.*

Typhlodromus dillus, n. sp.

The male of *T. dillus* can be most readily distinguished from the male of *T. dentilis* by the foot of the spermatophore bearer being about as long as the shank, the heel lacking the triangular shaped process, and by the ventrianal shield having four pairs of preanal setae. The ventrianal shield of the female has the sides practically straight or slightly bowed out whereas in *dentilis* the sides bend in slightly.

FEMALE: Dorsal shield imbricate, 294–315 long, 168–188 wide (five specimens) with nine lateral, two median, and six dorsal pairs of setae. The lengths of these setae follow: L1 18–26, L2 14–18, L3 12–19, L4 18–31, L5 14–24, L6 17–24, L7 14–21, L8 14–18, L9 63–73 (pectinate); M1 9–15, M2 33–47 (pectinate); D1 18–26, D2 14–18, D3 10–14, D4 11–17, D5 10–20, D6 10. S1 and S2 present. L1 and L4 are somewhat shorter to about as long as the distance between the bases of L1–L2 and L3–L4, respectively; L2 and L3 are distinctly shorter than the distance to the base of the seta next behind; the six setae of the dorsal hexagonal area are shorter than the distance between their bases. Peritremata extending forward about to D1. Sternal shield with three pairs of setae; two pairs of metapodal shields, the primary one unevenly oval, 17 long, about 5.5 wide, the accessory linear, 9 long, about 2.5 wide. Ventrianal shield 108 long, 92 wide with three pairs of preanal setae and a pair of half-round pores between and in line with the posterior pair of preanals; ventrianal shield bordered by four pairs of interscutal setae including VL1 which is 40–45 long. Movable digit with three teeth; fixed digit with *pilus dentilis* and nine teeth including the subapical tooth. Legs rather short and heavy; genua I–IV each with a macroseta 16, 14, 19, and 24–36 long, respectively; tibia IV and metatarsus each with a macroseta 10–16 and 40–51 long, respectively; all macrosetae slightly enlarged at tips.

MALE: Resembles female; dorsal shield 252 long, 147 wide. Ventrianal shield with four pairs of preanal setae and a pair of pores. Spermatophore bearer roughly L-shaped, the foot about 10 long with a small more or less laterally directed process near the middle, the shank about 13 long and rather thick. Movable digit with one tooth, fixed digit with six teeth basad of subapical tooth which is about the size of the terminal hook.

Holotype: Male, Barwell, FLORIDA, September 1, 1956 (D. De Leon), from *Hicoria* sp. *Paratypes:* three males, four females, other data as for holotype; one female, Fellowship, Fla., September 1, 1956, from *Zanthoxylum clava-herculis;* one male and one female, Branford, Fla., September 1, 1956 from *Quercus* sp. Additional specimens were collected at Columbus, Ga., August, 1956, from alder and from red maple.

Types of the above two species are in the author's collection; paratypes will be deposited in the University of Florida Collections, Gainesville.

Literature Cited

Chant, D. A. 1958. Immature and adult stages of some British Phytoseiidae Berl., 1916 (Acarina). Jl. Linn. Soc. Lond. Zoology, 43 (294): 599–643.

Evans, G. O. 1957. An introduction to the British Mesostigmata (Acarina) with keys to families and genera. Jl. Linn. Soc. Lond., Zoology, 43 (291): 203–259.

Garman, P. 1948. Mite species from apple trees in Connecticut. Conn. Agr. Exp. Sta. Bul. 520.

Eucerceris simulatrix Viereck & Cockerell Misspelled on Type Label

By H. A. Scullen

On a recent visit to the Academy of Natural Sciences of Philadelphia (Sept. 29, 1958) the writer discovered Type No. 10396 was labeled *Eucerceris simulator* Viereck & Cockerell. This was one of a series of type labels placed on specimens by E. T. Cresson, Jr. As no *E. simulator* was ever described a careful check was made with the original description of *E. simulatrix* Viereck & Cockerell (Jour. N. Y. Ent. Soc., XII: 87, 1904). The above specimen was found to agree with the original description of *E. simulatrix*. I, therefore, consider the above specimen to be the Holotype of *Eucerceris simulatrix* Viereck & Cockerell and have so corrected the label. The species was described from a single specimen.

As indicated in my 1939 review of the genus *Eucerceris* (Oreg. State Monog., Studies in Ent., No. 1, p. 28) *E. simulatrix* V. & C. is a synonym of *E. fulvipes* Cresson.

Further Notes on the Genus Gesonula (Orthoptera; Acrididae; Cyrtacanthacridinae)

By JAMES A. G. REHN, Curator of Insects, Academy of Natural Sciences of Philadelphia

A few years past the author assembled a considerable amount of information on the forms of this genus,[1] and demonstrated that it was made up of two species, one of them—*G. punctifrons*—being southeast Asian in distribution, the other—*mundata*—with a broad range from northern Thailand through the Sunda Islands to New Guinea, the Solomon Islands and northern Australia, and north at least to the Philippines. Previous records of the genus from Formosa (Taiwan) and the Ryukyu Islands could not then be placed specifically, as material from those areas was not available.

Since the above mentioned paper was published additional material of the genus has become available, some belonging to the Museum of Comparative Zoology, at Cambridge, Mass., some to the California Academy of Sciences, at San Francisco, Cal., and also a few specimens in our Academy series which had been overlooked previously. The information supplied by these small but important representations is of particular value as it fixes the relationship of Formosan and Ryukyu populations and also shows that south Thailand possesses the same member of the genus as the more northern portion of the same country, that the *Gesonula* of this area as a whole is Indonesian and not continental Asian in relationship, and further that Lower Burma individuals show the same Indonesian affinity. While previously I knew the north Thailand material was of the *mundata* stock, I then lacked any representation from the Bangkok area, which, fortunately, is now available.

A key to the forms of the genus, and ample discussion of the species and subspecies have been presented in the earlier paper, and the present contribution is largely of supplementary, chiefly geographic, information.

[1] "On the Genus Gesonula," Trans. Amer. Entom. Soc., LXXVIII, pp. 117–136, pl. V, (1952).

Gesonula punctifrons (Stål)

CHINA: Hangchow, Chekiang Province; V, 25, 1923; (E. C. Van Dyke); 1 ♀; [Cal. Acad. of Sci.]. Cheng-tu, Szechuan Province; (Crampton); 1 ♀; [M.C.Z.].

Gesonula mundata laosana Rehn

BURMA: Toungoo; (A. V. B. Crumb); 1 ♀; [A.N.S.P.]. THAILAND: Bangkok: III, 3, 1928; (R. M. de Schauensee); 5 ♂, 3 ♀; [A.N.S.P.].

This material demonstrates that *mundata*, and this one of its component subspecies, is the representative of the genus found in lower Thailand, as well as the more northern, more montane, portion of the country, and also in Lower Burma, although the broadly distributed continental Asian *G. punctifrons* is the generic representative in the mountainous areas of northern Burma, as well as in Assam.

Gesonula mundata sanguinolenta (Krauss)

NEW GUINEA: Finschafen; V, 10, 1944; (E. S. Ross); 1 ♂; [Cal. Acad. Sci.]. Roon Island; (Thomas Barbour); 1 ♂; [M.C.Z.].

SOLOMON ISLANDS: Fulakora, Santa Isabel Island; (W. M. Mann); 1 ♀; [M.C.Z.].

Gesonula mundata zonocera (Navas)

It is now clearly evident that *Racilia okinawensis* Shiraki (1910, Acrid. Japans., p. 58), based on material from Okinawa, Ryukyu Islands and Formosa, is inseparable from Navas *zonocera*, proposed six years earlier, on the basis of Philippine material. This point I was unable to solve in my earlier study.

PHILIPPINES: 10 ms. E. of Olongapo, Bataan Province, Luzon, elev. 1200 ft.; V, 1907; (J. C. Thompson); 3 ♀; [Cal. Acad. Sci. and A.N.S.P.]. Carayrayan, Baco, Mindoro;[2] XII; (Pedro de Mesa); 2 ♂, 3 ♀; [M.C.Z. and A.N.S.P.].

[2] I have been unable to place this locality, either in the index of geographic names or on the detailed map of Mindoro (facing p. 190) in the comprehensive 1918 Philippine Census volume (published in 1920).

FORMOSA [TAIWAN]: Karenko; IV, 23, 1932; (L. Gressitt); 1 ♀; [M.C.Z.]. Rokki; V, 26, 1934; (L. Gressitt); 1 ♂; [M.C.Z.].

RYUKYU ISLANDS: Iriomote Island; VIII, 19, 1934; (L. Gressitt); 1 ♀; [M.C.Z.].

Gesonula mundata subsp.?

I have also seen two female specimens of the genus taken at Piru, Ceram in 1906–1907 by Thomas Barbour, and from the Museum of Comparative Zoology collection. They have been dried from alcohol and in consequence, except that they represent *G. mundata*, it is not possible to allocate them more definitely. However, in their longer alar organs they show a closer approach to *G. m. sanguinolenta* of New Guinea than to *G. m. pulchra* of the Greater Sunda Islands.

In a recent "Synopsis of the Acridoidea of the Indo-Malayan and Adjacent Regions" Willemse [3] has failed to clarify the distribution of *Gesonula punctifrons*, and continues to include in its distributional area localities in the Philippines, and Java, which regions were shown in my study of 1952 to possess members of the *mundata* line of the genus, and not of the *punctifrons* one, which is, as far as known, entirely continental Asian in its occurrence. The information here presented shows also that in southern Thailand the representative of the genus is *G. mundata laosana*, and not *G. punctifrons* as given by Willemse. Further I cannot help but question his records of *G. mundata mundata* from New Guinea, New Pomerania and the Aru Islands, as these records probably relate to *G. mundata sanguinolenta*, which is the form of that species found in New Guinea and the Solomon Islands, and which had the Aru Islands as one of its original localities. The present records increase to 231 the number of specimens of the genus personally studied, these from a total of 54 localities.

[3] Publicaties Naturh. Genootschap Limburg, VIII, p. 162, (1955).

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Conopidae of the World wanted. Will pay 10¢ to $1.00 for pinned and labelled specimens. S. Camras, 4407 N. Milwaukee Ave., Chicago 30, Illinois.

Anisoptera—Nearctic sp. wanted for exchange, espec. Ophiog., Arigom., Aeschna, Neurocor., Somatoc., Cordulia, Dorocor., Leucor. R. D. Cuyler, Dept. of Entomology, N. C. State College, Raleigh, N. C.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Tenebrionidae of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

Butterflies. Wish to exchange specimens for Japanese species. Please write to Ichiro Nakamura (Boy, age 16), 26 Aza-Nichiyama Obayashi Takarazuka-shi, Hyogo-Ken, Japan.

Phasmidae of nearctic area desired alive. Purchase or trade, drawing on large stock of major orders, worldwide. Domminck J. Pirone, Dept. Entomology, Cornell University, Ithaca, N. Y.

Nitidulidae and Rhizophagidae wanted in exchange for European beetles of all families. O. Marek, Žamberk 797, Czechoslovakia.

+ + +

ENTOMOLOGICAL NEWS

MAY 1959

Vol. LXX **No. 5**

CENTENNIAL YEAR
THE AMERICAN ENTOMOLOGICAL SOCIETY
1859—1959

CONTENTS

PUBLISHED MONTHLY, EXCEPT AUGUST AND SEPTEMBER, BY

THE AMERICAN ENTOMOLOGICAL SOCIETY

PRINCE AND LEMON STS., LANCASTER, PA.

AND

1900 RACE STREET, PHILADELPHIA 3, PA.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada.
Second-class postage paid at Lancaster, Pa.

ENTOMOLOGICAL NEWS

ENTOMOLOGICAL NEWS is published monthly, excepting August and September, by The American Entomological Society at Prince and Lemon Sts., Lancaster, Pa., and the Academy of Natural Sciences, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

Subscription price, per yearly volume of 10 numbers: Domestic, $5.00; Foreign, $5.30; Canada, $5.15—U. S. Currency.

SUBSCRIPTIONS: Communications and remittances to be addressed to **Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

ADVERTISEMENTS: Rate schedules available on request. Address, **Fred B. Jacobson, Advertising Manager, Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

MANUSCRIPTS and all communications concerning same should be addressed to **R. G. Schmieder, Zoological Laboratory, University of Pennsylvania, Philadelphia 4, Pa.**

The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. Articles longer than eight printed pages may be published in two or more installments, unless the author is willing to pay the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

ILLUSTRATIONS: Authors will be charged as follows: For text-figures, the cost of engraving; for insert plates (on glossy stock), the cost of engraving plus printing. Size limit, when printed, 4 × 6 inches. All blocks will be sent to authors after printing. It is not advisable to print half-tones as text-figures.

TABLES: The cost of setting tables will be charged to authors.

SEPARATA: Members of the American Entomological Society may elect to receive, gratis, 25 offprints of their contributions. These will be "run-of-form," without removal of extraneous matter.

Those members desiring more than 25 separates, and all non-members, will receive no gratis copies. They must obtain all their separates (as reprints, with extraneous matter removed) from the printer at the prices quoted below. Authors must place their order for such separates with the editor at the time of submitting manuscripts, or when returning proof.

Copies	1–4 pp.	5–8 pp.	9–12 pp.	13–16 pp.	17–20 pp.	Covers
50	$3.95	$6.33	$ 9.89	$10.28	$13.44	$4.31
100	4.74	7.51	11.86	12.65	16.21	5.89
Add'l 100	1.58	2.36	3.94	4.74	5.54	3.16

Plates printed one side: First 50, $3.15; Additional 100's, $2.37.

Transportation charges will be extra.

ENTOMOLOGICAL NEWS

Vol. LXX MAY, 1959 No. 5

The Centennial Celebration
American Entomological Society 1859–1959

On Thursday, March 26, 1959, the American Entomological Society held an open house, luncheon, and meeting in celebration of its 100th anniversary. Seventy-one members and guests were present.

At the open house, held from ten A.M. to noon, the insect collections were open for inspection as were the libraries of both the Society and the Academy of Natural Sciences of Philadelphia. Guests and visitors were welcomed by Mrs. Raymond Q. Bliss, Fred B. Jacobson and Harold J. Grant, Jr. Visitors to the insect collections were guided by Mrs. Margaret Cary in the Lepidoptera, James A. G. Rehn in the Orthoptera, Raymond Q. Bliss in the Coleoptera and Selwyn S. Roback in the Diptera and Hymenoptera.

In the Society meeting room an exhibit of some of its memorabilia was on display. This material was arranged and labelled through the efforts of Mrs. Judith Hurwitz and Richard F. Sivel. It included the Charter, several portraits of early members, old photographs, minutes of the first meeting (in the beautiful script of J. Frank Knight), the hand press first used to print its "Proceedings," an ivory gavel presented by Louis Schneider in 1860 (and still used by the presiding officer at stated meetings), lenses and instruments used by Cresson, Horn, and LeConte, and many other items. It was noted also that the tables and chairs now used in the meeting room date from 1862, from the time the Society occupied its quarters on Rodman Street. In the library, Maurice E. Phillips had prepared

Dr. Karl F. Koopman
Mr. Karl V. Krombein
Mr. Edward J. F. Marx
Mr. and Mrs. Frank McDermott
Mr. Carl F. W. Muesebeck
Mr. and Mrs. Maurice E. Phillips
Dr. Kenneth W. Prescott
Mr. and Mrs. James A. G. Rehn
Dr. and Mrs. Avery E. Richmond
Mr. George S. Rigby
Miss Grace Ridings
Dr. Selwyn S. Roback
Mr. Curtis W. Sabrosky
Dr. Reece I. Sailer
Dr. John B. Schmitt
Dr. Rudolf G. Schmieder
Mr. Richard F. Sivel
Dr. and Mrs. Neal A. Weber
Mr. and Mrs. Arthur B. Wells
Mr. Henry T. Yost

Addendum

ENTOMOLOGICAL NEWS was unable to restrain itself from taking up valuable page space to tell about the Centennial Celebration of the Society to which it owes its existence. And if the NEWS is a creature of the Society, the reverse is likewise true, for the NEWS is a chief reason for the existence of the Society—publication of research. Not as old or as dignified as the "TRANSACTIONS," which date back to the beginnings, it has yet attained its "three score years and ten" in good health, and with a large and growing circulation. It is proud to belong to that triumvirate of publications, including also the "MEMOIRS," whose undiminished importance in the entomological world attests the vitality of the Society.

Thus we are convinced that the Society's Centennial is a truly significant entomological event. This idea finds support in the success of our Celebration, as evinced particularly by the presence of renowned entomologists who journeyed from a distance in order to attend. There were, for example, Drs. J. C. Bradley and C. P. Alexander, and other members of the panel, as well as that eminent group from the Nation's capital (Gurney, Krombein, Muesebeck, Sabrosky and Sailer) who were so good as to get up very early in the morning in order to drive over and spend the whole day with us. To these and to all our other loyal friends who participated, our heartfelt thanks!

A Synonymical List of American Himantariidae, with a Generic Key and Description of a New Genus (Chilopoda: Geophilomorpha: Himantariidae)

By Ralph E. Crabill, Jr., U. S. National Museum, Smithsonian Institution, Washington, D. C.

We understand less today about the world fauna of the Himantariidae than about that of any other major geophilomorph family. With the exception of the southwestern European and western North African himantariids, which have been revised at least twice (1, 4), our knowledge of virtually all of the remaining species is nearly limited to the descriptions of new species and elucidation of higher categories. Almost nothing is known of intraspecific variability, or of the geographical distribution of species, while much of the generic framework of the family is admittedly preliminary and certainly transitional.

Until Professor Chamberlin began his investigations of the group in this century, disclosing for the first time the previously unsuspected presence of a possibly rich and evidently highly endemic fauna in the New World, it was not believed that there was any significant concentration of species and genera outside of the Mediterranean perimeter.

Apart from the circum-Mediterranean fauna, a very few species are known today from the more eastern Old World tropics and northern subtropics, e.g. from coastal Africa, India, southeastern Asia, Japan and Korea. In addition, a relatively larger number of species and genera in recent years has been described from northern South America and Mexico, but especially from western North America. It is likely that these exceedingly long, ribbon-like centipedes are not actually as uncommon as such evidence suggests. They are probably rather abundant in the tropical and especially subtropical areas of eastern Asia and of the Americas. It is not unreasonable to suspect that owing to their retiring habits and well-known inclination to burrow in the ground the animals simply are not being collected very often.

The earliest *unquestionable* North American himantariids were described by H. C. Wood in 1862; they were *laticeps* and *taeniopsis,* both originally referred to *Strigamia.* The Texan *laticeps,* which is the type-species of *Gosiphilus,* q.v., is still preserved in the Museum of Comparative Zoology at Harvard University (No. TC-5(867)); *taeniopsis,* however, remains in question. The type is apparently lost, and its specific identity and generic assignment are uncertain.[1]

Today the roster of described forms is comparatively long and is growing. Undoubtedly some of the generic and specific names listed at the end of this paper will be submerged as we learn more about intraspecific variability and the systematic fabric of the whole group.

EMPHEROZOSTER, new genus

Like nearly all of the American genera, *Empherozoster* has a diastemate 2nd maxillary coxosternum,[2] lacks major paratergites, ultimate leg pretarsi, and special sternital pouches and fossulae.[3] Additional important diagnostic characters are the following: *intercalary* paratergites absent except on the ultimate pedal segment; coxopleura ventrally and dorsally cavitate, the pores cryptic; pore-fields present on sternites 2 through the penultimate; prosternal sclerotic lines (chitin lines) absent, i.e., not passing toward and meeting the prehensorial condyles (see Note A); prehensorial ungular basal denticle absent; antennae not flattened nor distally attenuate, excluding the first, the basal articles compressed laterally; labrum deeply embayed and centrally completely incised; mandibular pectinate lamellae numerous; 1st maxillary lappets entirely absent; ultimate pedal

[1] The stated type locality, Georgia, is probably incorrect. Wood subsequently admitted that owing to a confusion in vial labels, some of his species described as Georgian were actually Californian.

[2] Hence belongs to the subfamily Himantariinae (= tribe Himantariini, auctt.).

[3] For an effective understanding of most of the terms and criteria employed here the reader is referred to the superb 1909 paper by Chalande and Ribaut, which stands as one of the clearest and most detailed synthetic treatments of a restricted group of chilopods.

sternite much longer than its width at midlength; ultimate pedal pretergite flanked by and separated by sutures from very large intercalary pleurites; all stigmopleurites discrete, i.e., not fused with associated tergites or intercalary pleurites; possibly differing from all known genera in possessing a distinct pair of terminal (or anal) pores.

Empherozoster seems most like *Garriscaphus* and *Gosiphilus,* for in all three: 1) *major* paratergites and ultimate pretarsi are absent; 2) the coxopleura are cavitate or fossulate, their pores essentially cryptic, not uniformly dispersed over the exposed surface; 3) pore-fields occur on the rear body sternites as well as on those of the middle and anterior body thirds. Important distinctions between the new genus and *Garriscaphus* appear to include the following. *Garriscaphus:* prehensorial ungula with a distinct but small basal denticle; ultimate sternite broad; body constricted behind the head; coxopleural pores "along border of sternite" (and tergite?); anal pores absent?. *Empherozoster:* ungula without basal denticle; ultimate sternite long and narrow; body not constricted behind head; coxopleural pores concealed ventrally in pits, not in elongate fossulae, dorsally in weakly defined pits; anal pores present.

The new genus seems most like the apparently (see Note C) widely dispersed *Gosiphilus,* at least differing as follows. *Gosiphilus:* intercalary paratergites present at least on anterior segments in all specimens known to me; prosternal sclerotic lines prominent in most, meeting the condyles (see Note A); ultimate pedal sternite often much broader than long; antennae in most proximally flattened and distally attenuate, in some proximally subcylindrical; 1st maxillary lappets present, at least in some and probably in all; anal pores absent in the type and in all specimens known to me. *Empherozoster: intercalary* paratergites absent; prosternal sclerotic lines absent, i.e., not passing across prosternum to meet condyles; ultimate pedal sternite longer than width at midlength, comparatively narrow; antennae proximally compressed laterally, these articles distinctly longer than wide, distally not attenuate; 1st maxillary lappets absent; anal pores present.

Apparently the most striking characters of *Empherozoster* are the peculiar antennae, the lack of *intercalary* paratergites, the lack of 1st maxillary lappets, and the presence of anal pores. Until discovery of *antaeus* it was assumed that anal pores were absent throughout the Himantariidae. The intercalary paratergites, not to be confused with *major* paratergites (see Attems 1929, Chalande and Ribaut 1909), occur in every specimen of North American himantariid that I have seen. It is interesting to note that Verhoeff specifically mentions their absence in his Bolivian species (23, p. 126).

It would be desirable obviously to be able to employ many other important characters as well. Most have been extensively discussed and lucidly figured by Chalande and Ribaut (4); unfortunately subsequent authors have not always taken full advantage of their exemplary contribution, so that a fuller and more confident comparative treatment is not possible at this time.

Type-species: *Empherozoster antaeus,* new species. (Original designation and monotypic).

Empherozoster antaeus, new species

Holotype: ♀. New Mexico, Eddy County, Carlsbad Caverns National Park, Spider Cave; from dry silt beds about 100 feet inside entrance. December 10, 1958; James K. Baker, leg. U. S. National Museum Myriapod Collection, No. 2529.

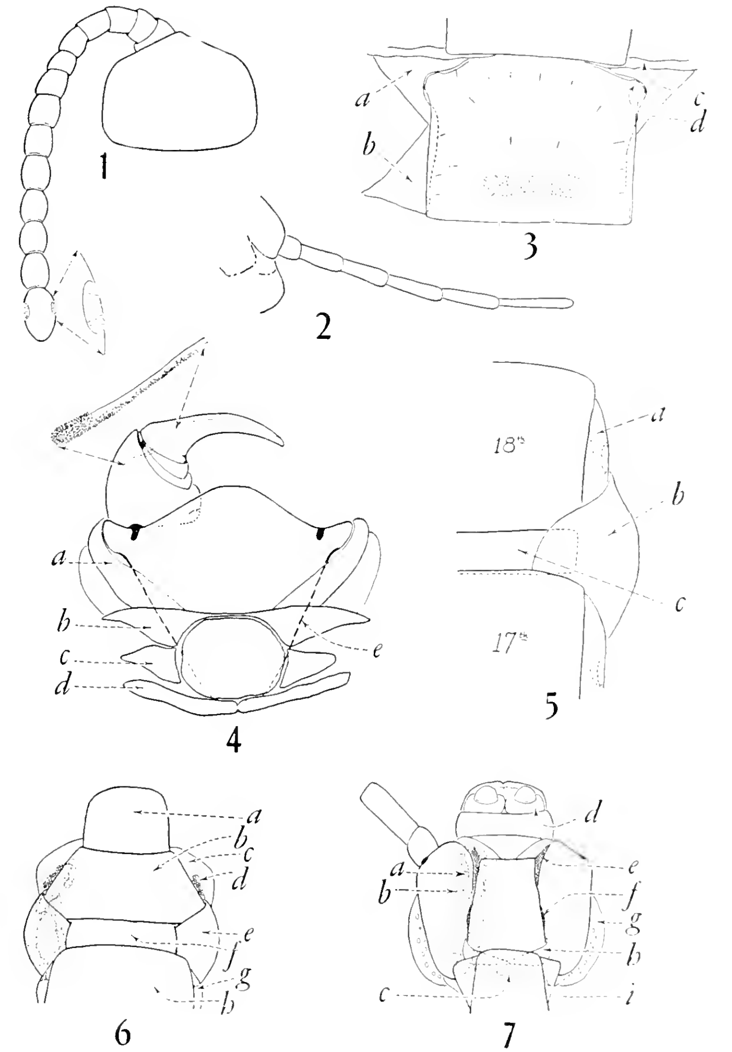
Introductory. Length, 43 mm. Pedal segments, 63. Color: antennae, cephalic plate, prehensorial segment, basal plate light sordid yellow to tan-yellow; tergites, pleurites, legs, sternites pale sordid yellow to yellowish-white.

Antennae (fig. 1). Length, 3.2 mm. Shape: distally not attenuate; articles 2–5 compressed laterally (not depressed dorso-ventrally), each distinctly much longer than wide; articles 6–14 each essentially cylindrical in cross section, not flattened or compressed, each slightly longer than wide; articles 11–13 submoniliform, the 14th much longer than wide. Setae: articles 1–5 sparsely clothed with short setae; articles 6–14 densely, uniformly clothed with very short straight setae. Ultimate article: on each side just posterior to midlength with an ovate depression, this densely packed with short, thick, apically blunt modified setae (chemorectors?). Cephalic Plate (fig. 1). Length, 0.83 mm.; width 1.24 mm. Shape: antero-lateral margins meeting in an obtuse angle to form a pointed rostrum; sides slightly diverging posteriorly; rear corners rounded; posterior margin straight and slightly overlapping the basal plate. Clothed very sparsely with short pale setae. Uniformly finely areolate; without sutures or sulci; frontal plate not discernibly discrete (even by transmitted light). Prebasal plate apparently absent. Clypeus (fig. 8). Paraclypeal sutures present but very obscure. Transbuccal sutures absent. Anterior portion of inner edge of each bucca strongly sclerotized to form an elongate plate whose inner edge is elevated into a short ridge. Clypeus vaguely divided into an anterior coarsely areolate and a posterior very smoothly areolate portion. Setae rather short and thick, disposed as shown. Entire lower margin of clypeus bordering the labrum developed into a strongly sclerotized band, this concolorous with labrum and much paler than remainder of clypeus. Labrum (fig. 8). Completely separated from clypeus by a membranous strip, this is broad laterally but much narrower medially. Lateral labral extensions very narrow, only slightly indented at points of articulation with the fulturae. Central embayment deep and broad, the diastema between the two central teeth essentially dividing the labrum into right and left halves. Teeth: right, 9; left 9 or 10; each strong, well sclerotized, concolorous with rest of labrum. Mandible. With one deeply pigmented dentate lamella, its long axis at a slight angle to the distal mandibular edge, occupying slightly less than one-fourth of the width of the distal mandibular edge, with 7 dark, strong, blunt teeth and 1 or 2 hyaline weak teeth. With 10 well developed pectinate lamellae, the long axis of each approximately perpendicular to the distal mandibular edge, their teeth hyaline, with parallel sides, on each lamella decreasing in length, the longest lamellae with 20–24 such teeth. First Maxillae (fig. 9). Telopodite distinctly bipartite, entirely without lappets or vestiges thereof. Medial lobes separated by a deep, narrow cleft that cuts the coxosternum very deeply; each lobe very indistinctly separated from coxosternum; each with a hyaline, nipple-like distal extension. Coxosternum medially very weakly areolate and weakly sclerotized, almost membranous; entirely without lappets. SECOND MAXILLAE (fig. 9). Anterior margin with a deep diastema, without a midlongitudinal sulcus or groove or any other indication of midlongitudinal division. Pore openings lateral, subsemicircular, very weakly defined. Setae rather robust and short; antero-medial to each pore opening with a small group of short conical alveolate sensory cones (modified setae). Telopodite dorsally and ventrally with rather robust setae; first article bicondylic; terminal claw robust, with 2 stout basal spurs, apically flat and rounded, inner surface broad and shallowly concave, the concave surface not visible from ventral aspect, being directed dorso-anteriorly. PROSTERNUM (fig. 4). Exposed portion very short and wide, the rear concealed parts extending posteriorly to level of rear of first pedal sternite. Anteriorly not denticulate or diastemate. Subcondylic sclerotic lines (chitin lines) absent, that is, not extend-

---

Emphcrozoster antaeus, holotype. Figs. 1–7

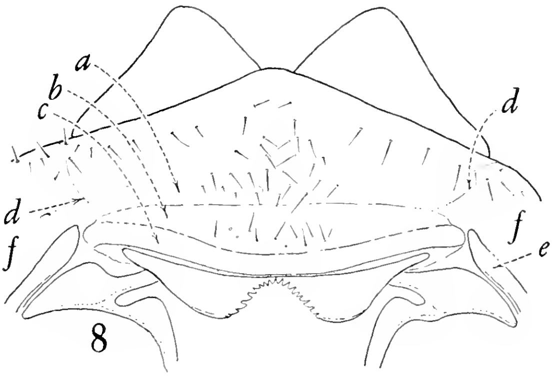
1. Cephalic plate and left antenna; dorsal. Setae deleted. Inner patch of sensilla of 14th article shown *in situ* and enlarged.
2. Left ultimate leg; ventral. Setae deleted.
3. 4th pedal sternite; ventral. Setae shown. a, procoxal pleurite. b, metacoxal pleurite. c, intercalary sternite. d, slight extension of sternite passing under procoxal pleurite.
4. Prehensorial segment and adjacent parts; ventral. Setae deleted. Poison calyx shown *in situ* and enlarged. a, pleurite. b, 1st pedal procoxal pleurite. c, 1st pedal metacoxal pleurite. d, intercalary sternite. e, concealed margin of posterior prosternal extension.
5. 17th and 18th pedal tergites and adjacent sclerites; dorsal. a, stigmopleurite. b, intercalary pleurite. c, intercalary tergite (or pretergite), lateral edge concealed beneath pleurite. Setae deleted.
6. Posterior end of body; dorsal. a, postpedal tergum. b, ultimate pedal tergite. c, exposed part of coxopleuron. d, exposed portion of rear coxopleural pit. e, intercalary pleurite of ultimate pedal pretergite. f, ultimate pedal pretergite. g, penultimate pedal stigmopleurite. h, penultimate pedal tergite.
7. Posterior end of body; ventral. Setae deleted. a, concealed pore-canals of rear pore-pit. b, concealed glands of rear pore-pit. c, pore-field of penultimate pedal sternite. d, concealed terminal (or anal) pore, lying dorsal to gonopod. e, exposed part of rear pore-pit. f, exposed part of middle pore-pit. g, undersurface of right ultimate pleurite of pretergite, showing pore-openings. h, ultimate pedal presternite. i, penultimate pedal metacoxal pleurite.



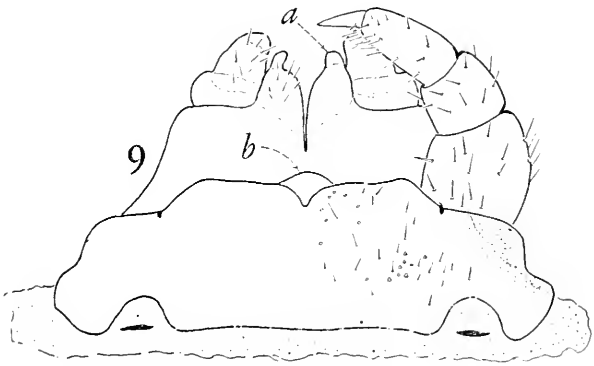
Figs. 1–7

ing across corner of prosternum toward and connecting with condyles. Ventral surface without sutures or grooves; uniformly finely, granularly areolate; uniformly very sparsely clothed with short setae. PREHENSORS (fig. 4). Not attaining frontal margin of head when closed. Ventral edge of ungula smooth, not serrulate; inner surface broad and shallowly concave, the concave surface not visible from ventral aspect, directed dorso-anteriorly; base of ungula (claw) without a denticle. Poison calyx extremely elongate, extending into trochanteroprefemur from proximal extremity of blade proper; poison canal opening on outer surface of blade just short of tip; outlines of poison gland extremely vague, not traceable with precision, apparently passing out of telopodite into prehensorial segment (dorsal to prosternum). Trochanteroprefemur ventrally sparsely but dorsally densely setose. Tibioid and femuroid without denticles.

TERGITES (fig. 5). Basal plate very broad, not suturate or grooved, its anterior margin beneath overhanging cephalic plate. Remaining tergites (except ultimate pedal tergite) as follows. Setae very sparse, minute; surface finely granularly areolate. The large intercalary pleurites reflected dorsally to cover outer corner of each major tergite and outer end of each intercalary tergite, the latter entirely without primary or secondary paratergites (preparatergites). An occasional tergite very indistinctly bisulcate, i.e., paired longitudinal sulci evidently present but extremely obscure. PLEURITES. Major and intercalary paratergites entirely absent. Stigmopleurites discrete, i.e., not fused with adjacent tergites or intercalary pleurites; penultimate pedal stigmopleurite similarly discrete. Spiracles of anterior third of body broadly elliptical, their long axes nearly horizontal, i.e., nearly parallel with the long axis of the body. STERNITES (fig. 3). Not suturate or sulcate; without stigmalike pouches or pits, depressions or similar special fossae. Sternites of anterior third of body somewhat wider than long, thereafter becoming longer and narrower; those on posterior third of body with long dimension greater than width at midlength, i.e., essentially longer than wide. Pedal sternites 2 through the penultimate each with a pronounced pore-field; each pore-field very thin (antero-posteriorly) and extremely wide (from side to side), none is raised or discernibly depressed. Sternital setae very sparse, minute. LEGS. Dorsal orange articular condyles



8



9

Empherozoster antaeus, holotype. Figs. 8, 9

8. Clypeus, labrum and adjacent parts; pentral. All but antennal setae shown. a, anterior portion of clypeus, areolation granular, pronounced. b, posterior portion of clypeus, areolation weak, vague. c, strongly sclerotized clypeal strip. d, paraclypeal sutures. e, sclerotized inner edge of left bucca. f, bucca.
9. 1st and 2nd maxillae; ventral. All setae shown on left side of 2nd maxillae and on right side of 1st maxillae. 1st maxillae somewhat displaced anteriorly from original position. a, nipple-like extension of medial lobes of 1st maxillae (possibly artifacts). b, posterior medial, free margin of 1st maxillae, displaced anteriorly.

contrasting notably with yellowish-white leg surfaces. Essentially glabrous. Pretarsi relatively long, compressed laterally, deep red-brown in color, narrowly concave beneath; pretarsal accessory claws equal in length, robust and very long, at least two-thirds as long as the associated claw proper.[4]

ULTIMATE PEDAL SEGMENT (figs. 2, 6, 7). Pretergite separated from its huge intercalary pleurites by sutures, these pleurites overlapping each lateral edge of their pretergite and completely concealing the anterior part of each coxopleuron from above. Tergite trapezoidal, very broad, sides strongly convergent posteriorly, the rear margin nearly straight; very sparsely and shortly setose. By contrast the tergum of the postpedal segments is subdensely setose. Presternite with convergent posterior margins, mostly concealed; medially essentially (or actually?) divided. Sternite much longer than width at midlength, its sides slightly convergent, the rear margin nearly straight; sparsely setose. Each coxopleuron elongate, extending forward nearly to base of penultimate leg, largely covered by tergite and pleurites; ventro-posteriorly slightly swollen; each with three ventral subsurface pits, the most anterior of these completely concealed; with two long poorly defined dorsal pits, the posterior of these slightly exposed; with numerous sclerotic gland canals opening into all five pits, gland canals and glands situated in coxopleuron, under sternite and presternite, on underside of pleurites, under lateral and anterior margins of tergite. Legs extremely long and thin, much longer than the penultimates; each with 6 articles distal to the coxopleuron, i.e., with two tarsal articles; pretarsus totally absent; all articles sparsely clothed with short straight setae. POSTPEDAL SEGMENTS (fig. 7). Gonopods completely separated from each other; each consists of two distinct, swollen segments. With a distinct pair of terminal (anal) pores.

(to be continued)

[4] The remarkable length of the pretarsal accessory claws is almost certainly significant interspecifically; it is probably a generic character as well. *Gosiphilus* specimens that I have seen, including the type-species, have broader, shorter pretarsi and accessory claws that never attain half the length of the pretarsus.

A New Species of the Genus Chionodes in California (Lepidoptera, Gelechiidae)

By Jerry A. Powell, University of California, Berkeley

During the course of investigations on the early stages of the Xyelidae (Hymenoptera), Donald J. Burdick has discovered larvae of several gelechiid moths which feed in the staminate cones of pines. One of these subsequently has proven to be an undescribed species, and although closely related to *Chionodes johnstoni* Clarke (1947), specimens from two localities are quite consistent in the differing characters. The species is described at this time in order to make the name available for biological studies now in progress.

Chionodes sabinianae, new species

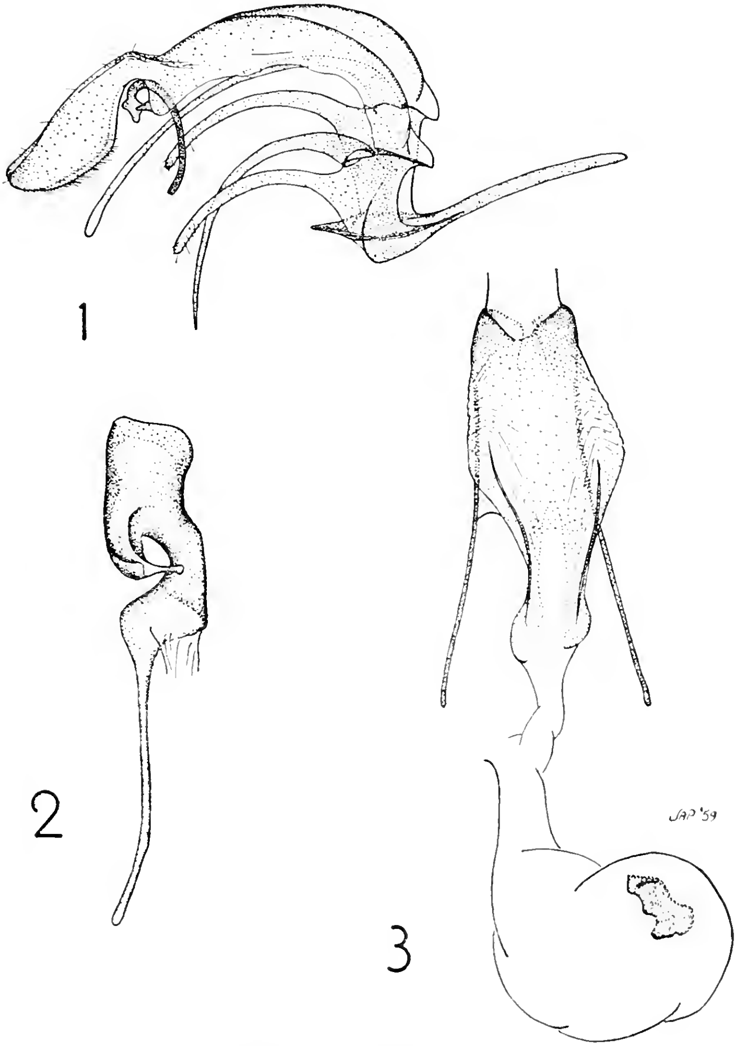
A dark grey moth, flecked with white and with a single, sinuate, white, transverse band on the fore wing at the apical one third of the wing. With the characters of the genus as outlined by Busck (1939).

Male: *Labial palpus* predominantly black. Second segment with scattered white scales exteriorly and a pure white tuft at the apex exteriorly; mixed grey and white scales above and interiorly, nearly white on upper half interiorly. Third segment with white scales intermixed especially above and along distal half; with a white tip. *Antenna* black; whitish scales scattered along the length dorsally; the scale rows alternating black and white ventrally; a white tuft at apex of basal segment, more pronounced ventrally. *Head* grey, the scales darker toward apices; face below antennal bases predominantly whitish. *Thorax* grey, the scales darker toward apices; with a bright ochre-yellow tuft posteriorly. *Fore wing* dark grey, the scales whitish on their basal halves, blackish toward apices. Markings on wing as follows: a roundish spot at one third the length of the wing from base on lower fold, margined exteriorly by a black area; another white spot at about the end of the cell, both preceded and followed by black areas; a transverse, white band from apical third on costa to anal angle, curved slightly outward at middle; two small, white submarginal spots, one at apex and one just below and inside it. Fringe with hairs grey, scales whitish-grey, darker at apices. Wing surface roughened by areas of upturned scales; most pronounced in the random scattered white scales and in the scales which make up the white spots. *Hind wing* light grey, darker toward apical margin. Fringe of whitish hairs. *Legs* whitish, marked with grey. Fore and mid legs with dark grey overscaling above and exteriorly as follows: intermixed black and white on femora; tibiae with three subequal bands separated by raised, yellowish, narrow bands; tarsi black except tufts at apices of first, second and fifth segments. Hind leg with pale grey overscaling exteriorly as follows: tibia with small basal spot, ill-defined blotch before mid spurs, broad band before apical whitish tuft; tarsi except apical tufts on all segments. (The holotype lacks one prothoracic and one metathoracic leg.) *Abdomen* greyish, with dorsal tufts of whitish hairs laterally on first segment and apically on eighth segment. *Genitalia* as in figs. 1, 2 (drawn from paratype). Harpes asymmetrical; right harpe sharp-pointed, left harpe blunt, about one fourth longer than the right. Aedeagus slightly shorter than the remainder of the genitalia, the slender stalk constituting about one half the length; distal end with a finger-like lateral projection which curves around the deeply cleft central portion.

Female: Coloration nearly identical with that of male; tip of abdomen yellowish above. Genitalia as in fig. 3 (drawn from paratype). Signum subrectanglar, irregular in outline, quite large.

Wing expanse: male, 12.2–14.0 mm.; female, 14.3–15.6 mm. (reared specimens).

Holotype male and *allotype female:* Russelman Park, Mt. Diablo, Contra Costa County, CALIFORNIA, April 9, 1958, reared from staminate cones of *Pinus sabiniana,* emerged May 6 and May 9, 1958, (D. J. Burdick), deposited in the collections of



Chionodes sabinianae Powell

Fig. 1. Male genitalia, lateral aspect, aedeagus removed. Fig. 2. Aedeagus, dorsal aspect. Fig. 3. Female genitalia, ventral aspect, anal papillae and posterior apophyses removed.

the California Academy of Sciences, San Francisco. *Paratypes* as follows: 3 ♂♂, Arroyo Mocho, 20 miles south of Livermore, Alameda County, California, April 2, 1957, reared from staminate cones of *Pinus sabiniana,* emerged April 29 to May 14, 1957, (D. J. Burdick); 1 ♂, 4 ♀♀ same data as holotype except emerged May 5 to May 9, 1958, deposited in collections of U. S. National Museum, British Museum, California Insect Survey (University of California, Berkeley), and in author's collection.

The coloration, especially with regard to the extent of white, is variable. Any of the small white spots may be lacking on one or both wings, but the white band is uniform throughout the series studied. Some paratypes show much more extensive white scaling than the holotype and appear more variegated to the naked eye with the black spots prominent on a lighter background.

The species is nearest to *C. johnstoni* Clarke, from which it differs by the shape of the aedeagus (two specimens examined) and by minor differences in the shape of the sclerotization of the eighth segment and signum of the female. In addition, Dr. J. F. Gates Clarke, U. S. National Museum, Washington, D. C., who kindly compared specimens of *sabinianae* with *johnstoni,* states (*in litt.*) that the light areas in *johnstoni* are yellowish in comparison with the white markings of *sabinianae.* He further notes that the upturned scales are absent in *johnstoni,* but that this may be due to the fact that the specimens of *sabinianae* were reared and those of *johnstoni* had flown.

Literature Cited

Busck, A. 1939. Proc. U. S. Nat. Mus. 86 (3064): 563–593.
Clarke, J. F. G. 1947. Jour. Wash. Acad. Sci. 37 (7): 243–254.

A New Genus of Mexican Cerambycidae Related to Crossidius (Coleoptera)

By John A. Chemsak,* University of California, Berkeley

The following new genus is proposed for a species originally asigned by Bates to the genus *Crossidius,* but which does not appear to be congeneric with the other Mexican and United States species of that group.

Neocrossidius Chemsak, new genus

Body stout, robust. Head with front vertical; antennal tubercles somewhat elevated, acutely angulate; antennae filiform, eleven segmented, longer than the body in the male, eleventh segment long, slightly appendiculate, tapering, shorter than the body in the female; eyes finely granulate, strongly divided, upper lobe small; mandibles small, bifid at apex. Pronotum transverse, rounded, slightly angulate or tuberculate at sides, disk convex, fairly even; scutellum moderate, slightly wider than long, triangular, acutely pointed at apex; prosternal process broad, slightly expanded at apex; mesosternum rather sharply declivous in front, raised from sternum behind; episternum of metathorax moderately broad, parallel. Elytra with surface convex, distinctly costate with two impunctate, slightly raised longitudinal costae on each elytron; pubescence dense, fairly long, suberect; punctation moderate, dense; apices not produced, sinuate-truncate.

Type species: *Crossidius trivittatus* Bates.

This genus can be differentiated from *Crossidius* by the distinct smooth elytral costae, stout form, broader prosternal process, and the more sharply declivous mesosternum. Although Horn (1885) has stated that the type species *Crossidius trivittatus* Bates is closely allied if not identical with *C. humeralis* LeConte, a study of series of both species shows them to be quite distinct. The latter is a true *Crossidius.* The following

* Acknowledgment is given to Dr. E. G. Linsley, University of California, Berkeley, for helpful suggestions.

redescription is offered as a supplement to the original provided by Bates.

Neocrossidius trivittatus (Bates)

Crossidius trivittatus Bates, 1880, Biol. Cent.-Amer., Coleopt., vol. 5, p. 82; Bates, 1885, Biol. Cent.-Amer., Coleopt., vol. 5, p. 327.

Male: From broad, robust, subparallel; color dark testaceous and black or shining black, elytra with three distinct dark longitudinal vittae or at least a sutural stripe, vittae with greenish caste, elytra distinctly costate; appendages, pronotum, and underside black; pale pubescence fine, dense, suberect; antennae very long. *Head* coarsely confluently punctate on vertex, more finely on front, pubescence long, pale, fine; antennae surpassing elytral apices by about four segments, eleventh segment long, appendiculate. *Pronotum* wider than long, broadly rounded with small lateral tubercles; surface convex with trace of small impunctate callus behind middle, punctures dense, moderately coarse, contiguous; pubescence fine, pale, long and erect but not obscuring surface; prosternum barely impressed before coxae, confluently punctured, densely pubescent, prosternal process broad, wider at apex, mesosternal process rather sharply declivous in front, distinctly raised from sternum behind; meso- and metasterna densely, finely punctate, densely pubescent. *Elytra* only about twice as long as broad, slightly wider than pronotum; each elytron with two distinct, slightly raised, impunctate costae, three black vittae present, one on each side at about the middle and another sutural one, sometimes only sutural stripe present, black stripes having faint metallic cast; punctation coarse, dense, sub-confluent at base, becoming finer apically; pubescence long, pale, suberect, longer and erect at base; apices sinuate-truncate. *Legs* fairly short, stout, moderately coarsely, densely punctate, pubescence dense, long, suberect. *Abdomen* finely densely punctate, densely clothed with long fine pale hairs; fifth sternite broadly rounded, slightly emarginate at apex. Length, 12–17 mm.

Female: Antennae short, rarely surpassing apical one-fourth of elytra. Color as in male but may be entirely shining black. Length, 11–16 mm.

Type locality: Mexico.

This species shows an extreme variability with regard to the dark stripes of the elytra, first noted by Bates (1885) in a series collected by Mr. Flohr at El Salto, near Huehuetoca. This same variation is evident in series from Tuxpan, Michoacan, IX–18–57 (H. A. Scullen); Mexico City, D.F., IX–25–57 (R. & K. Dreisbach); and 44 miles N.E. of Durango, Durango, X–19–57 (H. A. Scullen). The extremes are a male with only a dark stripe along the suture, and two females which are entirely submetallic black. Bates indicated that some of his examples had two or three large tawny spots on the thorax, but none of the 19 specimens at hand exhibit this coloration.

Literature Cited

Bates, H. W., 1880-1885. Biol. Cent.-Amer., Coleopt., vol. 5, pp. 82, 327.
Horn, G. H., 1885. Trans. Amer. Ent. Soc., vol. 12, p. 177.

A New Name in the Clerid Genus Lebasiella Spinola (1844)

(Notes on North American Coleoptera, No. 7)

By Charles S. Papp, University of California, Riverside, Cal.

During my recent study of the beetle family Cleridae I discovered the use of the same name for two different species assigned to the same genus. To avoid further taxonomic complications, a new name is introduced for the following reason:

Lebasiella mexicana new name for *L. unimaculata* Pic (in "Neue Cleridae aus der Sammlung des Deutschen Entomologischen Instituts," published in the Beiträge zur Entomologie, Berlin, 1953, Vol. 3, No. 3, p. 332) from Tasco, Mexico. The type specimen is in the collection of the Deutsches Entomologisches Institut, Berlin, Germany. The name *L. unimaculata* was previously occupied by Pic (in Exchange, 1940, Vol. 56, No. 481, p. 10) for another Mexican species. The type of this species is in the collection of Mr. Maurice Pic, Les Gourreaux par St. Agnan, France.

Lebasiella mexicana (n.n.) is easy to differentiate from *L. unimaculata* Pic (1940) because it is dark metallic blue in color and has a sharp yellow spot on each elytron. Its distribution is restricted to Mexico. Length: 1.0–5.5 mm., an extremely unusual variation in size.

In Pic's description there is no indication of the number of specimens used in the original description.

In the genus *Lebasiella* (occasionally misspelled as L*a*basiella) Spin. there are 13 species and 2 varieties known, all from the Western Hemisphere: *L. discolor* Kl. from Mexico and Texas; *L. discolor* var. *tibialis* Schnklg. from Mexico and California; *mesosternalis* Schaeff. from Arizona and Mexico; *pallipes* Kl., which ranges from Pennsylvania through Texas to Mexico; *marginella* Chevr. from California and Mexico. Others are restricted to Mexico: *quadrimaculata* Pic, *mexicana* Papp, and *unimaculata* Pic (1940); *bisbinotata* Gorh. occurs in Honduras, as the only Central-American species of this genus. The rest of the species are all from South America: *limbipennis* Chevr., *lineata* Pic, *ruficollis* Pic and *rufic. ab. sinuatelineata* Pic, which are very closely related species all known from Chile; *erythrodera* Spin. from Colombia and *basipennis* Pic. from Argentina.

For students in this genus the following papers are useful: Wolcott: in Publ. Field Mus., Chicago, 1910, *7*: 397, and also Wolcott: in Fieldiana (Zool.), 1947, 23(2): 87–88.

Biological Notes on Prochelostoma philadelphi (Robertson) (Hymenoptera, Megachilidae)

By Karl V. Krombein, Entomology Research Divison, Agricultural Research Service, U. S. Department of Agriculture

A moderately large population of this bee nests in abandoned borings of anobiid larvae in an old wooden cowshed in Arlington, Va. The following observations were made in 1954.

Most of the bees present on May 15–16 were males which hovered in front of the boring entrances. A few females were present on these dates and mating was noted. Large numbers of bees were mating on the following week-end. The rather protracted mating took place outside the boring entrance on the surface of the wall. I did not time the matings, but one pair was in copula for at least 5 minutes. There was no courtship and sometimes as many as four males struggled to mate with one female.

Some females began to provision nests the week-end of May 22–23, and a few females were still nesting as late as June 5. When a female laden with pollen and nectar returned to her nest, she quickly entered the boring head first, remained inside for a few seconds presumably to regurgitate the nectar, and then backed out of the boring. Then she immediately backed into the boring to deposit the pollen load from the abdominal scopa. The provisioned cells were separated by thin clay partitions, and the boring entrance was plugged with clay. The females slept in the burrows at night with the abdomen plugging the entrance.

This bee is proterandrous, although there was some overlap in emergence of the two sexes in the entire population. This overlap may have been due to temperature factors, because many nests were shaded the entire day and others were exposed to the sun for periods ranging from 1 to 4 hours. The males apparently emerge first when both sexes are present in a single nest. Six of the nests stored during May, 1954, were marked and the occupants trapped in glass vials when they emerged in May, 1955, as follows:

Nest 1—2 ♂♂, May 19; 1 ♀, May 21; 4 ♀♀, May 22; 2 ♀♀, May 23
Nest 2—2 ♂♂, May 19; 2 ♂♂, May 20
Nest 3—1 ♂, May 21; 2 ♀♀, May 22; 1 ♀, May 24
Nest 4—3 ♀♀, May 23; 1 ♀, May 24
Nest 5—1 ♀, May 25; 1 ♀, May 26
Nest 6—2 ♀♀, May 26

There is only a single generation a year as indicated by the above data, and also by some 50 specimens in the U. S. National Museum which bear dates of capture ranging from mid-May to mid-June.

Ichneumon koebelei Swezey, Selection of Lectotype (Hymenoptera—Ichneumonidae)

By Gerd H. Heinrich, Dryden, Maine

The original description of *Ichneumon koebelei* (Report of Work of the Experiment Station of the Hawaiian Planter's Association, Bull. No. 7, Honolulu, Hawaii, November 1909, p. 30/31) contains no statement concerning the designation and location of a holotype. There are two specimens (♀♂) in the collection of the Smithsonian Institution identified by the author as *Ichneumon koebelei* and labeled as "cotypes" (type no. 11771). I designate one of them, the female, as lectotype of the species.

Sinea diadema Fabr. (Hemiptera: Reduviidae) Biting a Human

By W. W. Judd, Department of Zoology, University of Western Ontario, London, Ontario

In the autumn of 1958 a man reported that while driving a car through Ilderton, Ontario on September 28 he felt a sharp, stinging sensation in the skin on the outside of his right thigh. When the car was stopped examination of the affected area of the skin showed a small puncture hole that exuded blood for a short while. No swelling or change in colour was seen in the surrounding skin. The pain lasted for half an hour. The insect that caused the bite was found in the clothing at the site of the bite. It was crushed but was recognizable as the assassin bug, *Sinea diadema* Fabr., as identified by keys in Blatchley (1926) and Britton (1923). The insect had evidently crawled or fallen into the clothing.

Sinea diadema is an assassin bug which is common in southern Ontario and which occurs frequently in autumn on flowers of Compositae where it feeds on plant lice and other insect prey (Blatchley, 1926; Miller, 1956). Herms (1939) includes this species in his key to predaceous Reduviidae likely to be of medical importance.

References

Blatchley, W. S. 1926. Heteroptera or true bugs of eastern North America. Nature Publ. Co., Indianapolis.

Britton, W. E. 1923. The Hemiptera or sucking insects of Connecticut. Conn. State Geol. and Natural Hist. Surv., Bull. 34.

Herms, W. B. 1939. Medical entomology. Macmillan Co., New York.

Miller, N. C. E. 1956. The biology of the Heteroptera. Leonard Hill Ltd., London.

Review

A Century of Biological Research by Harlow B. Mills *et al.* Bull. Ill. Nat. Hist. Survey 27(2) 85–234, illus. Urbana, Illinois, Dec. 1958.

This is a series of articles describing the history and the accomplishments of the Natural History Survey Division of the State of Illinois. The Survey Division is a large and active organization engaged in research and publication in a number of biological fields. Although a separate agency, it is housed in a fine modern building on the campus of the University of Illinois, to the mutual benefit of the Survey and the University, and two of its entomologists, Doctors Decker and Ross are professors in the Graduate College. The present publication seeks to tell how this organization came into being and how it developed to its present stature. Each of the articles is of absorbing interest, and together they represent a major contribution to the history of biological, particularly entomological, research in America.

The first article "From 1858 to 1958," by Dr. Harlow B. Mills, Chief of the Survey, presents a fascinating account, set in historical perspective. There is S. A. Forbes, as a boy of fourteen at the Lincoln-Douglas debate in 1858, "who wormed his way to the front of the crowd and gained some renown by vocally taking issue with Douglas at one point in this historically climactic discussion." In 1858, the Natural History Society of Illinois was formed at the Illinois State Normal University and there undertook to develop a museum and a library. In 1867 it accepted State support and since then has undergone various changes in name and organization, as well as in location by removal from Normal to Urbana. Its history reflects the initiative and personalities of outstanding leaders: S. A. Forbes, appointed curator in 1872 (in addition to being State Entomologist), and remaining in charge until 1930; T. H. Frison who served from 1931–45, and under whom the new Natural Resources Building was built (1940) and other advances made (in faunistic work, wild-life research, etc.); and finally the present chief, H. B. Mills.

A second article, by G. C. Decker, "Economic Entomology," is devoted to the history of insect control in Illinois. Again, we are fascinated by learning just how these problems appeared to the early entomologists, and, through the years beginning with the 1850's, what attempts were made to solve them. Numerous quotations from contemporary sources help to give a vivid picture. For the future, the urgent need appears to be "a return to the basic study of insect biology and ecology," so that new methods may be worked out that will supplant present reliance on chemical control.

The history of Faunistic Surveys is treated by H. H. Ross, beginning with the earliest period, 1850 to about 1870. With the beginning of State support, and the appointment of a State Entomologist there began a "Period of Expansion," accelerated also by removal to Urbana in 1885. Much later, with the appointment of T. H. Frison as Systematic Entomologist in 1923, there was a resurgence in faunistic activity bringing on the present "Period of Specialization." In 1931 Frison became chief, and H. H. Ross was appointed Systematic Entomologist. Since then other reorganizations have taken place with expansion of the work in insects, and in other groups as well. Since 1947 Ross has been in charge of the "Section of Faunistic Surveys and Insect Identification." The remainder of this article provides brief histories of taxonomic work done in each of the principal orders or families of insects.

The remaining articles have less to do with insects; they are an Aquatic Biology, Wildlife Research, Publication and Public Relations, and the Library. Finally, there is a list of over 200 former technical employees as well as a list of references.—R. G. Schmieder

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Tenebrionidae of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

Butterflies. Wish to exchange specimens for Japanese species. Please write to Ichiro Nakamura (Boy, age 16), 26 Aza-Nichiyama Obayashi Takarazuka-shi, Hyogo-Ken, Japan.

Phasmidae of nearctic area desired alive. Purchase or trade, drawing on large stock of major orders, worldwide. Domminck J. Pirone, Dept. Entomology, Cornell University, Ithaca, N. Y.

Nitidulidae and Rhizophagidae wanted in exchange for European beetles of all families. O. Marek, Žămberk 797, Czechoslovakia.

Wanted and Needed. We are compiling a history of entomology, and particularly, at present, of the amateur insect clubs that flourished 50 to 75 years ago. Will you who have knowledge of such early clubs or societies advise me, giving facts on the time of existence, members, etc., which you may have. J. J. Davis, Dept. of Entomology, Purdue University, Lafayette, Indiana.

ENTOMOLOGICAL NEWS

JUNE 1959

Vol. LXX **No. 6**

CENTENNIAL YEAR
THE AMERICAN ENTOMOLOGICAL SOCIETY
1859—1959

CONTENTS

PUBLISHED MONTHLY, EXCEPT AUGUST AND SEPTEMBER, BY
THE AMERICAN ENTOMOLOGICAL SOCIETY
PRINCE AND LEMON STS., LANCASTER, PA.
AND
1900 RACE STREET, PHILADELPHIA 3, PA.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada
Second-class postage paid at Lancaster, Pa.

ENTOMOLOGICAL NEWS

ENTOMOLOGICAL NEWS is published monthly, excepting August and September, by The American Entomological Society at Prince and Lemon Sts., Lancaster, Pa., and the Academy of Natural Sciences, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

Philip P. Calvert, Editor Emeritus. R. G. Schmieder, Editor. Editorial Staff: H. J. Grant, Jr., E. J. F. Marx, M. E. Phillips, and J. A. G. Rehn.

Subscription price, per yearly volume of 10 numbers: Domestic, $5.00; Foreign, $5.30; Canada, $5.15—U. S. Currency.

SUBSCRIPTIONS: Communications and remittances to be addressed to **Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

ADVERTISEMENTS: Rate schedules available on request. Address, **Fred B. Jacobson, Advertising Manager, Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

MANUSCRIPTS and all communications concerning same should be addressed to **R. G. Schmieder, Zoological Laboratory, University of Pennsylvania, Philadelphia 4, Pa.**

The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. Articles longer than eight printed pages may be published in two or more installments, unless the author is willing to pay the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

ILLUSTRATIONS: Authors will be charged as follows: For text-figures, the cost of engraving; for insert plates (on glossy stock), the cost of engraving plus printing. Size limit, when printed, 4 × 6 inches. All blocks will be sent to authors after printing. It is not advisable to print half-tones as text-figures.

TABLES: The cost of setting tables will be charged to authors.

SEPARATA: Members of the American Entomological Society may elect to receive, gratis, 25 offprints of their contributions. These will be "run-of-form," without removal of extraneous matter.

Those members desiring more than 25 separates, and all non-members, will receive no gratis copies. They must obtain all their separates (as reprints, with extraneous matter removed) from the printer at the prices quoted below. Authors must place their order for such separates with the editor at the time of submitting manuscripts, or when returning proof.

Copies	1–4 pp.	5–8 pp.	9–12 pp.	13–16 pp.	17–20 pp.	Covers
50	$3.95	$6.33	$ 9.89	$10.28	$13.44	$4.31
100	4.74	7.51	11.86	12.65	16.21	5.89
Add'l 100	1.58	2.36	3.94	4.74	5.54	3.16

Plates printed one side: First 50, $3.15; Additional 100's, $2.37.

Transportation charges will be extra.

ENTOMOLOGICAL NEWS

Vol. LXX — JUNE, 1959 — No. 6

Observations on the Nest-site Behavior of Melissodes composita Tucker and its Parasites, with Notes on the Communal Use of Nest Entrances (Hymenoptera: Apoidea)

By Paul D. Hurd, Jr. and E. Gorton Linsley,
University of California, Berkeley

In early September of 1958 while in residence at the Southwestern Research Station near Portal, Arizona,[1] a nesting site of *Melissodes composita* Tucker[2] was discovered. Because of the unusual physical arrangement of the burrows and the modified behavior of the adult bees and their parasites, a brief account of the circumstances is offered in the hope that it may possibly contribute to current theory as to the evolution of behavior patterns in these and other bees (cf. Michener and Lange, 1958).

The nesting area was situated in grassland on the upper portion of a small, gently sloping plateau amidst the open oak-juniper woodland which overlooks the Station from the northeasterly slopes of Cave Creek Canyon. The elevation is approximately 6,500 ft. Growing among the grasses on the lower portions and margins of the plateau were two conspicuous composites, *Aster tanacetifolius* HBK and *Haplopappus gracilis* (Nutt.) Gray,[3] whose flowers were being visited for nectar and pollen by a large number of *Melissodes* and an unidentified

[1] We are indebted to Dr. Mont A. Cazier, Director of the Southwestern Research Station, American Museum of Natural History, for facilitating these and other investigations undertaken while in residence at the Southwestern Research Station during August and September, 1958.

[2] Determined by Dr. Wallace E. LaBerge, Iowa State University, Ames.

[3] The plant identifications were made by Helen K. Sharsmith, University of California Herbarium, Berkeley.

species of *Xenoglossodes.* Several parasitic bees, *Triepeolus helianthi* (Robertson), were also among them and by observing the activities of one of the relatively slow flying *Triepeolus* females as she left the flowers, we were able to locate the nesting site of the *Melissodes.* This occupied an area of approximately 16 square feet and included twelve irregularly spaced and irregularly shaped ground openings. They were devoid of tumuli, situated inconspicuously in small barren interspaces in the grassland, and were used communally by the bees.

During the warmer part of the morning (10:30 A.M.–11:30 A.M. MST), numerous pollen laden females were observed returning to the site, circling briefly, and entering one of the communal openings. Sometimes several females would enter the same opening within a few seconds of each other and commonly others, having already deposited their pollen stores, would be departing at the same time, requiring a returning female to pause near the entrance so as to permit a female to leave. At times females waiting within the entrance would remain there for relatively long periods of time thus effectively blocking it until they departed. If a *Triepeolus* female approached an opening and found it occupied she would hastily retreat. Similar reactions were noted when ovipositing bombyliid females, *Villa* (*Paravilla*) spp.[4] began to hover above an occupied burrow entrance. Even so, when an entrance was unoccupied, if only for a brief interval, *Triepeolus*[5] females would enter and, unless forced out, remain within for varying periods of time. In one instance one of these females spent 17 minutes underground. As many as three females of *Triepeolus* were observed simultaneously investigating a single entrance without displaying antagonistic behavior toward one another. Nor did they exhibit aggressive behavior toward *Villa* females, even when the

[4] Determined by Dr. F. R. Cole, University of California, Berkeley, as belonging to the group of *V.* (*P.*) *tricellula* Cole and *V.* (*P.*) *apicola* Cole which have been reared from cells of species of *Diadasia* [Cole (1952)].

[5] Although we have identified these from the literature as *T. helianthi* Robertson, they may well prove to be subspecifically or specifically distinct. The Robertson species has been recorded from Wisconsin by Graenicher (1905) as a parasite of *Melissodes trinodis* Robertson, a bee with more orthodox nesting habits.

latter hovered immediately behind or followed them about the nesting site. Miltogramine flies were observed in the nest area, but none were seen to enter the burrows.

While these activities were taking place, *Melissodes* males coursed continuously and erratically over the nesting site within an inch or so of the ground. Several times one was observed to pounce upon a returning pollen laden female, forcing her to the ground where they would mate. The resulting union was brief, usually lasting 10 to 15 seconds, although one pair remained in contact for 35 seconds during which time they moved spasmodically over the ground. Following separation the females entered one of the burrow openings and the males either resumed flight over the site or left the area.

During five days of intermittent observation (September 5–9) the greatest period of activity about the nesting site occurred between 11 A.M. and 2:30 P.M. On one occasion, an early afternoon thunder shower caused complete cessation of activity, but shortly after the storm passed the bees became active again even though the vegetation was wet and some water had drained into the burrow openings.

On the morning of September 9, a clear warm day, the first female *Melissodes* departed from one of the openings at 9:30 and returned 15 minutes later with a complete pollen load. As the morning progressed more and more females became evident and by 10:00 males had commenced their coursing flight over the site. At 10:45 the first females of *Triepeolus* and *Villa* commenced their activities over the nesting site.

In an effort to gain some idea of how many *Melissodes* females were using these communal entrances, a net was placed over the opening well before the bees became active. During the hours 9:30–11:30 A.M., 143 females were collected as they emerged, sometimes singly, more often in groups of 3–5. Occasionally one would escape and within 15 minutes or so she would return pollen laden, circle the area, and land either near or on the obstructing net. Commencing at 11:15 one of the burrows was readied for plaster of Paris pouring. Within the next 15 minutes 3 large beakers (1500 c.c.) of liquid plaster of Paris were poured in it without filling it.

Upon returning to the nesting site at 1:30 with additional plaster of Paris several more burrow entrances were prepared and similar large quantities of liquid plaster were poured into them. Since it was clear that the openings lead to extensive underground cavities, one of the partly poured burrows was finally selected for excavation. The entrance was oval in outline measuring 7×12 mm. The burrow at a depth of .5 cm. assumed a circular outline with a diameter of 5 mm. At about this point it began to turn gradually and within the next 2.5 cm. formed a semicircular curvature on the wall of the excavation so that at a depth of 3 cm. the descending portion of the burrow was again in line with the burrow opening. It continued downward for another 2.5 cm. with its lower end opening into an earth fissure which clearly extended downward and laterally for some distance. Excavation of another burrow opening resulted in similar findings and demonstrated that the irregularities within the first 2 or 3 cm. of the burrow were occasioned by small rocks and pebbles in the 5 to 6 cm. mantle of soil which overlaid the heavily fissured adobe-like substrate. Exploratory excavations along the fissures in this underlying substrate revealed several bees at a depth of 32–40 cm. from the ground surface and a number of old cells from the preceding year. Further digging in this extremely hard, yet moist, adobe-like material produced one newly constructed cell series at a depth of 36 cm. The tunnel, 5 mm. in diameter, extended inward, horizontally from a fissure for a distance of 10 cm. Two cells, each measuring 6 mm. in internal diameter (widest) by 15 mm. in length, were appended at the terminus and lay in the same plane as the burrow. One of the cells was provisioned and sealed and contained a first instar larva. The other cell was still in the process of being provisioned. On the basis of nests from previous seasons it was learned that the horizontal tunnels leading inward from the fissures had been excavated in the 32–40 cm. depth level and varied in length from 10 to 15 cm. Each of these tunnels terminated in 4–6 cells.

Our excavation opened some 9 square feet of the nesting site and extended downward to a depth of 2 to 3 feet, before it was necessary to terminate the digging. It was obvious that many of the fissures which varied in width from .5 cm. to 1.5 cm.

extended downward beyond the 2–3 foot level and laterally for indeterminate distances. How far laterally the bees extended their underground activities can only be conjectured. Since only one newly constructed nest was found in the removal of 18 or more cubic feet of earth and since 143 females were collected from just one of the 12 communal nest entrances, it must have been considerable. The number of *Melissodes* using the 12 underground entrances varied somewhat from entrance to entrance, but if only 100 on the average used each, the nesting site must have contained at least 1200 females.

Discussion

Two aspects of these observations would appear to require further comment. First, to our knowledge, this is the first recorded instance of North American eucerine bees utilizing a common entrance, although this type of behavior has been previously recorded in the exomalopsine genus *Exomalopsis* [Hicks (1936); Linsley, MacSwain and Smith (1954); Rozen and MacNeill (1957)]. Females of this last genus apparently employ two different methods of reaching the level at which they build their cells: (a) by the utilization of pre-existing passageways, such as soil cracks extending downward or burrows of prior generations or those of other bee species, or (b) by utilizing a common nest entrance. Further investigation may reveal the same situation in *M. composita,* which was found nesting in very hard, cracked soil, overlaid by a mantle. This habit, apparently developed independently to meet similar physical problems in the nesting area, would also appear to have potentialities as an incipient stage toward a more complex social behavior than is usually evident in anthophorid bees.

The second aspect is the behavioral response of the parasites to the problem created by the busy communal entrance, blocked much of the time by females entering and leaving, and by the relatively long distances from the entranceway to the cells being provisioned by the bee. The unusual behavior patterns of the females of *Triepeolus* are marked departures from those characteristic of species which oviposit in cells of completely solitary bees. This was reflected in the fact that several females would poise around a single entrance awaiting the opportunity to enter, the lack of antagonism toward each other, and the long periods of time during which they would stay below the surface presumably investigating numerous crevices and burrows. Their ability to successfully parasitize the *Melissodes* under these conditions was emphasized by the relatively large number of individuals present at the site. The same was true of the bombyliid flies, although the difficulties associated with successful parasitism in their case must have been much greater. Since the flies did not pass through the entrance to oviposit, primary larvae hatching near the opening had to traverse long distances to reach the open cells and pupal flies had to work their way to the communal opening from the intricate underground cracks for emergence. Empty pupal cases were found in numbers around the communal openings but none were encountered in underground spaces during excavation. It is interesting to speculate as to whether these modifications of more usual behavior patterns reflect adaptations to the habits of this particular species of bee, or whether they are within the range of normal response of these parasites to variations in nesting habits of their hosts.

Literature Cited

COLE, F. R. 1952. New bombyliid flies reared from anthophorid bees. Pan-Pacific Ent., 28(3): 126–130.

GRAENICHER, S. 1905. Some observations on the life history and habits of parasitic bees. Bull. Wisconsin Nat. Hist. Soc., 3(4): 152–167, 1 pl.

HICKS, C. H. 1936. Nesting habits of certain western bees. Canadian Ent., 68(3): 47–52.

LINSLEY, E. G., J. W. MACSWAIN and R. F. SMITH. 1954. A note on the nesting habits of *Exomalopsis solani* Cockerell. Pan-Pacific Ent., 30(4): 263–264.

MICHENER, C. D. and R. B. LANGE. 1958. Distinctive type of primitive social behavior among bees. Science, 127(3305): 1046–1047.

ROZEN, J. G. and C. D. MACNEILL. 1957. Biological observations on *Exomalopsis* (*Anthophorula*) *chionura* Cockerell, including a comparison of the biology of *Exomalopsis* with that of other anthophorid groups (Hymenoptera: Apoidea). Ann. Ent. Soc. Amer., 50(5): 522–529.

A New Genus and Three New Species of Phytoseiid Mites from Mexico with Collection Records on Phytoseius plumifer (C. & F.) and P. macropilis (Banks)

By Donald De Leon, Pensacola, North Carolina

Phytoseiids are mostly predaceous mites preying chiefly on plant feeding mites. The family is represented in Mexico by a rather large number of species some of which are widespread and common.

The genus *Phytoseius* includes two species, the rediscovered *plumifer* (C. & F.) (Chant, 1957) and the ubiquitous *macropilis* (Banks). Recently the writer collected *plumifer* on the east coast of Mexico and on Key Largo, Florida. A third species, more common and with a broader distribution than *plumifer* in Mexico, is described below.

Chant (*l. c.*) erected the genus *Proprioseius* for two undescribed species from the eastern United States; a third species is added to the group in this paper.

All measurements are in microns and are averages unless the variation from the average is more than ten percent; if so, the range is given.

Phytoseius nahuatlensis, n. sp. (Figures 3–4)

P. nahuatlensis resembles *P. plumifer* (C. & F.) as redescribed and figured by Chant (*l. c.*) in general facies, but differs from it chiefly by having a large pore behind M1 and by having shorter lateral setae.

Female: Dorsal shield 260 long, 131 wide, with faint imbrications along the anterolateral margins, faint rugosities anteromedially, and with 16 pairs of setae as follows: Eight laterals (including S1 which is on the shield and close to L4), two medians, and six dorsals. The lengths of these setae follow: L1 36, L2 12, L3 31–40, L4 13–18, L5 46, L6 57–69, L7 42–61; M1 9, M2 31–44; D1 20, D2–D6 9–14; all setae except M1 and D2–D6 and apparently L2 pectinate. S1 30 and VL1 38–48 long, both pectinate. Sternal shield with three pairs of setae; ventrianal shield strongly constricted laterally and with three pairs of preanal setae. Fixed digit with three teeth just proximal of terminal hook, movable digit with one tooth. Genu, tibia and metatarsus of leg IV each with a slender, tapering macroseta about 18, 18, and 20 long respectively, the tips not or scarcely enlarged.

MALE: Resembles female; dorsal shield 206 long, about 118 wide.

Holotype: Female, Tuxtla Gutierrez, Chiapas, January 15, 1957 (D. De Leon), from *Lonchocarpus rugosus. Paratypes:* One male, same locality as for holotype, but from *Rhus schideana;* one female, Veracruz, Ver., December 25, 1956, from *Guazuma tomentosa;* three females, Tuxtla Gutierrez, January 12, 1957, from an unknown host. Additional specimens were collected from the latter locality on *Pluchea odorata;* from Cordoba, Ver., February 4 and 5, 1957, from *Heliocarpus tomentosa* and *Luehea candida* and from Santa Maria del Oro, Nay., March 24, 1957, from an unknown host.

Specimens which closely resemble the above species, but are larger (dorsal shield 266–288 long), with most of the lateral setae longer (L1 38, L2 10, L3 46, L4 9, L5 60, L6 72–90, L7 58–72; M2 49–60), and with the macrosetae of leg IV somewhat longer, coarser and with the tips distinctly enlarged were collected at Ixtlan del Rio, Nay., March 24, from an unknown host; at Tepic, Nay., from *Lippia umbellata;* Mirador del Aguila (near Tepic), from *Guazuma tomentosa;* and at San Blas, Nay., April 4, from *Thevetia* sp. In addition three specimens collected on the east coast of Mexico in December 1956 from *Guazuma* sp. and *Hamelia patens* have very long lateral setae as follows: L1 47, L2 10, L3 60, L4 12, L5 78, L6 90–102, L7 74–81; M2 68. The macrosetae of leg IV of these last three mentioned specimens are large, coarse and with strongly expanded tips. Further work is necessary to determine whether three species are involved or whether all these specimens are variations of a single plastic species.

Phytoseius plumifer (C. & F.)

Collection records for this species follow:

Reynosa, Tam., December 18, 1956, from *Cordia boissieri* and *Melochia tomentosa*. Ciudad Victoria, Tam., December 20, 1956, from an unknown host. Tamazunchale, S. L. P., December 21, 1956, from *Eriobotrya japonica*. Veracruz, Ver., December 25, 1956, from *Guazuma tomentosa*. Tuxtla Gutierrez, Chiapas, January 15, 1957, from *Cecropia peltata*, *Achras zapota*, and *Morus alba*. Key Largo, Florida, USA, June 1956 from *Callicarpa americana*.

Phytoseius macropilis (Banks)

Collection records for this species in Mexico follow:

Minatitlan, Ver., January 8, 1957, from an unknown host. Ocozocoatla, Chiapas, January 28, 1957, from sangre toro.

Proprioseius mirandai, n. sp. (Figures 1–2)

P. mirandai is readily distinguished from the two other species in the genus (*P. meridionalis* Chant and *P. clancyi* Chant) by having L4, L7, and M2 much longer and more slender than they are in the latter two species.

Female: Body whitish, elongate; dorsal shield rugose, 277 long, 148 wide, with 14 pairs of setae as follow: Seven laterals, two medians, and five dorsals (D5 missing). Dorsal shield setae of the following lengths: L1–L3 14–18, L4 81, L5 13, L6 20, L7 111; M1 5, M2 94 (L4, L7, and M2 strongly pectinate); D1 27, D2–D6 7–11; S1 31 (pectinate), S2 18, VL1 71 (pectinate). Peritremata extending forward to D1. Sternal shield with three pairs of setae; ventrianal shield with three pairs of preanal setae, no pores, about 100 long and 55 wide with the sides constricted and surrounded by four pairs of interscutal setae, including VL1. Two pairs of metapodal shields, the primary one about 19 long; a pair of small circular shields between VL1. Fixed digit with five or six teeth, movable digit with one tooth. Metatarsus of leg IV with a rapidly tapering macroseta about 19 long.

MALE: Resembles female. Dorsal shield 210 long, 125 wide; L4 45, L7 50, and M2 47 long, all pectinate.

Holotype: Female, Tepic, Nay., March 25, 1957 (D. De Leon), from *Lippia umbellata*. *Paratypes:* One female, same data as for holotype; one male, San Blas, Nay., April 6, 1957, from agualama; one male and one female December 25, 1956, Veracruz, Ver., from *Guazuma tomentosa;* two females, Cordoba, Ver., from *Croton draco*. Additional specimens were collected from *Hamelia patens,* Cordoba; from a composite, Matias Romero, Oax., January 30, 1957; and from *Polygonum* sp., San Blas, Nay., March 31, 1957.

I am not certain that these mites are predaceous; they may be facultative predators, as two specimens on a composite appeared to be sucking sap from the leaf—no other mites were observed on the leaf.

The mite is named for Dr. Faustino Miranda of the Instituto de Biologia, Mexico, D. F., who kindly identified most of the host plants I collected on the east coast of Mexico and in Oaxaca.

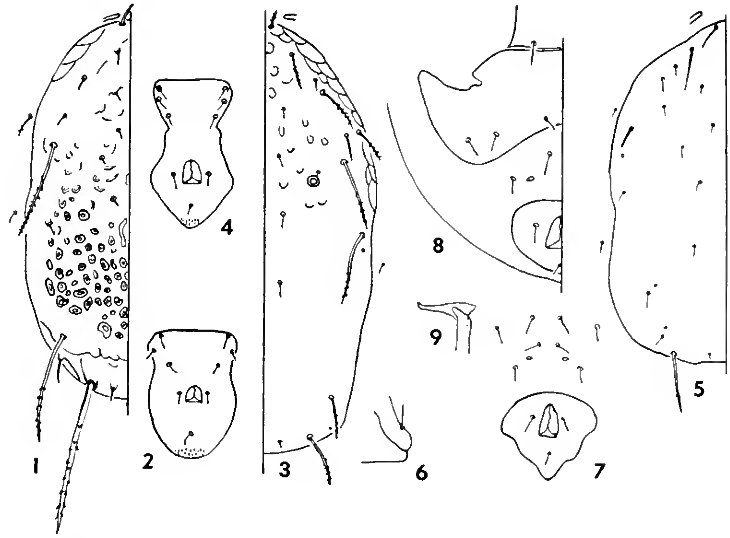
TYPHLOSEIOPSIS, n. gen.

Phytoseiids with dorsal shield smooth or nearly so, with at least five pairs of anterolateral setae, and with D2–D6 minute; female without ventrianal shield (only anal shield present), male with ventral shield separated from anal shield; genua I–IV, tibia IV, and metatarsus IV each with a macroseta. The absence of a ventrianal shield in the female and the separated ventral and anal shields in the male are distinguishing characters.

Type: *Typhloseiopsis theodoliticus,* n. sp.

Typhloseiopsis theodoliticus, n. sp. (Figures 5–9)

FEMALE: Body light tan; dorsal shield 308 long, 201 wide with 16 pairs of setae as follows: Eight lateral (L4 is distinctly medial of a line drawn between L3 and L5), two median, and six dorsal. Lengths of setae as follows: L1 33, L2—L4 7–9, L5 9–18 (10 ♀♀, 1 ♀ with L5 44), L6 9–13, L7 8, L8 56; M1 8, M2 12; D1 21–29, D2–D6 7–11; S1 14, S2 10; VL1 38.



Proprioseius mirandai, n. sp.: 1, dorsal shield; 2, ventrianal shield. *Phytoseius nahuatlensis*, n. sp.: 3, dorsal shield; 4, ventrianal shield. *Typhlosciopsis theodoliticus*, n. sp.: 5, dorsal shield; 6, posterolateral margin of genital shield; 7, anal shield of female and the four pairs of preanal setae and the pair of pores of the ventrianal area; 8, ventral and anal shields of male; 9, distal end of spermatophore bearer.

Sternal shield longer than wide, very faintly reticulate and with three pairs of setae; ventral shield missing, not fused with anal shield; four pairs of preanal setae and a pair of small pores anterior of anal shield; anal shield 59 long, 63 wide with three setae and of shape shown in figure; three pairs of setae including VL1 surrounding ventrianal area; two pairs of small, narrowly oval metapodal shields. Legs slender, with macrosetae of the following lengths: Genu I 36, genu II 27–36, genu III 35, genu IV 54; tibia IV 27–36; metatarsus IV 43–63; all macrosetae slender and tapering to a fine point.

Male: Resembles female, but L5 22 long and ventral shield present although not fused with anal shield; three pairs of setae on ventral shield and two pairs of setae and a pair of pores between ventral and anal shields; anal shield 45 wide, 32 long of shape shown in figure. Dorsal shield 248 long, 163 wide.

Holotype: Female, San Blas, Nay., March 28, 1957 (D. De Leon), from *Paullinia fuscescens.* *Paratypes:* One male, three females, San Blas, Nay., March 31, 1957, from *Combretum farinosum;* two females, Cordoba, Ver., February 4, 1957, from *Miconia glaberrima.* Additional specimens were collected in the San Blas area from *Licaria* sp., *Annona* sp., banana, and a lauraceous tree, and at Tuxtla Gutierrez, Chiapas, from *Piper* sp.

These mites were found in association with species of *Brevipalpus* and *Tenuipalpus.*

Holotypes of the above species are in the writer's collection, paratypes will be deposited in the University of Florida Collections, Gainesville.

Reference Cited

Chant, D. A. 1957. Descriptions of two new phytoseiid genera (Acarina: Phytoseiidae), with notes on *Phytoseius* Ribaga, 1902. Canad. Ent. 89 (8): 357–363.

A Synonymical List of American Himantariidae, with a Generic Key and Description of a New Genus (Chilopoda: Geophilomorpha: Himantariidae)

By Ralph E. Crabill, Jr., U. S. National Museum, Smithsonian Institution, Washington, D. C.

(*Continued from p. 126*)

The underlying key should assist in the generic allocation of many existing species and provide a framework within which forthcoming new forms may be studied. Without any doubt the future accumulation of additional information on distribution and variation will affect it profoundly: this is frankly anticipated. The reader will note that I have included *Nothobius* Cook and *Gosothrix* Chamberlin, both questionably referred to the family by Attems (1, p. 54) because of their possession of ultimate pedal pretarsi. On the basis of the original description at least of *Gosothrix* it certainly seems apparent, at least to me, that the Chamberlin genus is a true himantariid.

Key to the American Himantariid Genera [5]

1a. Ultimate legs with typical unguiform pretarsi (*Nothobius, Gosothrix*)..2

1b. Ultimate legs without pretarsi........................3

2a. Narrow *major* paratergites present at least on some segments. Ventral pore-fields present. Coxopleural pores numerous, presumably free and not concentrated in pits or fossae..........................*Nothobius* Cook

2b. Major paratergites and ventral pore-fields absent. The majority of the coxopleural pores concealed, opening into pits or fossae along and beneath the edge of the sternite (and tergite?).......................*Gosothrix* Chamberlin

3a. Coxopleural pores exposed, essentially uniformly distributed over most or all of the coxopleural surface. Ventral pore-fields present or absent (*Stenophilus, Arcophilus*).......4

[5] The key makes no provision for *Haplophilus subterranea* (Leach) (*sensu* Chalande & Ribaut, 1909), a widespread European form intercepted at quarantine and possibly established in this country, or for *Haplophilus grenadae* Chamb., 1912, or *Haplophilus hesperus* Chamb., 1928; the generic affinities of the latter two species are in doubt.

3b. Most or all of the coxopleural pores concealed, opening into one to several pits or into fossae lying next to and/or somewhat beneath the sternite margins. Ventral pore-fields present (*Gosophilus, Garriscaphus, Emphcrozoster*) 5

4a. Labrum not deeply incised medially, instead evenly arched over its entire breadth. Ventral pore-fields present, evidently on most sternites, including those of rear third of body [6] .... *Arcophilus* Chamberlin

4b. Labrum medially deeply incised, not evenly arched over its entire breadth. Ventral pore-fields absent (*coloradanus, californicus*), present on anterior half of body (*rothi*), or present on most of the posterior segments as well (*audacior*) .... *Stenophilus* Chamberlin

5a. Base of prehensorial claw with a small but distinct black denticle. Subcondylic sclerotic lines of prosternum absent (applies only to type-species, *orcines;* see Note A) .... *Garriscaphus* Chamberlin

5b. Base of prehensorial claw without such a denticle. Subcondylic sclerotic lines absent or present (*Gosiphilus, Emphcrozoster*) 6

6a. Prosternal subcondylic sclerotic lines *in most* pronounced, extending to condyles. Ultimate sternite in most broader than long, usually conspicuously so. Intercalary (not major) paratergites present, at least in some species and probably in all. Antennae often flattened proximally, often attenuate distally. 1st maxillary lappets present. Anal pores absent (in type and in all known specimens......... ....*Gosiphilus* Chamberlin (see Notes A, B, and C.)

6b. Prosternal sclerotic lines absent, i.e., not passing across corner of prosternum toward and connecting with condyles. Ultimate pedal sternite much longer than its width at midlength. Intercalary paratergites absent, the lateral ends of intercalary tergites covered by intercalary pleurites. Antennae not attenuate distally, the more proximally articles not depressed dorso-ventrally nor subcylindrical, instead compressed on each side and distinctly longer than wide. 1st maxillary lappets absent. Anal pores present........ .... *Emphcrozoster*, New Genus

[6] The Bolivian *Stigmatogaster gracillima* Verhoeff, 1938, is questionably placed here; however, its pore-fields occur only on the anterior half of the body.

List of American Himantariidae

The following list is synonymical to the extent that a very careful study of the literature and an admittedly limited acquaintance with the American specimens are capable of making it. As will be seen, most of the species are known only from their type localities. I have listed what seem to be the valid genera, the type species with the method of fixation, the species believed at this time to be included under each generic name, synonyms, the sources and dates of publication, and a general indication of distribution. An asterisk indicates that the associated species is known only from the type locality or localities.

Arcophilus Chamberlin, 1943. (14, 10).

Type-species: *Arcophilus toltecus* Chamb., 1943. (Original designation and monotypic).
Arcophilus toltecus Chamb., 1943. (14, p. 10; Mexico: Puebla *).
? **Stigmatogaster gracillima** Verhoeff, 1938. (21, p. 126; Bolivia *).

Empherozoster Crabill, 1959.

Type-species: *Empherozoster antaeus* Crab., 1959. (Original designation and monotypic).
Empherozoster antaeus Crab., 1959. (New Mexico *).

Garriscaphus Chamberlin, 1941. (13, p. 789).

Type-species: *Garriscaphus oreines* Chamb., 1941. (Original designation).
Garriscaphus oreines Chamb., 1941. (13, p. 790; California *).
? **Garriscaphus amplus** Chamb., 1941. (13, p. 790; California *). (? = **Gosiphilus**).

Gosiphilus Chamberlin, 1912. (6, p. 671). (See Note C).

Type-species: *Strigamia laticeps* Wood, 1862, vid. infr. (= *Gosiphilus laticeps* (Wood)). (Subsequent designation of Crabill, 19, p. 88).
? Syn.: *Californiphilus* Verhoeff, 1938. (20, p. 370), with type-species *C. michelbacheri* Verhoeff, 1938. (20, p. 371). (Monotypic).
? **Garriscaphus amplus** Chamb., 1941. (13, p. 790; California *).

Gosiphilus auximus Chamb., 1938. (12, p. 254; Texas *).

Gosiphilus bakeri Chamb., 1912. (6, p. 672; California *).

Gosiphilus craterus Chamb., 1944. (15, p. 186; Mexico: Hidalgo *).

Gosiphilus euphorion Crab., 1953. (19, p. 85; Alabama *, Tennessee *, Kentucky *).

Strigamia laticeps Wood, 1862. (22, p. 49; Texas, California, Nevada [7]).

Californiphilus mexicanus Attems, 1947. (2, p. 51; Mexico *). (? = *auximus* Chamb., 1938, q.v.).

Californiphilus michelbacheri Verhoeff, 1938. (20, p. 371; California *).

Gosiphilus minor Chamb., 1912. (6, p. 671; California *).

Gosiphilus minor arizonicus Chamb., 1925. (9, p. 54; Arizona *).

Gosiphilus morelus Chamb., 1943. (14, p. 11; Mexico: Morelus *).

Gosiphilus orizabae Chamb., 1944. (15, p. 185; Mexico: Vera Cruz *).

? **Strigamia taeniopsis** Wood, 1862. (22, p. 48; Georgia, ? = California).

Gosothrix Chamberlin, 1923. (8, p. 398).

Type-species: *Gosothrix insulanus* Chamb., 1923. (Original designation and monotypic).

Gosothrix insulanus Chamb., 1923. (8, p. 398; Gulf of California *).

Nothobius Cook, 1899. (18, p. 303).

Type-species: *Nothobius californicus* Cook, 1899. (Monotypic).

Nothobius californicus Coo, 1899. (18, p. 303; California).

Stenophilus Chamberlin, 1946. (16, p. 35). (Revised, 17, p. 37).

[7] The type was collected in Texas. Chamberlin has reported the California and Nevada records, basing them upon specimens with prominent, complete prosternal sclerotic lines and circular anterior spiracles. The holotype of *laticeps,* however, lacks subcondylic sclerotic lines and has vertically elliptical spiracles. See Notes A and B.

Type-species: *Stenophilus coloradanus* Chamb., 1946. (Original designation and monotypic).

? **Haplophilus audacior** Chamb.,[8] 1909. (5, p. 177; Idaho *).

Meinertophilus californicus Chamb., 1930. (11, p. 297; California *).

Stenophilus coloradanus Chamb., 1946. (16, p. 35; Colorado *).

Stenophilus rothi Chamb., 1953. (17, p. 38; Oregon *, Montana *).

Generic Assignment Uncertain.

Haplophilus audacior Chamb., 1909. (5, p. 177; Idaho *).

Haplophilus hesperus Chamb., 1928. (10, p. 309; Utah *).

Haplophilus grenadae Chamb., 1912. (7, p. 435; Mississippi *, not "Missiones," auctt. lap. cal.).

Note A. Prosternal Sclerotic Lines ("chitin lines").

It is easy to misinterpret the meanings of various authors when they refer to this character. For instance, when it is stated that chitin lines (or better, prosternal sclerotic or subcondylic lines) are absent, this only means (in the case of these himantariid genera) that the lines do not pass across the anterolateral corners of the prosternum toward or to the condyles, as is the case in fig. 4. Note, however, that the lines are actually present (e), though mostly covered by the pleurites (a). To state that the lines are complete means that they connect with the condyles. Therefore we should not describe them as absent unless in fact they are. Instead, the following distinction should be made: 1) sclerotic lines passing *toward* the condyles across the prosternum, or passing toward and *connecting with* the condyles, versus; 2) sclerotic lines not passing across the prosternum toward the condyles. I suspect that all himantariid species which are said by convention to lack these lines in fact have them, though they do not migrate across the prosternal corner toward or connect with the condyles.

[8] Originally (16, p. 35) Chamberlin referred *audacior* to *Stenophilus*, even though he characterized the genus as lacking sternital pore-fields. Subsequently (17, p. 37) he altered the generic diagnosis to make provision for species with ventral pore-fields but only if they are restricted to the anterior half of the body (e.g. *rothi*). However, in 1909 he stated that *audacior* does have pore-fields on the rear body sternites.

Note B. Gosiphilus laticeps (Wood), type-species of the genus; a brief diagnosis of the holotypical specimen.

Male with 81 pairs of legs. Antennae basally flattened, distally attenuate. Prebasal plate concealed. Labrum: deeply embayed but not divided medially, teeth 9 + 10; apparently broadly fused with clypeus, at least laterally. Mandible: dentate lamella with 12–13 teeth; 7–8 pectinate lamellae, their teeth with parallel sides. 1st maxillae: telopodite bipartite, with distinct triangular lappets; deeply incised medially; coxosternum without lappets. 2nd maxillae: deeply incised medially; with a shallow midlongitudinal groove (but no suture); claw pointed, inner surface concave, with basal spines. Prosternal sclerotic lines not passing toward condyles across prosternal corner, appearing exactly as in fig. 4(e). Prehensors: without articular denticles; claw distally concave. Tergites: except the first two and last each conspicuously bisulcate; major paratergites absent; intercalary paratergites present and readily seen at least on the anterior body third. Pleurites: no stigmopleurite fused with adjacent plates; spiracles at least of anterior body half each distinctly vertically elliptical, the lower arc of each narrower than the upper (hence each is rather egg-shaped in outline), no spiracle is circular; intercalary pleurites very large, overlapping sides of intercalary tergites, at least on posterior third of body. Sternites: pore-fields on sternites 2 through penultimate; without pouches, fossae, etc. Ultimate segment: pretergite separated from very large intercalary pleurites; tergite broadly trapezoidal; sternite no broader than long, posterior margin deeply emarginate, sides gently convergent; each coxopleuron with 3 ventral pits containing cryptic pore-openings and with 2 elongate dorsal pits also with cryptic pore-openings; legs incomplete but reportedly clawless. Postpedal segments: ♂ gonopods long, very widely separated, each bipartite. Terminal pores absent.

Note C. Gosiphilus and **Californiphilus.**

Lacking adequate material and other evidence, I have not felt justified in re-allocating the species here included under *Gosiphilus*. Quite obviously this arrangement is both unsatisfactory and tentative. This is all the more apparent from the fact that the type-species of *Gosiphilus* lacks complete prosternal sclerotic lines, though the presence of such lines was supposed to be a signal characteristic of the genus. Should the accumulation of additional information justify a generic division based upon this character *alone*, then perhaps most of the species would take the Verhoeff name, *Californiphilus*, whose type-species does possess complete sclerotic lines. At the same time it is quite likely that the best, and as yet unknown, arrangement is much more complicated than this.

Bibliography

Attems, C. G.

1) Das Tierreich, Lief. 52: 1–388, (1929).
2) Ann. Naturh. Mus. Wien, 55: 50–149, (1947).

Broelemann, H.

3) Faune de France, 25: 1–405, (1930).

Chalande, J. and H. Ribaut.

4) Arch. Zool. Exper., (5)1: 197–275, (1909).

Chamberlin, R. V.

5) Ann. Ent. Soc. Amer., (2)3: 175–195, (1909).
6) III. Journ. Ent. Zool. Pomona, 4(1): 651–672, (1912).
7) Bull. Mus. Comp. Zool. Harvard, 54(13): 407–436, (1912).
8) Proc. Cal. Acad. Sci., (4)12(18): 389–407, (1923).
9) Journ. Ent. Zool. Pomona, 17(4): 53–54, (1925).
10) Ent. News, 39(10): 307–311, (1928).
11) Univ. Cal. Publ. Zool., 33(14)): 297–300, (1930).
12) Ent. News, 49: 254–255, (1938).
13) Ann. Ent. Soc. Amer., 34: 773–790, (1941).
14) Bull. Univ. Utah Biol. Ser., 7(3): 1–55, (1943).
15) Zool. Ser. Field Mus. Nat. Hist., 28(4): 175–216, (1944).
16) Proc. Biol. Soc. Wash., 59: 35–38, (1946).
17) Psyche, 60(1): 37–39, (1953).

Cook, O. F.

18) Proc. Ent. Soc. Wash., 4(3): 303-312. (1899).

Crabill, R. E., Jr.

19) Ent. News, 48(4): 85–88, (1953).

Verhoeff, K. W.

20) Zool. Jahrb. (Syst.), 71: 339–388, (1938).
21) Zool. Anz., 123(5/6): 123–130, (1938).

Wood, H. C., Jr.

22) Journ. Acad. Nat. Sci. Phila., (2)5: 1–52, (1862)

Types of Tingidae Described by Torre-Bueno (Hemiptera) [1]

By George W. Byers

In 1948, the Snow Entomological Museum of the University of Kansas acquired two outstanding collections of Hemiptera, those of J. R. de la Torre-Bueno and G. W. Kirkaldy. Together with the collections were purchased the extensive libraries of reprints and separate papers accumulated by these two hemipterists. Interpolation of the Torre-Bueno and Kirkaldy specimens into the Snow Museum collection has only recently been completed. It was found at the time of purchase that the Torre-Bueno collection had been extensively damaged by water (as a result of flooding of a basement in which the collection had been stored) and by dermestids. The following notes pertain to the type series of two species of Tingidae found in this collection, which are, as far as I am aware, the only North American species of this family described by Torre-Bueno.

Acalypta lillianis Bueno

1916. A new tingid from New York state. Bull. Brooklyn Ent. Soc., 11 (2) : 39–40.

A box that had contained about eighty pinned tingids, including a part of the type series of this species, was found to have all the specimens detached from the paper points to which they had been glued; the insects lay scattered in the bottom of the box. By reference to the original description and comparison with specimens kindly loaned from the United States National Museum by Dr. Peter D. Ashlock, I isolated from the debris

[1] Contribution No. 1044 from the Department of Entomology, University of Kansas, Lawrence, Kansas.

Collembola from Japan. I. Onychiurinae

By Harold George Scott [1]

During 1951 and 1952, Captain John E. Scanlon [2] collected a number of interesting springtail insects while with the 406th Medical General Laboratory (U. S. Army) in Japan. This is the first of a series of papers reporting on these collections. Specimens will be deposited with the Academy of Natural Sciences, Philadelphia, Pennsylvania.

Onychiurus pseudarmatus Folsom, 1917.

The similarity between this species (not previously recorded from Japan) and the Japanese *Onychiurus yagii* is recognized. However, the Scanlon specimens are clearly *Onychiurus pseudarmatus.*

Japanese Record. From soil of rodent burrow, 23–x–1952, Shizuoka, Subashiri, Honshu, Japan, by J. E. Scanlon.

Distribution. Japan, Alaska (from moss), New York (from leaf mold).

Onychiurus ramosus Folsom, 1917.

The Japanese specimens agree fully with Folsom's description. This species has not been recorded previously from Japan.

Japanese Record. From Berlese funnel sample of soil, bamboo grove in woods, 677 meters altitude, 20–vi–1952, Beppu, Otta Ken, Kyushu, Japan, by J. E. Scanlon.

Distribution. Japan, Ontario, Illinois (among grass roots, in woods under damp logs), Iowa.

Key to the Species of Onychiurinae Recorded from Japan

1. Furcula well developed; body pigmented; adults longer than 5 mm................*Homaloproctus sauteri* Borner, 1909

[1] Training Branch, Communicable Disease Center, Bureau of State Services, Public Health Service, U. S. Department of Health, Education, and Welfare, Atlanta, Georgia.

[2] Medical Service Corps, U. S. Army. Present address: Department of Entomology, University of Maryland, College Park, Maryland.

Furcula absent or strongly reduced; body generally unpigmented; adults shorter than 5 mm. 2

2. Hind margin of head with pseudocelli 3
   Hind margin of head without pseudocelli 5
3. Anal spines absent . . . . . *Onychiurus folsomi* (Schaffer, 1900)
   Anal spines present 4
4. Tergites minutely granulate; pseudocellar formula (2 + 2) (0, 1 + 1, 2 + 2) (2 + 2, 2 + 2, 2 + 2, 2 + 2, 2 + 2, 0) . . . . *Onychiurus yagii* Kinoshita, 1923
   Tergites coarsely granulate; pseudocellar formula (2 + 2) (0, 1 + 1, 1 + 1) (2 + 2, 2 + 2, 2 + 2, 2 + 2, 3 + 3, 0) . . . . *Onychiurus pseudarmatus* Folsom, 1917
5. Postantennal organ with about 30 tubercles; integument coarsely granulate . . . *Onychirus granulatus* (Borner, 1909)
   Postantennal organ with about 13–15 tubercles; integument minutely granulate 6
6. Unguiculus much less than one-half length of unguis; postantennal tubercles simple . . . . *Onychirus tomuraushensis* (Yosii, 1940)
   Unguiculus approximately half length of unguis or longer; postantennal tubercles many lobed . . . . *Onychiurus ramosus* Folsom, 1917

Summary

Onychiurus pseudarmatus and *Onychiurus ramosus* are recorded for the first time from Japan. A key to the species of Onychiurinae known from Japan is presented.

Japanese Summary

(By Dr. Shinichi Matsuda, Chief, Department of Epidemiology, Institute of Public Health, Ministry of Health and Welfare, Tokyo, Japan.)

二種のSpringtail昆虫(Collembola)，すなわちOnychiurus pseudarmatusとOnychiurus ramosusが，日本で初めて記録された，そして日本でOnychiurinaeが発見された鍵が提示された。

REFERENCES CITED

BORNER, C. 1909. Sitz. Ges. naturf. Freunde Berlin, 2: 99–135.
FOLSOM, J. W. 1917. Proc. United States Natl. Mus., 53: 637–659.
KINOSHITA, M. 1923. Konchu Sekai, 27: 75–79.
SCHAFFER, C. 1900. Fauna Arctica, 1(2): 237–258.
YOSII, R. 1940. Annot. Zool. Japon., 19(3): 185–190.

Note on the Rearing of Thysanus fasciatus (Hymenoptera: Thysanidae) from Melanaspis lilacina (Homoptera: Diaspididae) in California

By P. H. ARNAUD, JR., Bureau of Entomology, California Department of Agriculture, Sacramento

Melanaspis lilacina (Cockerell) is considered to be a rare scale in California, having been recorded so far from only two California localities in San Diego County—Banner, in 1939, and Descanso, in 1955 (McKenzie, H. L., 1956, Bull. Calif. Insect Sur., 5: 77). The thysanid parasite here recorded was reared from the latter collection. From a small collection of a half dozen adult scales of *M. lilacina* (det. confirmed, H. L. McKenzie) collected on *Quercus* sp. at the Sherilton Ranch, Descanso, 30 November 1955, by G. W. Schwegel and J. P. Dion, a single female specimen of *Thysanus fasciatus* (Girault) (det. B. D. Burks) was reared by the writer. Its pupa was discovered under one of the scale covers previous to its emergence. This is very probably a primary parasite, as De Bach, Kennett and Pence (Jour. Econ. Ent. 51(1): 114–115, 1958) have recently recorded rearings of *Thysanus merceti* (Malenotti) and *T. thoreauini* (Girault) from armored scales as primary parasites. *Thysanus fasciatus* was originally described from Mexico, and in the United States is known to occur in Texas.

Variation in the Ant Polyrhachis thrinax (Hymenoptera)

By W. L. Brown, Jr., Museum of Comparative Zoology

Polyrhachis (Myrmothrinax) thrinax Roger

Polyrhachis thrinax Roger, 1863, Berlin. Ent. Zeitschr. 7: 152, worker. Type loc.: Ceylon.

Polyrhachis (*Myrmothrinax*) *thrinax* var. *mucronis* Donisthorpe, 1942, Ann. Mag. Nat. Hist. (11) 9: 460, worker (stated in error to be female). Type loc.: Nadungayam, 200 feet, Malabar, S. India. New Synonymy.

Donisthorpe states, "In this variety the central spine on the petiole is simple instead of being bimucronate as in the typical form." In a type of *mucronis* received from the British Museum, however, I find that the tip of the central spine is actually finely bimucronate. The Nadungayam specimen, a few workers from Bombay (*ex.* G. B. King Coll.), and two nest series from Jorhat, Assam (A. C. Cole *leg.*) show some variation in the breadth of the apex of the spine, as well as in other minor characters, but there is nothing exceptional in this for a *Polyrhachis*.

Notes and News in Entomology

Under this heading we present, from time to time, notes, news, and comments. Contributions from readers are earnestly solicited and will be acknowledged when used.

Michigan State List in Preparation. According to the steering committee (R. R. Dreisbach, Roland Fisher, J. H. Newman, George Steyskal, and Henry Townes) work has begun on a list of insects, arachnids, and other land arthropods of Michigan. Records of about 17,000 species and 85,000 individual county occurrences are on hand. Additional records with authentic determinations, specialists to advise, and, in some areas, to take responsibility for taxonomic groups are needed. Typed copy is to be ready for specialists by January 1960, and for final typing by January, 1962. Mr. R. R. Dreisbach is general editor and communications may be addressed to him at 301 Helen Street, Midland, Michigan.

Review

A Reclassification of the Order Odonata. By F. C. Fraser. The Royal Zoological Society of New South Wales, 1957. 133 pp., 63 figs.

R. J. Tillyard's concept of Odonata classification, which was annotated, completed and posthumously published by F. C. Fraser in 1938–40 (A reclassification of the Order Odonata, based on some new interpretations of the venation of the dragonfly wing. Australian Zool. 9: 125–169; 195–221; 359–396), has been revised by Fraser. Updating of this significant study is occasioned by (1) subsequent discoveries of fossil Odonata in Oklahoma and Kansas, (2) re-examination by Carpenter of Commentary fossil wings initially and inaccurately described and figured by Brongniart and by Meunier, (3) finding of nymphs of the archaic genera *Chorismagrion* and *Lestoidea* by Dobson and (4) study of evolutionary and ontogenetic development of the subcostal and anal veins by Fraser. A considerable part of the present work is essentially a reprint of the earlier with Fraser's previous footnote annotations incorporated in the body of the text. Usually in identifiably new paragraphs are interpolated Fraser's views (some previously published), systematic rearrangements and elucidating comments on the differing concepts of Tillyard and Carpenter regarding ancestral Odonata. None of the figures appears to be new although there is reinterpretation of some, especially that of the wing of the ancestral *Protagrion audouini*.

Controversial in the study of Odonata evolution has been the source of the Anisozygoptera and their descendents, the Anisoptera. Tillyard's original view was that the broad-based wing of anisopterous forms derived from narrow-petioled zygopterous types by means of recurrent branches thrown off from the stem of the anal vein which was fused at its base with the posterior cubitus (Cu_2) in both suborders. This view yielded, prematurely according to Fraser, to a concept of dual origin held by Carpenter and based on his studies of the Permian Protanisoptera. It is Carpenter's contention that the Anisoptera derived from the Protanisoptera, forms in which the anal vein was independent of the posterior cubitus, and that the Zygoptera, having the anal vein fused with the posterior cubitus, arose from the Protodonata independently of the Anisoptera through protozygopterous types. As Fraser points out, adherence to Carpenter's thesis necessitates acceptance of a parallelism of evolution in so many venational structures as to be incredible. It is, as well, a thesis which neither explains why the forewing of the Anisozygoptera is zygopterous while the hindwing is anisopterous nor accounts for the existence of zygopterous structures in present-day Anisoptera. Largely on the basis of these vestigial characters, and reinforced by the fossil record and acceptance of Lameere's ancestral Palaeopterous type of wing-venation, Fraser proposes that the Anisoptera have, in their descent from the Protodonata, passed through a zygopterous stage and that the anal vein arises independently of the posterior cubitus from the base of the wing in both extant suborders.

The present classification is consistent with his hypothesis, and reflects, in so far as it can, Fraser's views on evolution within the palaeopterous Odonata. The starting point of separation from the Protodonata is held likely to be *Eresipteron* (Suborder Meganisoptera), a point proposed earlier by Carpenter. From the Meganisoptera arose two lines, the successful Protozygoptera and, according to Fraser, a dead end, the Protanisoptera. It was because of the seeming foreshadowing within this latter group of libelluloid and aeshnoid features that Carpenter (and later Tillyard) proposed this group as the direct precursors of the Anisozygoptera, and hence Anisoptera. Although Fraser argues well his point that the Protanisoptera indeed constituted an evolutionary blind alley, this is a locus likely to be controversial for some time. Fraser then considers that the Protozygoptera, in addition to bearing an unsuccessful side-branch, the Archizygoptera, gave rise also to the Zygoptera from which developed the Coenagrioidea, Hemiphlebioidea and Lestinoidea. The Agrioidea and Anisozygoptera separated from the Lestine complex, according to Fraser.

In addition to this main evolutionary stream and resulting therefrom, there are several noteworthy and probably controversial items of classification: (1) a further development of Fraser's previously published account on the position of his new family Macrodiplactidae (*Macrodiplax, Urothemis, Aethriamanta* and *Selysiothemis*) as a natural annectant between the Corduliidae and Libellulidae; (2) a consideration of the Synthemidae as a link between Corduliidae, in which these archaic forms were previously included, and Cordulegasteridae, bringing the latter into the orbit of the Libelluloidea; (3) a splitting of the hodge-podge Megapodagriidae with inclusion of that family in the Lestinoidea; (4) a discussion of the relationship of Agrioidea to Lestinoidea based largely on the amphipterygine-like nymph of *Lestoidea conjuncta.* It is significant to point out that the last point is one of the very few instances in which characteristics of the larval form are brought to bear on the systematics of the group, for it reflects the regrettable paucity of critical studies on immature dragonflies.

Whereas the wings and wing venation are of greatest importance in recognition of orders and families of insects and these are the very parts generally preserved as fossils, there should be no overlooking the importance of the potential value of thorax (for evidence on changes in obliquity and obliteration of sutures), tarsi (for numbers), head (for fusion of the eyes over the vertex), terminal abdominal portions (for changes occasioned by the progressive loss of endophytic oviposition) and larvae, the characters of which may be more representative of evolutionary struggle. No ecological and only scant zoogeographical evidence is brought to bear on the problem. The present study has dealt considerately with what evidence obtains; that it is deficient in ancillary evidence is immediately recognizable. Occasional typesetting and editing errors do not and could not very well detract from the significance of this study in increasing the student's understanding of the group. —Edward J. Kormondy

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Tenebrionidae of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

Butterflies. Wish to exchange specimens for Japanese species. Please write to Ichiro Nakamura (Boy, age 16), 26 Aza-Nichiyama Obayashi Takarazuka-shi, Hyogo-Ken, Japan.

Phasmidae of nearctic area desired alive. Purchase or trade, drawing on large stock of major orders, worldwide. Domminck J. Pirone, Dept. Entomology, Cornell University, Ithaca, N. Y.

Nitidulidae and Rhizophagidae wanted in exchange for European beetles of all families. O. Marek, Zămberk 797, Czechoslovakia.

Wanted and Needed. We are compiling a history of entomology, and particularly, at present, of the amateur insect clubs that flourished 50 to 75 years ago. Will you who have knowledge of such early clubs or societies advise me, giving facts on the time of existence, members, etc., which you may have. J. J. Davis, Dept. of Entomology, Purdue University, Lafayette, Indiana.

S.

ENTOMOLOGICAL NEWS

JULY 1959

Vol. LXX   No. 7

CENTENNIAL YEAR
THE AMERICAN ENTOMOLOGICAL SOCIETY
1859—1959

CONTENTS

PUBLISHED MONTHLY, EXCEPT AUGUST AND SEPTEMBER, BY
THE AMERICAN ENTOMOLOGICAL SOCIETY
PRINCE AND LEMON STS., LANCASTER, PA.
AND
1900 RACE STREET, PHILADELPHIA 3, PA.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada
Second-class postage paid at Lancaster, Pa

ENTOMOLOGICAL NEWS

ENTOMOLOGICAL NEWS is published monthly, excepting August and September, by The American Entomological Society at Prince and Lemon Sts., Lancaster, Pa., and the Academy of Natural Sciences, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

PHILIP P. CALVERT, Editor Emeritus. R. G. SCHMIEDER, Editor. Editorial Staff: H. J. GRANT, JR., E. J. F. MARX, M. E. PHILLIPS, and J. A. G. REHN.

Subscription price, per yearly volume of 10 numbers: Domestic, $5.00; Foreign, $5.30; Canada, $5.15—U. S. Currency.

SUBSCRIPTIONS: Communications and remittances to be addressed to **Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

ADVERTISEMENTS: Rate schedules available on request. Address, **Fred B. Jacobson, Advertising Manager, Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

MANUSCRIPTS and all communications concerning same should be addressed to **R. G. Schmieder, Zoological Laboratory, University of Pennsylvania, Philadelphia 4, Pa.**

The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. Articles longer than eight printed pages may be published in two or more installments, unless the author is willing to pay the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

ILLUSTRATIONS: Authors will be charged as follows: For text-figures, the cost of engraving; for insert plates (on glossy stock), the cost of engraving plus printing. Size limit, when printed, 4×6 inches. All blocks will be sent to authors after printing. It is not advisable to print half-tones as text-figures.

TABLES: The cost of setting tables will be charged to authors.

SEPARATA: Members of the American Entomological Society may elect to receive, gratis, 25 offprints of their contributions. These will be "run-of-form," without removal of extraneous matter.

Those members desiring more than 25 separates, and all non-members, will receive no gratis copies. They must obtain all their separates (as reprints, with extraneous matter removed) from the printer at the prices quoted below. Authors must place their order for such separates with the editor at the time of submitting manuscripts, or when returning proof.

Copies	1–4 pp.	5–8 pp.	9–12 pp.	13–16 pp.	17–20 pp.	Covers
50	$3.95	$6.33	$ 9.89	$10.28	$13.44	$4.31
100	4.74	7.51	11.86	12.65	16.21	5.89
Add'l 100	1.58	2.36	3.94	4.74	5.54	3.16

Plates printed one side: First 50, $3.15; Additional 100's, $2.37.

Transportation charges will be extra.

ENTOMOLOGICAL NEWS

Vol. LXX JULY, 1959 No. 7

New Species of Chimarra from Mexico and Central America (Trichoptera, Philopotamidae)

By Herbert H. Ross, Illinois Natural History Survey, Urbana

The Nearctic species of *Chimarra* contain data which should be highly informative concerning the evolution of aquatic insects in the eastern and central United States, especially during Pleistocene time. Up to the present, however, efforts to extract and apply this information have been hampered seriously because of the polyphyletic nature of our *Chimarra* fauna. The chief difficulty seems to be that the United States fauna of *Chimarra* has probably arisen from several phyletic lines having an origin in Mexico, and our knowledge of the Mexican fauna is fragmentary. An effort is made in this paper to describe new species from Mexico and Central America as the first step in adducing the phylogeny of this interesting group.

Holotypes and some paratypes described in this paper are deposited in the collection of the Illinois Natural History Survey; other paratypes are deposited in the Escuela Nacional de Agricultura, Mexico City, D. F.

Subgenus CHIMARRA Stephens

The first 11 species described herein belong to the *aterrima* group of the subgenus *Chimarra* as defined by Ross (1956). In all of these species the ninth segment has a large ventral keel, the cercus is button or biscuit shaped, and the tenth tergite has two pairs of lobes of which the mesal pair are membranous and often inconspicuous, and the aedeagus has one or two pairs of simple rods in addition to other unpaired internal structures.

Chimarra embia new species

The simple claspers and processes of the tenth tergite are not only diagnostic for this species but also indicate that it is probably one of the most primitive known members of the *aterrima* group.

Male: Length 4.5 mm. Color very dark brown, the dorsal surface blackish, the legs a slightly lighter shade of brown. General structure and venation typical of the *aterrima* group. Male genitalia as in fig. 1. Ninth segment constricted near middle of lateral margin, with a rather narrow dorsal position. Claspers elongate and narrow from both lateral and posterior views, with a simple mesal lobe near middle. Tenth tergite with both mesal and lateral lobes short and pointed. Aedeagus with two short pairs of simple rods.

Holotype ♂.—Tonala, Chis., Mex., Sept. 2, 1932, A. Dampf. *Paratypes.*—Mexico (all at light, A. Dampf): Same data as holotype, 11 ♂; Tonala, Chis., May 23, 1926, 7 ♂; Rio Ixtepec, Oax., July 30, 1938, 5 ♂; La Forestal, Ver., May 22, 1926, 7 ♂.

Chimarra ovalis new species

An unusually distinctive member of the *aterrima* group, set off from all others by the spikelike lateral lobes of the tenth tergite.

Male: Size, color, and general structure similar to the preceding. Male genitalia as in fig. 2. Ninth segment forming a wide ring. Clasper fairly long and broad, bearing a series of long apical dorsal spines; the dorsal margin is incised and curved mesad to form a large mesal projection. Lateral lobes of tenth tergite narrow, spikelike, and heavily sclerotized. Aedeagus with two simple rods, one of medium length and the other twice as long.

Holotype ♂.—Salto de Agua, Chis., Mex., Apr. 28, 1938, A. Dampf.

Chimarra volenta new species

This species is probably closest to *ovalis,* differing in the shorter clasper and much higher lateral lobes of the tenth tergite.

Male: Length 6.5 mm. Color and general structure as for *ovalis*. Male genitalia as in fig. 6. Ninth segment somewhat narrowed dorsally. Clasper short, almost quadrate, the dorsal margin produced mesad to form a short lobe. Lateral lobes of tenth tergite high near the base, then tapering almost to a point at apex. Aedeagus with two simple rods, both of them massive at base, tapering and heavily sclerotized, one fairly long and the other only two-thirds as long.

Holotype ♂.—No data but submitted by A. Dampf and presumably collected in Mexico.

Chimarra acuta new species

This and the following species are readily distinguished from other members of the *aterrima* group by the curious forked mesal process on the dorsal margin of the clasper.

Male: Size, color, and general structure similar to *embia*. Genitalia as in fig. 3. Ninth segment with very broad ventral lobes; the dorsal portion forms a ridge at the base of the tenth tergite. Clasper broad at base, tapering dorsally to a narrow apex which curves abruptly mesad and is incised and almost clawlike at the tip. Lateral lobes of tenth tergite short and blunt. Aedeagus with two subequal simple setae, both very long.

Holotype ♂.—Cuernavaca, Mor., Mex., Apr. 30, 1932, at light, A. Dampf. *Paratype*.—Same data as holotype, but Mar. 2, 1932, 1 ♂.

Chimarra boneti new species

This is a sister species of the preceding, differing from it in the truncate apex of the clasper and the dissimilar simple rods of the aedeagus.

Male: Size, color, and structure similar to the preceding. Male genitalia, fig. 4, similar in most respects to the preceding with the following differences: lateral lobes of the tenth tergite slightly shallower; lateral view of clasper with the tip forming an obliquely truncate and slightly expanded apex; the two simple internal rods of the aedeagus dissimilar, one long and only slightly curved, the other shorter and markedly arcuate.

Holotype ♂.—Ocosingo Valley, Chis., Mex., Finca El Real, July 1, 1950, at light, Rio Sta. Cruz, C. & M. Goodnight and L. J. Stannard. *Paratypes*.—Same, but Finca Monte Libano, July 4, 1950, 2 ♂.

Chimarra schiza new species

This species differs from others in the *aterrima* group by the combination of the short clasper and the deep and rounded lateral lobes of the tenth tergite.

Male: Length 5.5 mm. Color a deep almost bluish black, the under parts and legs with a brownish cast. General structure as for *aterrima* group. Genitalia as in fig. 5. Ninth segment markedly narrow dorsally. Clasper short, almost quadrate from lateral view, with a row of four setae on apical margin. Lateral lobes of tenth tergite deep and rounded at apex. Aedeagus with two subequal simple spines which are long, slender, and parallel.

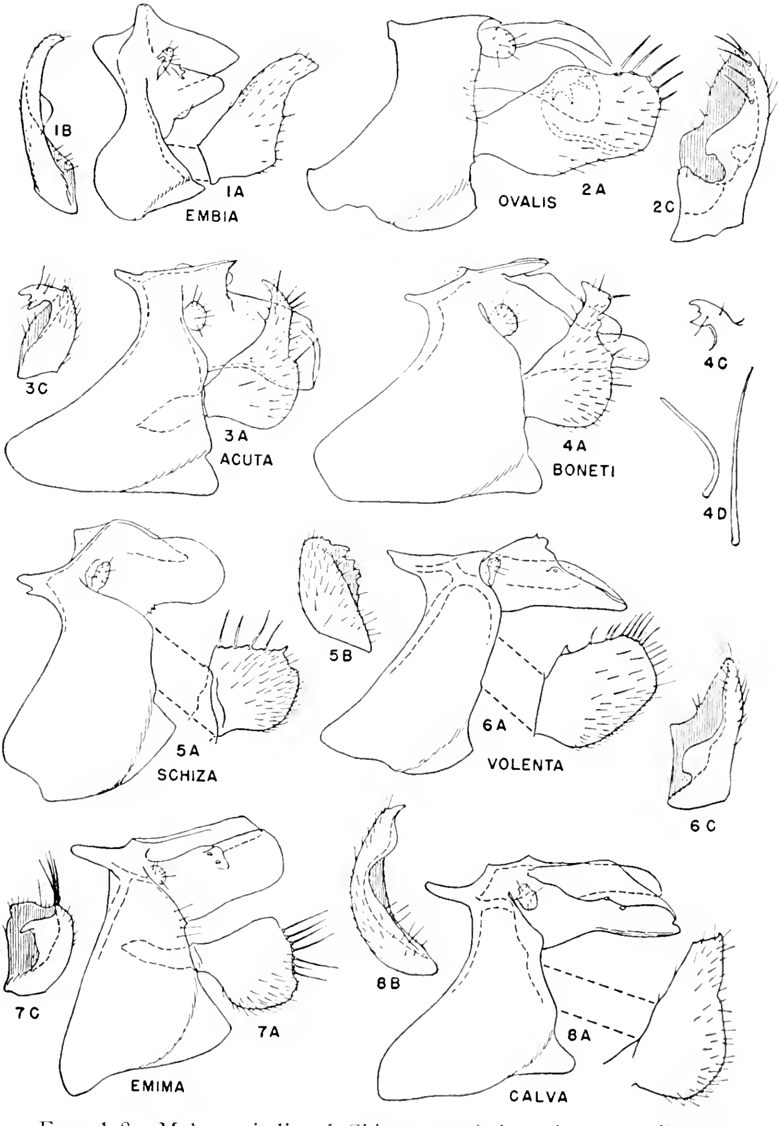
Holotype ♂.—Huajuapan, Oax., Mex., Nov. 8, 1944, at light, A. Dampf.

Chimarra emima new species

In the quadrate clasper this species resembles the preceding, but *emima* differs from *schiza* in the dorso-mesal tooth of the clasper and the dorsal position of the two sensillae on the lateral lobes of the tenth tergite.

Male: Length, color, and general structure similar to the preceding. Male genitalia as in fig. 7. Ninth segment narrowed dorsally. Clasper short and somewhat quadrate, with a row of long setae on the apical margin. Tenth tergite with lateral lobes fairly long and deep, nearly parallel-sided, slightly rounded at apex, and with the sensillae on a slight elevation near dorsal margin. Aedeagus with two heavily sclerotized simple rods, one very long and the other about half as long.

Holotype ♂.—Madden Dam, C. Z., Jan. 20–23, 1946, Eliot C. Williams, Jr.



FIGS. 1-8.—Male genitalia of *Chimarra*. *A*, lateral aspect; *B*, posterior or postero-ventral aspect of clasper; *C*, dorsal aspect of clasper; *D*, simple rods of aedeagus.

Chimarra calva new species

From all but *embia* this species differs in the elongate and simple clasper; from *embia* it differs markedly in the elongate lobes of the tenth tergite.

Male: Size, color, and general structure similar to the preceding. Genitalia as in fig. 8. Ninth segment markedly narrowed dorsally. Clasper moderately large at base, tapering to apex, from posterior view narrow and sinuate. Tenth tergite with lateral lobes long and large, the lateral face traversed by a sinuate crease on which are situated the two sensillae. Aedeagus with two simple rods, one of moderate length and the other only half as long.

Holotype ♂.—Tecpatan, Chis., Mex., Sept. 1, 1946, A. Dampf. *Paratypes.*—Mexico: Chiltepec, Oax., Dec. 9, 1937, at light, A. Dampf, 2 ♂; Hacienda, Santa Engracia, Tamaulipas, Mar. 9, 1939, C. C. Plumber, 8 ♂; Santa Engracia, Tamaulipas, Apr. 16, 1936, at light, A. Dampf, 1 ♂; same but Mar. 21, 1936, 2 ♂; Tamazunchale, Mar. 29, 1951, at light, J. D. Lattin & N. Walker, 21 ♂.

Chimarra curfmani new species

This species is easily distinguished from other members of the *aterrima* group by the mesal thickenings on the clasper.

Male: Size, color, and general structure similar to the preceding. Genitalia as in fig. 9. Ninth segment only moderately narrowed dorsally. Clasper fairly narrow and high, its posterior face also narrow and with a series of sclerotized thickenings on the mesal edge. Lateral lobes of tenth tergite short and deep, the apical area with a wide flange just above the ventral margin. Aedeagus with two simple rods which are long, stout, slightly curved, and subequal in length.

Holotype ♂.—Ocosingo Valley, Chis., Mex., Finca Monte Libano, July 4, 1950, at light, C. & M. Goodnight and L. J. Stannard. *Paratypes.*—Mexico: same data as holotype, 1 ♂; Rancho Monter, Oax., Dec. 16, 1937, at light, A. Dampf, 5 ♂.

Chimarra setosa new species

The short clasper is suggestive of both *schiza* and *emima* but from both of these *setosa* differs in the curious shape of the lateral lobes of the tenth tergite.

Male: Size, color, and general structure as for the preceding. Male genitalia as in fig. 10. Ninth segment markedly narrowed dorsally. Clasper short and somewhat quadrate, its apical margin with a row of long setae. Lateral lobes of tenth tergite incised at apex to form small lateral and apical lobes, the two sensillae situated on the former. Aedeagus with one very long and tapering simple rod, and another half as long, stouter, more heavily sclerotized, and with a minute right-angle hook at its tip.

Holotype ♂.—Finca Vergel, Chis., Mex., May 19, 1935, at light, A. Dampf. *Paratypes*.—Mexico: Same data but May 9 to June 13, 1935, 63 ♂; Finca Victoria, Chis., May 29, 1935, at light, A. Dampf, 1 ♂; Finca Esperanza, Chis., June 20, 1938, at light, A. Dampf, 6 ♂; same but June 5, 1939, 3 ♂; same but June 26, 1939, 2 ♂.

Chimarra cornuta new species

The shape of the clasper suggests a relationship with *boneti*, from which this species differs in the shorter ninth tergite and the shape of the lateral lobes of the tenth tergite.

Male: Size, color, and general structure as for the preceding. Genitalia as in fig. 11. Ninth segment narrowed dorsally, the tergite forming a well-defined lateral spur at the base of the tenth tergite. Clasper short and stocky, with a large ventral portion and a narrow apical portion; seen from above this latter curves mesad and ends in a sharp point. Tenth tergite with lateral lobes long, deep at base and narrowing and curved at apex, the two sensillae situated on a flange near the dorsal margin. Aedeagus with two subequal simple rods which are long and fairly straight.

Holotype ♂.—Finca Vergel, Chis., Mex., May 11, 1935, at light, A. Dampf. *Paratype*.—Mexico: Finca Esperanza, Chis., Sept. 21, 1938, at light, A. Dampf, 1 ♂.

Subgenus **CURGIA** Walker

The three following species belong to a compact group characterized as follows: The ninth segment tapers to a dorsal point, the claspers are small and heavily sclerotized, the tenth tergite is a single structure which has a large cluster of small sensillae at its apex, and the eighth tergite, fig. 12, bears setose lobes and sometimes other ornamentations.

Chimarra brustia new species

This species is a close relative of *laguna* Ross, differing from it only in the ornamentation of the eighth tergite.

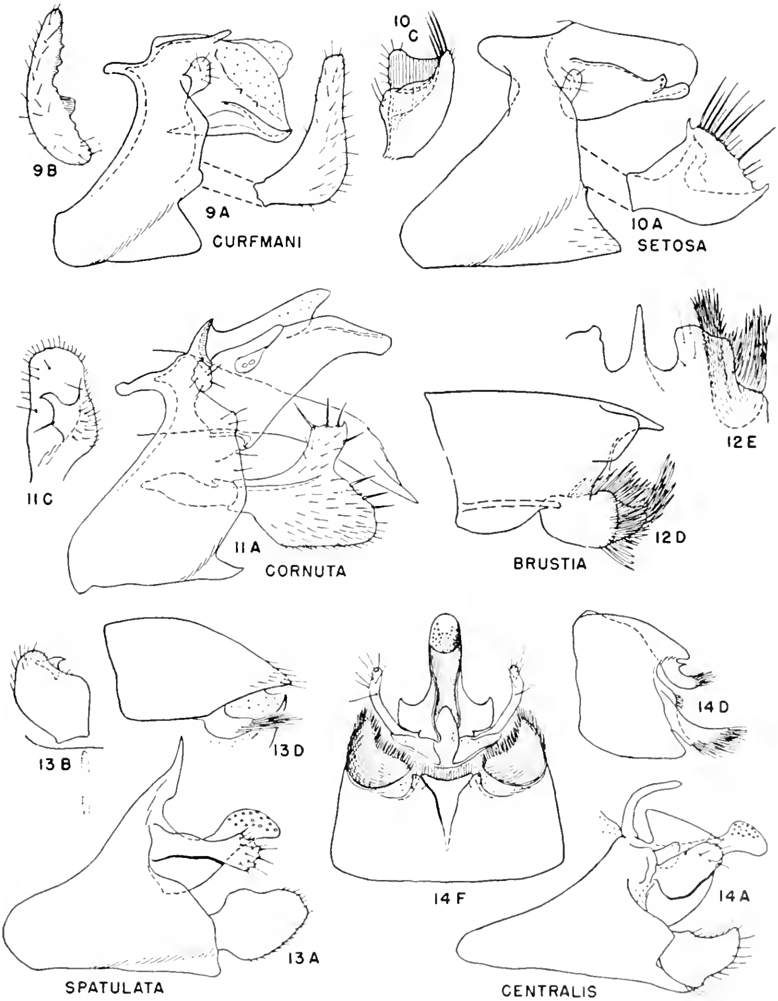
Male: Length 7 mm. Color dark brown, almost black dorsally. General structure as for group. Eighth tergite, fig. 12, with the apical margin incised to form a long central point and a pair of irregular but wide lateral lobes; postero-ventral corner of segment produced into a somewhat quadrate outer lobe bearing an apical brush of setae and, internal to this, a longer and narrower lobe ending in a tuft of long setae. Male genitalia exactly as for *laguna* (see Ross 1951, fig. 2). Ninth segment ending in a sharp ventral process. Tenth tergite deep, upturned, and slightly hooklike. Cercus small and clavate. Aedeagus with two short, stout, simple rods.

Holotype ♂.—Cocula, Guerrero, Mex., Dec. 17, 1936, at light, A. Dampf. *Paratypes.*—Mexico: Same data as holotype, 1 ♂; Cuernavaca, Mor., July 27, 1932, A. Dampf, 1 ♂; Camomilas, Mor., May 9, 1942, at light, A. Dampf, 1 ♂.

Chimarra spatulata new species

This species is most closely related to the preceding but differs from it in the simpler eighth tergite and the sinuous tenth tergite.

Male: Length 6 mm. Head, antennae, legs, and abdomen red, thorax and wings black. General structure as in the preceding. Genitalia as in fig. 13. Eighth tergite with apical margin wide and slightly emarginate; from its postero-ventral corner arises a small lobe bearing a brush of setae. Clasper small, with



FIGS. 9–14.—Male genitalia of *Chimarra*. *A*, lateral aspect; *B*, posterior or ventral aspect of clasper; *C*, dorsal aspect of clasper; *D*, *E*, lateral and dorsal aspect of eighth tergite; *F*, ventral aspect of genitalia.

a short hooklike tooth on its mesal surface. Cercus situated fairly high on base of tenth tergite, long and spatulate. Tenth tergite sinuate. Aedeagus without simple rods.

Holotype ♂.—Finca Vergel, Chis., Mex., May 22, 1935, at light, A. Dampf. *Paratypes.*—Mexico (all at light, A. Dampf): Finca Vergel, Chis., May 30, 1935, 1 ♂; Ayotzinapa, Gro., Jan. 24, 1941, 1 ♂; Finca Vergel, Chis., May 23, 1935, 1 ♂; Finca Esperanza, Chis., March 26–31, 1939, 1 ♂.

Chimarra centralis new species

This species is most closely related to the preceding and to *persimilis* Banks. From *spatulata* it differs in the winglike process on the aedeagus and from *persimilis* in the short claspers.

Male: Size, color, and general structure as for the preceding. Genitalia as in fig. 14. Eighth tergite with two pairs of apical finger-like lobes, each bearing a brush of setae. Dorsum of ninth segment bearing an erect narrow flap which curves posteriorly. Clasper short and triangular, the posterior face concave. Cercus short and deep. Tenth tergite very deep at base, the apex clavate; at its base there arises a pair of small flaps and from each side near the dorsal margin arises a broad, winglike extension. Aedeagus with three short, stout, simple rods.

Holotype ♂.—Potrerillos, Panama, March, 1934, H. S. Parish. *Paratypes.*—Same data as holotype, 6 ♂.

References Cited

Ross, H. H. 1951. The Trichoptera of Lower California. Proc. Calif. Acad. Sci. Fourth Ser., 27(3): 65–75.

——. 1956. Evolution and Classification of the Mountain Caddisflies. Univ. of Ill. Press, Urbana. 213 pp.

A Nest of Bombus huntii Greene (Hymenoptera: Apidae)

By John T. Medler, University of Wisconsin,
Madison, Wisconsin

Fortuitous observations on bumblebees entering and leaving a pile of wooden stakes led to the discovery of a large nest of *B. huntii* Greene while I was vacationing at Ruidoso, New Mexico. The stakes were piled in a 6-inch space between two outbuildings. When the stakes were removed, the bees were seen emerging from a crack at the bottom of the wall of one of the buildings. As this building was a storage shed, the floor boards were removed and the nest located on the ground in the 6-inch space under the floor. The bumblebees had utilized a rat nest made with well-shredded paper-like material, probably obtained from a piece of wood-fiber insulating board. This material had been worked up by the bees to form a uniform protective cover over the comb.

During the morning of August 3, 1958, the worker bees were captured with a net when returning to the nest from foraging trips, or when leaving. More than two-thirds of the bees returning were loaded with pollen; the others carried nectar. By noon, the foraging bees had been reduced to the extent that the nurse and guard bees could be collected from the nest, and the comb removed for study. Later in the afternoon about 25 bees were collected as they searched for their lost nest.

The adult population of the nest consisted of five hundred and fifteen workers and the queen.

The inner surface of the shredded paper that covered the comb was lined with a layer of wax. This formed a smooth, continuous canopy above the comb. The comb consisted of many irregular clusters of cells with a normal, healthy appearance. Cell clusters are a characteristic feature of a bumblebee nest as a result of eggs laid in batches in a single cell. The larvae which develop from the eggs subsequently occupy individual cells which are grouped around the site of the original cell.

The cells were counted according to their position in clusters. Careful attention was given to the cluster structure of the comb, but it was not possible to delimit precisely all of the clusters in the bottom layers of old comb. Therefore, a few doubtful separations were made among the empty cells. This problem was not encountered with the cells that contained brood.

The comb contained eighteen egg cells. The number of eggs in a cell ranged from 1 to 48, as follows: 1, 2, 2 (both eggs collapsed), 3, 5 (on long pollen cylinder), 7, 7 (on long pollen cylinder), 8, 9, 10, 15, 24, 25 (on long pollen cylinder), 31 (many mites), 40 (many mites, 15 eggs collapsed), 46 (5 eggs collapsed), 47 (4 mites), 48 (many mites). Total = 330 eggs.

The relationship between the mites and the eggs is not known. Possibly the mites feed on eggs and were responsible for the collapsed eggs found in some cells. Plath [1] thought it likely that mites in bumblebee nests live, at least in part, on the exudates of the larvae and adult bees.

Each egg cell was sealed with wax and located on top of a cylinder of pollen. All cylinders were 12 mm. in diameter. The measurements on length and weight that follow were not associated with the respective egg counts. However, no consistent relation was noted between the length of pollen cylinders and the number of eggs.

Cylinder No.	1	2	3	4	5	6	7	8	9
Length (mm.)	23	20	20	19	18	10	10	10	10
Weight (gm.)	3.03	2.66	2.43	2.08	1.79	1.29	1.08	1.08	1.04
Cylinder No.	10	11	12	13	14	15	16	17	18
Length (mm.)	10	9	9	8	8	7	7	7	6
Weight (gm.)	1.02	.98	.92	.89	.77	.58	.56	.44	.39

Twenty wax tubes had been constructed for the storage of pollen, of which sixteen were empty. Pollen storage had been started in the other four tubes. Thirteen of the tubes were located on the periphery of the comb. All tubes were 12 mm. in diameter and 25 mm. in length.

[1] Plath, O. E. 1934. Bumblebees and their ways. Macmillan Co., New York.

Seven clusters contained cells with larvae in several stages of development. The number of cells in each cluster, arranged in a sequence of young to mature larvae, were as follows: 17, 22, 13, 14, 11, 8, 16. The cells in the first four groups were still enclosed in a wax envelope. The larvae in the last four groups had spun cocoons. Mites were found within the wax envelopes of the first three groups.

The clusters containing pupae had cells of two sizes. The larger cells were approximately 10 mm. wide and 17 mm. long. The smaller cells were 7 × 10 mm. Counts are tabulated below.

Cluster No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total
Small cells	1	4	1	2	9	1	20	2	15	13	4	2	11	6	2	24		117
Large cells	18	1		4			7	10	2	6	14	2	11	24	18		2	119
Empty cells		16	30	18		25				2	3	3					27	124
Total	19	21	31	24	9	26	27	12	17	21	21	7	22	30	20	24	29	360

The two distinct sizes of cells indicated that reproductives were being produced. Most of the pupae in the large cells were in a non-pigmented stage. A small series of these preserved for study consisted of females only. Two pupae were matured enough so that the basal segment of the labial palp could be measured. These measurements were 3.5 and 3.9 mm. A similar measurement on the queen of the colony was 3.6 mm. As the basal segment of the palp in a long series of workers did not exceed 3.0 mm., it is concluded that the new queens were occupying the large cells, but that the nest was taken just prior to their emergence.

The empty cells in the comb were grouped in clusters ranging from 11 to 49 cells, as follows: 11, 12, 12, 13, 14, 17, 19, 20, 21, 21, 26, 28, 29, 30, 31, 32, 36, 38, 40, 41, 45, 49. Total = 585 cells.

A substantial number of the above cells were filled with honey, many of which were capped with wax. A few cells contained pollen.

The data obtained from a study of the nest are summarized as follows:

Queen	1	Empty worker cells	709
Adult workers	515	Eggs (in good condition)	308
		Larvae	101
		Worker pupae	117
		Queen pupae	119
		Total	1354

As the colony contained the queen, numerous workers, normal brood, and stores of nectar and pollen, it can be predicted that the population of this nest would have surpassed 1,500 individuals. The dry protected nesting site, and the ample rainfall in 1958, which had produced an abundance of flowering plants, especially sweet clover, were undoubtedly responsible in a large part for the development of this potentially large colony.

B. huntii is reported to be a common species in the transition zone of western North America. Ruidoso, New Mexico (elevation 7,500 ft.) probably represents a southern limit to the distribution of the species. This record of a large nest, however, indicates that the higher elevations in southern New Mexico can provide a suitable environment for the species.

Records of Diptera from Guadalupe Island, Mexico

By Paul H. Arnaud, Jr.,[1] California Department of Agriculture, Sacramento, California

Guadalupe Island, Mexico, is located 180 miles southwest of San Diego, California. Hanna and Anthony (1923: 71–83),[2] who provide an interesting illustrated account of their visit, describe the island as rising "precipitously from abysmal depths, a volcano some 12,000 feet high but with only 4,500 feet above the sea." It is approximately 20 miles long and 6 miles wide. Much of the native fauna and flora has been or is in the process of being exterminated as a result of the introduction of goats,

[1] The author would like to express his thanks to Mr. Sefton and Mr. Harbison for collecting these specimens. He is also indebted to Dr. D. Elmo Hardy, Dr. H. C. Huckett, and Mr. C. W. Sabrosky for their authoritative determinations.

[2] A cruise among desert islands. The National Geographic Magazine 44(1): 70–99, 31 figures, 1 map, 1923.

house cats, and house mice. Even though the recording of the following four species of Diptera is probably very incomplete for the existing fauna, they are recorded as an introduction to our knowledge of the Dipterous fauna of this island. I know of no recorded Diptera from Guadalupe in our entomological literature. The species here recorded are all known to occur in California, with the exception of *Euryomma peregrinum*. The specimens reported upon were collected through the interest of Mr. J. W. Sefton, Jr.,[3] President, San Diego Trust & Savings Bank, and Mr. C. F. Harbison,[4] Curator of Entomology, San Diego Society of Natural History.

Family Bibionidae

Bibiodes halteralis Coquillett (det. D. Elmo Hardy)

Bibiodes halteralis Coquillett, 1904, Proc. Ent. Soc. Washington 6(3): 171.
Bibiodes halteralis Hardy, 1945, Univ. Kansas Sci. Bull. 30(2): 496, figs. 207 a–b.

1 ♂, 1 ♀, Pine Ridge, 14–XII–1957 (C. F. Harbison) [Deposited in the collections of the San Diego Society of Natural History and Dr. D. Elmo Hardy, University of Hawaii.]

Dr. Hardy considers these two specimens to be aberrant specimens of *halteralis*. According to Coquillett (1904) the

[3] Mr. Sefton left San Diego aboard the Scripps Research ship *Orca* (formerly owned by the Sefton Foundation), October 24, 1957, arrived at Guadalupe on October 25, left October 30, and returned to San Diego October 31. In addition to the Diptera here recorded, Mr. Sefton collected 110 specimens of Coleoptera and a lesser number of specimens of miscellaneous orders. These specimens have been deposited in the collections of the California Academy of Sciences and the San Diego Society of Natural History.

[4] Mr. Harbison left San Diego aboard the Scripps Research ship *Stranger* December 12, 1957, arrived at Guadalupe on December 13, left December 19, and returned to San Diego December 20. In addition to the Diptera here recorded, Mr. Harbison collected a total of 325 Insecta (134 Coleoptera, 119 Lepidoptera, 48 Hymenoptera, 10 Orthoptera, 8 Thysanura, and 6 Hemiptera) and 26 Arthropoda other than Insecta. These specimens are all deposited in the collections of the San Diego Society of Natural History.

type series of this species consisted of nine males and one female collected in San Mateo and Los Angeles counties of California. Hardy (1945) lists the type locality as San Mateo County and records this species from additional localities in Saskatchewan, New Mexico and Arizona.

Family Calliphoridae

Phormia regina (Meigen) (det. C. W. Sabrosky)

Musca regina Meigen, 1826, Syst. Beschr. 5: 58.
Phormia regina Hall, 1948, The Blowflies of N. A., pp. 161–168, figs.

25 ♂♂, 22 ♀♀, Northeast Anchorage, 25–X–1957 (J. W. Sefton, Jr.); 1 ♂, same data except dated 26–X–1957; 1 ♀, Northeast Anchorage, 13–XII–1957 (C. F. Harbison); 1 ♀, Weather Station, 18–XII–1957 (C. F. Harbison) [Deposited in the collections of the United States National Museum, San Diego Society of Natural History, California Department of Agriculture, and the author.]

This is a holarctic species recorded by Hall (1948) as occurring as far south as Mexico City, Mexico and also from Oahu in the Hawaiian Islands.

Family Muscidae

Euryomma peregrinum (Meigen) (det. H. C. Huckett)

Anthomyia peregrina Meigen, 1826, Syst. Beschr. 5: 187.
Euryomma peregrinum Seguy, 1937, Genera Insectorum, 205^{me} Fasc.: 180.

2 ♀♀, collected in Captain's cabin on Orca, 26–X–1957 (J. W. Sefton, Jr.) [Deposited in collections of San Diego Society of Natural History and the author.]

In a communication dated January 27, 1958, Dr. Huckett states, "Distribution: Cosmopolitan. I have specimens from Chicago and Urbana, Illinois. Recorded from Europe, Hawaii." It has not been recorded as occurring in California.

It is probable that these specimens originated from the island and reached the ship while at anchorage. However, it should be noted that the specimens were collected on the third day out of San Diego. This species was originally described by Meigen on the basis of a female specimen collected in the saloon of an American ship at Hamburg.

Pegomya cognata Stein (det. H. C. Huckett)

Pegomyia cognata Stein, 1920, Arch. f. Naturgesch., 84 (A) (9): 67.

Pegomyia cognata Huckett, 1941, Mem. Amer. Ent. Soc., No. 10: 73, figs. 21, 82, and 89.

1 ♂, 1 ♀, Weather Station, 18–XII–1957 (C. F. Harbison) [Deposited in the collections of the San Diego Society of Natural History and the author.]

Huckett (1941) records only eight known specimens of this species, from two different California localities—5 males from Samoa Beach and dunes, Humboldt County and 3 male cotypes from Stanford University. The original orthography of the generic name is used here.

Nomenclatorial Considerations Relative to the Genus Myodocha Latreille, 1807 (Hemiptera)

By James A. Slater,[1] Harry G. Barber,[2] and Reece I. Sailer[3]

The correct use of the generic name *Myodocha* Latreille has been the subject of controversy for many years, even though it is well established as the name of a genus of Lygaeidae. There has been good reason to question the current use of the name. In fact it is evident that strict compliance with the International Rules would require that *Myodocha* be applied to a large genus of economically important rice bugs in the family Coreidae. This genus was long known as *Leptocorisa* Latreille, 1829, and more

[1] University of Connecticut, Storrs, Connecticut.
[2] Collaborator, Entomology Research Division, A.R.S., U.S.D.A.
[3] Entomology Research Division, A.R.S., U.S.D.A.

recently as *Leptocorixa* Berthold, 1827. In order to avoid the confusion that would result if *Myodocha* were to be applied to the rice bugs, we propose to ask the International Commission on Zoological Nomenclature to conserve *Myodocha* in the sense that it is currently used for a genus of Lygaeidae. This paper is published in order to make the relevant facts generally known pending publication of the Commission's decision. The pertinent nomenclatorial data are as follows:

1. Latreille (1807, p. 126) founded *Myodocha* to include three species, *Cimex tipuloides* De Geer, *Cimex trispinosa* De G., and *Cimex fulvipes* De G.

2. The generic diagnosis does not agree well with any of these species and most subsequent authors have agreed that the manuscript was probably mixed. This seems likely, since Latreille himself in 1810 (pp. 255, 433) named a lygaeid, *Myodocha serripes*, as type species. It is, of course, an invalid fixation as *serripes* was not an originally included species and, in fact, had not yet been described.

3. Olivier (1811, p. 106), apparently intending to follow Latreille, described the genus *Myodochus* and included the description of a single species, *serripes,* which thus became the monobasic type species of *Myodochus* Oliv. (not *Myodocha* Latr.).

4. Leach (1815, p. 122) designated *Cimex tipuloides* De G. as type species of *Myodocha* Latreille. This is the first valid type fixation under the Rules.

5. Say (1832, p. 19), Laporte (1832, p. 33), Spinola (1840, p. 103), Herrich-Schaeffer (1853, p. 213), and Stål (1874, p. 147) used *Myodocha* Latreille for the lygaeid genus to which *serripes* Olivier belongs.

6. Stål (1872, p. 50) replaced the subfamily name Rhyparochromida Stål (1862, p. 210) with Myodochina based on *Myodocha* Latreille. Myodochina continued in general use until Van Duzee (1916, p. 21) restored Rhyparochrominae on the grounds that it was based on the oldest group name used in the subfamily.

7. Kirkaldy (1902, p. 306), an advocate of strict application

of the rules of nomenclature, discovered that Leach (1815, p. 122) had designated *tipuloides* De G. as the type species of *Myodocha*. He then made *Leptocorisa* Latreille, 1829, a synonym of *Myodocha* Latreille, 1807, and referred *serripes* Olivier to *Chiroleptes* Kirby, 1873. A further consequence of this action relative to *Myodocha* was to add to the instability of the name used for the entire family to which *serripes* Olivier belongs. Kirkaldy in 1899 (p. 220) in common with Reuter (1888, p. 294) erroneously believed that Fabricius had fixed the type (see China 1943, p. 218) of *Lygaeus* as *valgus* L., 1758. This placed *Lygaeus* in the family Coreidae and, for reasons not clear to the present authors, he treated Coreidae Leach, 1815 [Coreides], as a synonym of Lygaeidae Schilling, 1829 [Lygaeides]. With *Myodocha* no longer available for the lygaeids, he named the family Geocoridae based on *Geocoris* Fallen, 1814. Subsequent authors did not follow Kirkaldy, and his attempt to replace Coreidae with Lygaeidae and to use Geocoridae for the lygaeids had no effect other than to promote confusion in the family and subfamily names of the coreids and lygaeids.

8. Van Duzee (1914, pp. 378–379), Horvath (1911, pp. 12–13), Stichel (1925, pp. 394–398), and Bergroth (1912, pp. 162–164), all rejected *tipuloides* as the type species of *Myodocha* and accepted the genus in the sense represented by *Myodochus serripes* Olivier. These authors were aware of Kirkaldy's action but either rejected Leach's type designation (Van Duzee) or openly accepted usage as a guide (Bergroth).

9. Under the Rules it is clear that *Myodocha* Latreille, 1807, must take *tipuloides* as type species. The name thus has priority over the long accepted coreid name, *Leptocorisa* Latreille, 1829 (now *Leptocorixa* Berthold, 1827, see Hussey, 1950, p. 152).

10. Also, under the above interpretation, the lygaeid genus must take the name *Myodochus* Olivier, 1811, with *serripes* Olivier as the type species.

From this evidence it is clear that *Myodocha* should be applied to the coreid genus. While such a change would seem to be contrary to the intent of the original describer, loss of the name in Lygaeidae would not be a serious matter, since it would be replaced by *Myodochus*. However, the use of *Myodocha* in the Coreidae would disturb usage that has been established for over a hundred years and is of special concern since the insects are of considerable economic importance. Therefore, in accordance with the restated objectives of the use of the plenary powers (Hemming, 1953, p. 23), we propose to request the International Commission on Zoological Nomenclature to consider this case. If the Commission agrees that action to conserve *Myodocha* Latreille in its current sense as the name for the genus of Lygaeidae is in accord with these objectives, the following actions should then be taken:

1. Reject Leach's (1815) designation of *Cimex tipuloides* De Geer as type species of *Myodocha* Latreille, 1807.
2. Designate *Myodochus serripes* Olivier, 1811, as type species of *Myodocha* Latreille, 1807.
3. Place the generic name *Myodocha* Latreille, 1807, with the type species mentioned under 2 above on the Official List of Generic Names in Zoology.

If approved by the Commission, these actions would allow *Myodocha* Latreille, 1807, to be retained for the genus of Western Hemisphere Lygaeidae represented by the species *serripes* Olivier to which the name has been generally applied for over 100 years; *Myodochus* Olivier, 1811, would become an objective junior synonym of *Myodocha* Latreille, 1807; and, most important of all, *Myodocha* Latreille, 1807, would not preoccupy the *Leptocorixa* Berthold, 1827, which could then be retained for the rice bugs.

Such action would retain current nomenclatorial usage and avoid the unfortunate confusion certain to result if the name of a well known genus in one family were to be applied to a well known genus in a different family. Pending the Commission's decision on this question, the authors propose to continue using the name *Myodocha* in its currently accepted sense and urge other authors who have occasion to use the name to do likewise.

References Cited

Bergroth, E. 1912. Wiener Ent. Zeit. 31: 162–164.

China, W. E. 1943. The Generic Names of British Insects. Part 8. Hemiptera-Heteroptera. pp. 211–242. Royal Entomological Soc. London. London.

Hemming, F. [edited by]. 1953. Copenhagen Decisions on Zoological Nomenclature. 135 pp. International Trust for Zoological Nomenclature. London.

Herrich-Schaeffer. 1853. Die Wanzenartigen Insecten. Bd. 9, 210 pp. Nürnberg.

Horvath, G. 1911. Ann. Mus. Nat. Hungarici. 9: 1–34.

Hussey, R. F. 1950. Florida Ent. 13: 150–154.

Kirkaldy, G. W. 1899. Entomologist 32: 217–221.

——. 1902. Jour. Bombay Nat. Hist. Soc. 14: 294–309.

Laporte, F. L. de. 1832. In Guerin, Magasine Zoolique, Nos. 52–55, suppl., 88 pp.

Latreille, P. A. 1807. Genera Crustaceorum et Insectorum secundum Ordinem naturalem in familias disposita, iconibus exemplisque plurimis explicata. Vol. 3, pp. 1–258. Paris.

——. 1810. Table des genres avec l'indication de l'espéce qui leur sert de type. Considérations générales sur l'order naturel des animaux. 144 pp. Paris.

——. 1829. Les Crustaces; les Arachnides et les Insects distribues en familles naturelles, ouvrage formant les tomes 4 et 5 de M. Le Baron Cuvier sur le regne animal (deuxieme edition). Vol. 2, xxiv + 556 pp.

Leach, W. E. 1815. Hemiptera, in Brewster's Edinburgh Encyclopaedia. Vol. 9, 766 pages.

Olivier, A. G. 1811. Encyclopedie methodique, dictionnaire des insects. Vol. 8, 722 pages. Paris.

Reuter, O. M. 1888. Acta Soc. Sci. Fenn. XV: I, 241–315; II, 443–812.

Say, T. 1831–32. Descriptions of new species of Heteropterous Hemiptera of North America. 39 pp. New Harmony, Ind. (pages 1–8 issued in 1831).

Spinola, M. 1837. Essai sur le Insectes Hemipteres, Rhyngotes, ou Heteropteres. 383 pp. Paris.

Stål, C. 1862. Ofv. Svenska Vet. Ak. Förh. 19: 203–225.

——. 1872. Ofv. Svenska Vet. Ak. Förh. 29: 37–62.

——. 1874. Svenska Vet. Ak. Handl. 12(1): 98–170.

Stichel, W. 1925. Konowia 4: 392–398.

Van Duzee, E. P. 1914. Can. Ent. 46: 377–389.

——. 1916. Check List of the Hemiptera (excepting the Aphidae, Aleurodidae and Coccidae) of America, North of Mexico. xi + 111 pp. New York Entomological Society.

Cratichneumon w-album Cresson and variegatus Provancher

By Gerd H. Heinrich, Dryden, Maine

About five different male species of the genus *Cratichneumon* Thomson, all occurring in the Eastern Canadian Zone (and adjacent regions), agree in the general color pattern of the body as given by Cresson in the original description of his species *Ischnus w-album* (Proc. Ent. Soc. Phila. 3: 191, 1864). As far as color is concerned in this group of species only the pattern of the legs, especially of the tibiae III, has to a certain degree, specific distinction. According to Cresson's original description this is the color of the tibiae of w-album ♂: ". . . a band on the posterior tibiae near their base, also whitish; extreme base of the posterior tibiae as well as their apical half exteriorly, blackish."

In 1877 (Trans. Amer. Ent. Soc. VI: 179, 180) Cresson redescribed the species. This time he refers to the color of legs of the male only as "legs fulvous."

The type (number 1253) in the collection of the Academy of Natural Sciences of Philadelphia at present considered as representing the species *Ischnus w-album* Cresson has uniform fulvous tibiae III without any whitish or dark mark. It therefore matches Cresson's redescription of the species of 1877 but not at all its original description.

The type, and all paratypes of *Ischnus w-album* in the Cresson collection, represent a species which is by five different morphological characters extraordinarily well and unmistakably defined. This species has invariably uniform fulvous tibiae III without whitish or dark marks. It is therefore with certainty different from the species originally described as *Ischnus w-album* by Cresson, the type of which has to be considered as lost.

The type of *Ischnus variegatus* Prov. ♂ is, as stated by Townes and confirmed by my recent type studies, identical with Cresson's type (number 1253) as mentioned above and therefore specifically different from *Ischnus w-album* Cresson. The name *Cratichneumon variegatus* Prov. has to be resurrected from synonymy.

A comprehensive treatment of the genus is planned.

Types of Tingidae Described by Torre-Bueno (Hemiptera) [1]

By George W. Byers

In 1948, the Snow Entomological Museum of the University of Kansas acquired two outstanding collections of Hemiptera, those of J. R. de la Torre-Bueno and G. W. Kirkaldy. Together with the collections were purchased the extensive libraries of reprints and separate papers accumulated by these two hemipterists. Interpolation of the Torre-Bueno and Kirkaldy specimens into the Snow Museum collection has only recently been completed. It was found at the time of purchase that the Torre-Bueno collection had been extensively damaged by water (as a result of flooding of a basement in which the collection had been stored) and by dermestids. The following notes pertain to the type series of two species of Tingidae found in this collection, which are, as far as I am aware, the only North American species of this family described by Torre-Bueno.

Acalypta lillianis Bueno

1916. A new tingid from New York state. Bull. Brooklyn Ent. Soc., 11 (2) : 39–40.

A box that had contained about eighty pinned tingids, including a part of the type series of this species, was found to have all the specimens detached from the paper points to which they had been glued; the insects lay scattered in the bottom of the box. By reference to the original description and comparison with specimens kindly loaned from the United States National Museum by Dr. Peter D. Ashlock, I isolated from the debris six specimens that matched *Acalypta lillianis*. Fortunately there were also only six labelled pins lacking specimens of this species. Of the salvaged six, two were macropterous females and the

[1] Contribution No. 1044 from the Department of Entomology, University of Kansas, Lawrence, Kansas.

others brachypterous males. In the description, Torre-Bueno stated the length and width of both the female and male syntypes, and only one of each sex of the available specimens fit these measurements. Accordingly, the identity of the two "types" was established. As the only paratype recorded from Marquette, Michigan, was a female, the replacement of the second female on the one pin so labelled was a simple matter. All male paratypes were collected at the type locality, White Plains, New York, between 18 and 28 May. It was thus not possible to restore the three remaining males to their correct pins with certainty. However, I have arbitrarily replaced them, on the basis that this is better than discarding them, and it seems unlikely that there could be any serious confusion arising from this action.

Acalypta lillianis was described from eight macropterous females and nine brachypterous males. According to the paper cited, paratypes were sent to the U. S. National Museum, H. M. Parshley and Otto Heidemann. However, neither of the supposed male paratypes loaned to me by the U. S. N. M. is actually a paratype, if one may judge from the data on the labels compared to that presented in the original description. It should also be noted that the female "type" bears a label reading "White Plains, N. Y., 21–V–11," while the description says this type was taken on 25 May, a paratype female having been taken on 21 May. There is no indication that the labels have ever been removed and repinned, so it appears that Torre-Bueno merely made a small mistake in pinning or in transcribing data.

Dr. Carl J. Drake, who is preparing a world catalogue of the Tingidae, has asked me to designate a single type from this series. Accordingly, following the precedent of Torre-Bueno himself in the case of *Corythaica bellula* (see below), I designate as lectotype the macropterous female syntype bearing the label data stated above. The brachypterous male syntype is designated lectomorphotype.

Corythaica bellula Bueno

1917. A new species of tingid from New York. Bull. Brooklyn Ent. Soc., 12 (1) : 19–20.

This species was described on the basis of seven macropterous females, six brachypterous females and seven brachypterous males, all collected near White Plains, New York. Twelve of these specimens, including the macropterous female holotype, brachypterous male morphotype, and three macropterous females, three brachyterous females and four brachypterous males, all paratypes, are in the Snow Museum collection. Dr. Drake informs me that one macropterous and one brachypterous paratype are in his collection. The present location of the other six paratypes is unknown to me. Torre-Bueno states that there were about 150 individuals collected on the same day as the type (26 June 1910) and that the species had been collected "in April, May, June, July, August and September." However, all the type series are June and September specimens. Apparently half a dozen of each of the three forms were arbitrarily selected as paratypes from a large number of specimens available. Fifteen specimens not labelled as paratypes but apparently a part of this large series are in the Snow Museum collection. Of these, only one is a macropterous form, all are from White Plains, New York, and all the indicated months except August are represented.

Review

THE ODONATA OF CANADA AND ALASKA by Edmund M. Walker, Professor Emeritus of Zoology University of Toronto, Honorary Curator of Zoology, Royal Ontario Museum. Volume Two, Part III. The Anisoptera—Four Families (Aeshnidae, Petaluridae, Gomphidae, Cordulegastridae). University of Toronto Press: 1958. Pp. i–xi, 1–318, Pls. 1–164 interspersed in the text, the figures on each plate numbered separately.

A Foreword by Dr. F. A. Urquhart describes how the increasing amount of material at Dr. Walker's disposal resulted in a widening of the method of publication.

The NEWS for April, 1954, contains a review of Volume I, Parts I–II of this work issued in 1953. That review states that the account there given of the general structure of the Odonata in Part I "is evidently designed to serve as an introduction both to this volume and to a later one on the Anisoptera." The present part, dated 1958, is that later one on the Anisoptera.

The general characteristics of the Anisoptera are described for the adults (pp. 3–9) and the larvae (pp. 9–11). Superfamilies are recognized for the Anisoptera: Aeshnoidea, Cordulegastroidea and Libelluloidea, all of Tillyard (pp. 11–12). Three families (Aeshnidae, Petaluridae and Gomphidae) are listed for the Aeshnoidea, one (Cordulegastridae) for the Cordulegastroidea, and three (Macromidae, Corduliidae and Libellulidae) for the Libelluloidea (pp. 11–12). Keys to the Anisopteran families occupy pp. 12–14 (adults pp. 12–13) and nymphs (p. 14). Thence follow the systematic descriptions and keys to the taxonomic divisions of the Aeshnidae (pp. 14–131), of the Petaluridae (pp. 131–135), of the Gomphidae (pp. 135–289), and of the Cordulegastridae (pp. 289–307). A bibliography occupies pp. 309–313, and an Index pp. 315–318.

A comprehensive review of the geographical distribution of the Canadian and Alaskan Anisoptera is not given as it was for the Zygoptera in Part I.

The total numbers of species and subspecies treated in this book are Aeshnidae 29, Petaluridae 1, Gomphidae 40, Cordulegastridae 4.

As in Volume I there is here given for each species and subspecies, as far as data are available: the most conspicuous characteristics (diagnosis), the description of male and of female, the variation, habitat and range, distribution in Canada, and field notes. The field notes deal with habits, time and place of emergence of adults, habits of flight and of rest.

The figures of the adults include the interocular area on the top of the head, the male appendages, the vulvar laminae, the male genitalia of the second abdominal segment, the thoracic color pattern, the color pattern of abdominal segments 6–10, dorsal views of entire nymphs and lateral views of the abdomen of some, dorsal views of abdominal segments 6–10, the left labial palp and ligula of nymphs—a wealth of illustration. Plate 59 illustrates these last-named organs of 18 species; so slight are the specific differences here that we have raised the question, both with Prof. Walker and ourselves, as to whether they are truly specific or may not be in some cases intraspecific variations. We are not aware that such differences have been investigated; until they are their status must remain doubtful.

The similarity in shape between these figures on Prof. Walker's Plate 59 and figures of the same organs in nymphs of neotropical Gomphines shown by Prof. Needham in Trans. Amer. Ent. Soc., Vol. LXV, Pl. XX, figs. 1, 3, 5, 11, 15, 16, 18, 20, 22, 24, 25; Pl. XXI figs. 27, 31, 33; Vol. LIX, Pl. XIV, figs. 2b, 5b, 7b, shows how wide the possibilities of variation may be.

As stated in the review of Part I, this work will be of great use to entomologists in the United States. It will be of use also to those of northern Eurasia, while its mode of presentation should be an inspiration to biologists everywhere.—Philip P. Calvert.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Tenebrionidae of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral. San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

Butterflies. Wish to exchange specimens for Japanese species. Please write to Ichiro Nakamura (Boy, age 16), 26 Aza-Nichiyama Obayashi Takarazuka-shi, Hyogo-Ken, Japan.

Phasmidae of nearctic area desired alive. Purchase or trade, drawing on large stock of major orders, worldwide. Domminck J. Pirone, Dept. Entomology, Cornell University, Ithaca, N. Y.

Nitidulidae and Rhizophagidae wanted in exchange for European beetles of all families. O. Marek, Žămberk 797, Czechoslovakia.

Wanted and Needed. We are compiling a history of entomology, and particularly, at present, of the amateur insect clubs that flourished 50 to 75 years ago. Will you who have knowledge of such early clubs or societies advise me, giving facts on the time of existence, members, etc., which you may have. J. J. Davis, Dept. of Entomology, Purdue University, Lafayette, Indiana.

Insects

ENTOMOLOGICAL NEWS

OCTOBER 1959

Vol. LXX **No. 8**

CENTENNIAL YEAR
THE AMERICAN ENTOMOLOGICAL SOCIETY
1859—1959

CONTENTS

PUBLISHED MONTHLY, EXCEPT AUGUST AND SEPTEMBER, BY
THE AMERICAN ENTOMOLOGICAL SOCIETY
PRINCE AND LEMON STS., LANCASTER, PA.
AND
1900 RACE STREET, PHILADELPHIA 3, PA.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada
Second-class postage paid at Lancaster, Pa.

ENTOMOLOGICAL NEWS

ENTOMOLOGICAL NEWS is published monthly, excepting August and September, by The American Entomological Society at Prince and Lemon Sts., Lancaster, Pa., and the Academy of Natural Sciences, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

PHILIP P. CALVERT, Editor Emeritus. R. G. SCHMIEDER, Editor. Editorial Staff: H. J. GRANT, JR., E. J. F. MARX, M. E. PHILLIPS, and J. A. G. REHN.

Subscription price, per yearly volume of 10 numbers: Domestic, $5.00; Foreign, $5.30; Canada, $5.15—U. S. Currency.

SUBSCRIPTIONS: Communications and remittances to be addressed to **Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

ADVERTISEMENTS: Rate schedules available on request. Address, **Fred B. Jacobson, Advertising Manager, Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

MANUSCRIPTS and all communications concerning same should be addressed to **R. G. Schmieder, Zoological Laboratory, University of Pennsylvania, Philadelphia 4, Pa.**

The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. Articles longer than eight printed pages may be published in two or more installments, unless the author is willing to pay the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

ILLUSTRATIONS: Authors will be charged as follows: For text-figures, the cost of engraving; for insert plates (on glossy stock), the cost of engraving plus printing. Size limit, when printed, 4 × 6 inches. All blocks will be sent to authors after printing. It is not advisable to print half-tones as text-figures.

TABLES: The cost of setting tables will be charged to authors.

SEPARATA: Members of the American Entomological Society may elect to receive, gratis, 25 offprints of their contributions. These will be "run-of-form," without removal of extraneous matter.

Those members desiring more than 25 separates, and all non-members, will receive no gratis copies. They must obtain all their separates (as reprints, with extraneous matter removed) from the printer at the prices quoted below. Authors must place their order for such separates with the editor at the time of submitting manuscripts, or when returning proof.

Copies	1–4 pp.	5–8 pp.	9–12 pp.	13–16 pp.	17–20 pp.	Covers
50	$3.95	$6.33	$ 9.89	$10.28	$13.44	$4.31
100	4.74	7.51	11.86	12.65	16.21	5.89
Add'l 100	1.58	2.36	3.94	4.74	5.54	3.16

Plates printed one side: First 50, $3.15; Additional 100's, $2.37.

Transportation charges will be extra.

ENTOMOLOGICAL NEWS

VOL. LXX OCTOBER, 1959 No. 8

Elevation of the Macromia Group to Family Status (Odonata)

By LEONORA K. GLOYD, Illinois Natural History Survey, Urbana

In regard to its assigned suprageneric placement and rank, the *Macromia* group, represented in North America by the genera *Macromia* and *Didymops*, has the history of a misfit. Its composition and the characteristics used to define it have been varied. In rewriting the key to odonate nymphs for the new edition of Ward and Whipple's Fresh Water Biology, I had to consider the status and nomenclature of the taxon. My study is not a complete one, but the evidence found seems to indicate that the *Macromia* group should be raised to the rank of a family under the name of Macromiidae.

HISTORICAL SKETCH

The name *Macromia* was first used as the basis for a taxon above the level of genus by Baron Edm. de Selys Longchamps in his *Synopsis des Cordulines* of 1871. Previously, however, in a "communication verbale" given at the November 5, 1870 meeting of the Société Entomologique de Belgique, Selys reported on the progress of the manuscript for this great work and referred to the same suprageneric taxon as "Légion Epophthalmia." With the receipt and study of additional material in the interval between this meeting and that of the Académie royale des sciences de Belgique on May 9, 1871, at which time his manuscript was submitted for publication, he found it necessary to make a complete revision of his preliminary classification. In the finished work, "Légion Macromia" was used instead of

"Légion Epophthalmia." It included the genera *Idionyx* Selys, *Aeschnosoma* Selys, *Synthemis* Selys, and *Macromia* Rambur with *Epophthalmia* Burmeister as a subgenus. In the *Secondes Additions au Synopsis* (Selys, 1878), *Idionyx* was demoted to subgeneric position under *Macromia,* and *Didymops* Rambur and *Phyllomacromia* Selys were added as subgenera of *Macromia.*

Selys' classification of the Cordulines has been universally followed. Kirby (1890) recognized the subgenera as genera but did not make use of his categories between subfamily and genus. In 1901, the *Macromia* group was given subfamily status by Needham (Needham and Betten, p. 479) who referred to it as "newly set apart" and gave it coordinate rank with Libellulinae and Corduliinae under the family Libellulidae. Subsequent changes may be briefly outlined as follows:

1901 Synthemiinae: Needham and Hart, p. 5 (Libellulidae)
1904 Macromiinae: Needham, p. 698, footnote *a*, Synthemiinae, 1901, an error
1906 Groupe des Macromia: Martin, p. 37 (Cordulines)
1908 Group V: Williamson (Sept.) p. 429 (Cordulinae)
1908 Macromiinae: Needham (Dec.), p. 276 (Libellulidae)
1910 Tribus Macromiini: Muttkowski, p. 118 (Corduliinae)
1910 Group Macromina: Tillyard, p. 329;
Macromiinae: idem, p. 327, fig. 3 (Libellulidae)
1917 Tribe Macromiini: Tillyard, p. 226 (Corduliinae)
1929 Macromiinae: Needham and Heywood, p. 163 (Libellulidae)
1940 Epophthalmiinae: Tillyard and Fraser, p. 389 (Corduliidae)
1955 Macrominae: Needham and Westfall, p. 326 (Libellulidae)
1957 Epophthalmiinae: Fraser, p. 111 (Corduliidae)

In all of this shifting the taxon was given coordinate rank with the highest *Cordulia* group by Needham only. Tillyard and Fraser (1940) and Fraser (1957) were in accord with Needham as to subfamily rank but placed it as a subdivision of the elevated Corduliidae (St. Quentin, 1939, p. 359).

The composition of the *Macromia* group since 1878 (Selys) has undergone some fluctuation. Martin (1906) added three genera—*Idomacromia* Karsch, *Libellulosoma* Martin, and *Ma-*

cromidia Martin. Williamson (1908) added *Azuma* Needham (= *Epophthalmia*), but excluded *Aeschnosoma* and *Idionyx* as well as Martin's three additions. Needham (1908) added *Macromidia* to Williamson's list and left out *Didymops*. Tillyard (1917) placed *Synthemis* in a separate tribe but otherwise his Macromiini was identical with Williamson's Group V. Tillyard and Fraser (1940) excluded the synonym *Azuma* and again added *Macromidia*. Fraser (1957) eliminated *Phyllomacromia* because of synonymy with *Macromia*. Thus the taxon in 1957 was composed of *Didymops, Epophthalmia, Macromia*, and *Macromidia*—essentially the same as Selys' "Genre Macromia" of 1878 but with *Idionyx* replaced by *Macromidia*.

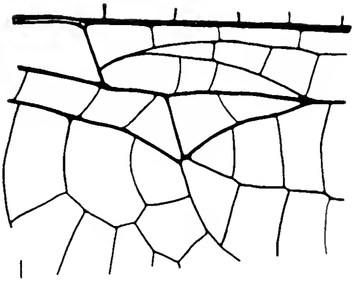
In their reclassification of the Odonata, Tillyard and Fraser (1940, p. 389) described the "Subfamily EPOPHTHALMIINAE nov. subfam." (family Corduliidae). They gave no explanation for discarding the name Macromiinae, nor did Fraser in his revision of this reclassification (1957, p. 111).

The Family-Group Name

Both *Epophthalmia* Burmeister 1839 and *Macromia* Rambur 1842 were included in Selys' suprageneric "Légion Macromia." The prior description of *Epophthalmia* does not invalidate the selection of *Macromia* as the basis of a Family-Group name. The only other matter of concern then is the use of "Légion Epophthalmia" in Selys' verbal report on the *Synopsis des Cordulines* given at the November 5, 1870 meeting of the Société Entomologique de Belgique. This report (at least in part) and the "extraite d'un tableau synoptique" was recorded in the Comptes-Rendus des Séances, which according to the Zoological Record for 1870 (vol. 7, p. 444) were distributed monthly to members of the society. These were printed, and each one was separately paged. They were later reprinted in the Annales, repaged, and sometimes obviously reorganized and revised. The Annales for 1870–1871 (vol. 14) containing the Comptes-Rendus with the account of Selys' report was published some time after November 4, 1871 as this is the last date of an included paper. The abstract of this preliminary report and the anticipated classification was also printed in Zoological Record (vol. 7, p. 449) after October 20, 1871, as indicated by the date of the preface. It is likely that the *Synopsis* appeared before either the Annales for 1870–1871 or volume 7 of the Zoological Record. Technically, Selys cannot be considered the author of any of these three accounts. Even if it were otherwise, for the sake of stability the taxon-name used in Selys' finished *Synopsis* should be given preference over the temporary one reported informally, i.e. without a title, in the minutes of a meeting. Tillyard and Fraser (1940) said nothing about priority or restoration of an old name when they proposed Epophthalmiinae. Because some authors never changed to Epophthalmiinae, it is correct to say that *Macromia*, as the basis of a Family-Group name, has been used in the literature for a total, to date, of 89 years. The suprageneric taxa based on the name *Macromia* should be credited to Selys; *Macromia* is the type genus by indication (Selys, 1871, p. 12, 82). Epophthalmiinae, as long as it includes the genus *Macromia*, is to be regarded as a synonym of Macromiinae.

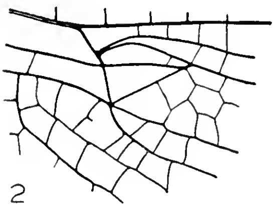
MACROMIIDAE, new status

Diagnosis.—Adult: Occiput well rounded and without a pronounced carina or sharp angle at posterior margin. Hind wing with triangle well separated from arculus, usually by a distance as great or greater than length of upper (costal) side of triangle in front wing; median cell (basilar space) without crossveins; at least one cubito-anal crossvein between level of arculus and proximal side of triangle (fig. 1); upper proximal angle of triangle acute (60° to 80°); tornus angulated in male; anal loop not bisected by a mid-rib. Tarsal claws with the inferior tooth (or hook) about as stout and long as tip of claw, giving the claw the appearance of being bifid (figs. 3 and 4); tibial keels present in males. Abdomen with no lateral or lateroventral carinae on any of the segments; segment 2 of the male with anterior hamules or hamular processes small but distinct (Schmidt, 1915); in the female, vulvar lamina sometimes long but without sawteeth, lateral processes or valves vestigial or absent. Nymphs:

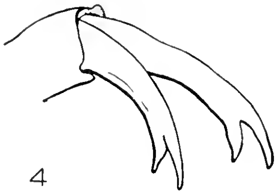


1

3



2



4

Fig. 1. Section of hind wing of *Macromia taeniolata* Rambur.
Fig. 2. The same of *Libellula quadrimaculata* Linn.
Fig. 3. Tarsal claws of right hind leg of *Macromia illinoiensis* Walsh.
Fig. 4. The same of *Didymops transversa* (Say).

Antennae 7-segmented; top of head with a nipple-like projection or low rounded tubercle near each posterolateral angle, the two projections approximately as widely separated as the lateral elevated margins of the dorsal shield of the prothorax. Labium spoon shaped or semiflattened; ligula entire (concave medianally in mature nymphs of *Epophthalmia* but not cleft). Proventriculus with four plates, the dorsal and ventral pairs dissimilar; ventral plates each with two large spines near margin of mesal ridge, one subapical, the other anterior to it, both directed downward and slightly inward from margin of ridge, and with a series of small teeth or sclerotized scallops on edge of ridge below the large subapical tooth (Ferguson-Beatty, 1958, p. 368, figs. 3 and 4). Mandibles each with two molars in the position of the molar crest (Watson, 1956, p. 189–190).

Macromiidae is similar to Libellulidae (including the Corduliinae, or Corduliidae of some authors) in having the ligula of the labium with the distal margin entire in both nymph and adult, the triangles in front and hind wings dissimilar, and, in the nymph, the dorsal pair of proventricular plates unlike the ventral pair. It differs from the Libellulidae most notably in the position of the triangle of the hind wing, the presence of distinct anterior hamules in the male, the absence of lateroventral carinae on the abdomen (as in Gomphidae, Cordulegastridae, and Petaluridae), and, in the nymph, by the presence of posterolateral tubercles on the head, only two molars on the right mandible, and a unique armature of the ventral pair of proventricular plates. In venation, Macromiidae is most similar to Synthemidae but differs in having no crossveins in the median cell (basilar space).

This diagnosis is based primarily on *Macromia, Didymops,* and *Epophthalmia.* The venational characteristics, at least, seem to apply to *Macromidia,* also. Characteristics have not been fully checked for species in all these genera and undoubtedly the diagnosis and the composition of Macromiidae may require revision with further study. If the formation of the anal loop in *Macromia* is like that described for *Synthemis* nymphs (Tillyard, 1914, p. 172–175), both genera should probably be included in the same family and diagnostic venational characteristics revised. Statements concerning mandibles and the proventriculus are based on Nearctic species of *Didymops* and *Macromia.*

Dr. E. M. Walker has suggested (*in lit.,* Feb. 20, 1956) that perhaps other groups should be taken out of the old subfamily Corduliinae or family Corduliidae as well as the *Macromia* group. It is also possible that some groups need to be put back together again. Certainly Nearctic Corduliinae and Libellulinae are so closely related that they belong in one family, the Libellulidae. Both usually have the anal loop bisected by a mid-rib, proximal side of triangle even with the arculus (fig. 2) or either slightly distal or proximal to it, longitudinal lateroventral carinae on two or more of abdominal segments 2 to 9; anterior hamules of the male vestigial or absent; and nymphs for which no character is known that will separate them above the generic level. The nymphs of these two groups are unique in having "lost the dentition on one of the ridges of the dorsal plates and on both ridges of the ventral plates (Fig. 5)" (Ferguson-Beatty, 1958, p. 369) of the proventriculus. Also in the nymphs of both groups there are three or four relatively small, single molars in the position of the molar crest on the right mandible and sometimes on the left as well (Watson, 1956, p. 170–190, 199–202).

Several authors have expressed the need for more comparative studies of various organs, structures, or systems to test the classification based primarily on wing venation. Because the proventricular plates in the nymphs of *Synthemis* Selys (Tillyard, 1910, p. 326, fig. 2) and *Presba* Barnard (Barnard, 1937, p. 236, fig. 24) appear to be so very similar, and such that those of *Macromia* (Ferguson-Beatty, 1958, p. 368, figs. 3 and 4) could easily be derived from them, the value of the venational characteristics used by Fraser (1957, p. 106, 109) to place them in two separate families is questionable. For major groupings, we need to know more about parts of the body which could have started to specialize before the elaborate development of the wing venation, as well as more about their ontogeny. For example, in the mature nymph of *Epophthalmia*, the palpal lobes are so bizarre that it is difficult to believe any close relationship exists with the genus *Macromia*. Yet, in the figure of an early instar of *Epophthalmia* (Lieftinck, 1931, p. 78, fig. 27) the lobes are very like those of *Macromia*. Dr. Calvert (1893, p. 212–213) in his discussion of relationships within the Order Odonata mentioned the distinctness of meso- and meta-thoracic ganglia in some groups and their union in others; he also took into consideration the presence or absence of lateral longitudinal carinae on the abdomen. These items are lacking in recent literature on classification.

I am deeply grateful to Dr. E. M. Walker for many helpful suggestions and advice and encouragement; to Dr. Alice Ferguson Beatty for the privilege of studying her unpublished doctorate thesis on the nymphal proventriculus; and to Dr. B. E.

Montgomery for his kindness in supplying information from papers not available to me here.

A number of papers not specifically cited were consulted in obtaining data for this paper, principally those of Barnard, Calvert, Fraser, Lieftinck, Needham, Pinhey, Ris, Tillyard, and Williamson. Those of Dr. Lieftinck with their many illustrations were especially useful.

Literature Cited

Barnard, K. H. 1937. Ann. S. Afr. Mus., 32 (pt. 3): 169–260.

Calvert, P. P. 1893. Trans. Am. Ent. Soc., 20: 152a–d, 153–272.

Comptes-Rendus des séances de la Société Entomologique de Belgique Année 1870–1871. *In* Ann. Soc. Belg., 14: I–LXVII. Published after Nov. 4, 1871.

Ferguson-Beatty, A. 1958. Proc. X Internat. Congress Ent., Montreal, Aug. 17–25, 1: 367–372.

Fraser, F. C. 1957. A Reclassification of the Order Odonata. Roy. Zool. Soc. N. S. Wales. Sydney: E. J. Miller & Co. Pp. 1–62.

Kirby, W. F. 1890. A Synonymic Catalogue of Neuroptera Odonata, or Dragonflies. London: Gurney & Jackson. ix + 202 pp.

Lieftinck, M. A. 1931. Treubia, 13 (Livr. 1): 21–80.

Martin, R. 1906. Cordulines. Cat. Coll. Zool. du Baron Edm. de Selys Longchamps. Bruxelles: Hayez, Impr. des Acad., Fasc. XVII: 1–98.

Muttkowski, R. A. 1910. Bull. Publ. Mus. Milwaukee, 1 (art. 1): 1–207.

Needham, J. G. and C. Betten. 1901. N. Y. State Mus., Bull. 47: 383–612. Odonata, pp. 429–540.

Needham, J. G. and C. A. Hart. 1901. Bull. Illinois St. Lab. Nat. Hist., 6 (art. 1): 1–94.

Needham, J. G. 1904. Proc. U. S. Nat. Mus., 27 (no. 1371): 685–720.

——. 1908. Ann. Ent. Soc. Am., 1 (no. 4, Dec.): 273–280.

Needham, J. G. and H. B. Heywood. 1929. A Handbook of the Dragonflies of North America. Springfield, Ill.: Charles C Thomas. viii + 378 pp.

Needham, J. G. and M. J. Westfall, Jr. 1955. A Manual of the Dragonflies of North America (Anisoptera). Berkeley & Los Angeles: Univ. Calif. Press. xii + 615 pp.

St. Quentin, D. 1939. VII Internat. Kongress Entom., Berlin, 15–20 Aug. 1938, 1 Sektion: Syst. u. Tiergeog., pp. 345–360.

Schmidt, Erich. 1915. Zool. Jahrb., Abt. f. Morph., 39: 1–111.

Selys Longchamps, E. de. 1871. Bull. Acad. roy. Belg. (2), 31: 238–316, 519–565. Reprint, Bruxelles. Pp. 1–128.

——. 1878. Bull. Acad. roy. Belg. (2), 45: 183–222. Separate, Bruxelles. Pp. 1–44.

Tillyard, R. J. 1910. Proc. Linn. Soc. N. S. Wales, 35 (pt. 2, no. 138) : 312–377.

——. 1914. Proc. Linn. Soc. N. S. Wales, 39: 163–216.

Tillyard, R. J. and F. C. Fraser. 1940. Australian Zool., 9 (pt. 4) : 359–396.

Watson, M. C. 1956. Trans. Amer. Ent. Soc., 81: 155–202.

Williamson, E. B. 1908. Ent. News, 19 (Sept.) : 428–434.

Revisional Notes on the Types of Ichneumoninae of Cresson, Cushman, Ashmead and Others

By Gerd H. Heinrich, Dryden, Maine

During January and February 1959 I studied the types of Ichneumoninae in the collections of the Connecticut Agricultural Experimental Station in New Haven, Connecticut, of the Academy of Natural Sciences in Philadelphia, and of the United States National Museum in Washington. As a result of my studies I propose the following changes in the taxonomy as used by Townes in the Catalog (Hymenoptera of America North of Mexico), 1951, for the Ichneumoninae. The entities dealt with will be given in the original combination, followed by the combination as used by Townes, 1951, and lastly by what I consider the correct combination and status.

In a few cases my concept of genera differs from Townes' as applied in the 1951 Catalog. As these differences will become apparent in the following combinations they need to be explained.

The type of the genus *Amblyteles,* the palaearctic species *armatorius* Panzer, is, as indicated by its name, "armed" by strong apophyses of the propodeum, similar to the genus *Hoplismenus.* I do not know at present any other species which I could consider as congeneric with it. Therefore I confine the genus *Amblyteles* to the single palaearctic species, the type of the genus. All North American species of this group that do not belong to *Eutanyacra* Cameron or *Spilichneumon* Thomson I place in the genus *Pseudamblyteles* Ashmead which has as type a palaearctic species, *palliatorius* Gravenhorst, related to the nearctic *bizonatus* Cresson and *robustus* Cresson.

The genera *Barichneumon* Thomson and *Melanichneumon* Thomson have been synonymized by Townes 1951 and separated again by Walkley 1958. Both possibilities have their strong "pro" and "contra." Although the types of the two genera, *anator* Fabricius and *spectabilis* Homgren respectively, are strikingly different, a great variety of intermediate forms exists. This matter needs further consideration and investigation. In the list below for the time being I am following Townes in lumping all the species into one genus.

I am not fully satisfied with Townes' arrangement of the Platylabini. The type of the genus *Platylabus,* the species *rufus* Wesmael, is characterized by deep, transverse gastrocoeli. I still am convinced that *Asthenolabus* Heinrich with obsolete or subobsolete gastrocoeli must be considered a distinct genus. I am placing in *Platylabus* all species with pronounced gastrocoeli, transverse or not transverse. *Cyclolabus* Heinrich and *Ectopius* Wesmael are distinct genera, both, unlike *Platylabus,* with small, circular or very short oval propodeal spiracles, but distinguished by the difference of the gastrocoeli, which are transverse and pronounced in *Cyclolabus* but obsolete or indicated only by a slight, longitudinal impression in *Ectopius.* *Cyclolabus* is more closely allied to *Platylabus* than is *Ectopius.*

I acknowledge with gratitude the assistance given to me by the following persons: Dr. F. B. Kring in New Haven, Dr. James A. G. Rehn and Mr. Harold J. Grant, Jr. in Philadelphia and Miss Luella M. Walkley in Washington.

1. *Trogus canadensis Provancher* ♀ = *Conocalama copei* (Cress) ♂ = **Conocalama canadensis** (Provancher), syn. resur. tentat.

The type of *Conocalama copei,* a male from Virginia, has a flat postpetiole without any trace of the conical elevation regarded by Hopper as the distinctive character separating the nearctic genus *Conocalama* Hopper from the palaearctic *Callajoppa* Cameron. As long as we do not know that this character mutates individually—and so far there seems to be no evidence that it does—we better consider the species *copei* as different from *canadensis*, even though the color is identical. Also the shape of the propodeum of *copei* differs slightly from the norm of *canadensis* in sloping down a little less abruptly and steeply from the ridge formed by the costulae and the carina that replaces the area superomedia, the latter carina not elevated (as is usual in canadensis) and forming a wider arc.

2. *Amblyteles (Chasmias) pequoitorum* Viereck ♀ = *Ichneumon pequoitorum* (Viereck) = **Coelichneumon pervagus** (Cresson) ♂, new synonymy.

3. *Ichneumon semicoccineus* Cresson ♂ = *Pterocormus rufiventris* (Cresson) = **Ichneumon semicoccineus** Cresson ♂, syn. resur.

The type, a male from "Western Territories," is similar in color to *rufiventris* but distinctly different in morphology. Head and temples are considerably wider, the cheeks shorter, the hind femora much stouter. Also the yellow color of face and clypeus differs from *rufiventris* ♂.

4. *Ichneumon gestuosus* Cresson ♀ = *Melanichneumon gestuosus* (Cresson) ♀ = **Ichneumon gestuosus** Cresson ♀, comb. resur.

5. *Ichneumon lewisi* Cresson ♀ = *Pseudamblyteles lewisi* (Cresson) = **Ichneumon lewisi** Cresson ♀, comb. resur.

6. *Ichneumon inurbanus* Cresson ♀ = *Pterocormus inurbanus* (Cresson) = **Ichneumon semicoccineus** Cresson ♂, new synonymy.

7. *Ichneumon propitius* Cresson ♂ = *Hoplismenus propitius* (Cresson) = **Ichneumon propitius** Cresson ♂, comb. resur.

This species possesses none of the characters which determine the genus *Hoplismenus*. Even the shape of the highly elevated scutellum is different from the norm of the latter genus, and the short protruding corners of the areae dentiparae have but little resemblance to the long apophyses of a typical *Hoplismenus*. In his monograph of the genus, Swift has already mentioned these facts and has included the species in *Hoplismenus* only because he considered its characters as too little significant for erecting a new genus for it.

The species is a parasite of Nymphalidae, sharing this biological character not only with the genus *Hoplismenus* but also with *Thyrateles* Perkins and furthermore with the *gracilicornis*-group of *Ichneumon* Linnaeus. *Thyrateles*—and also the *gracilicornis*-group—tend morphologically to an elevation of the scutellum and to a deepening of the gastrocoeli as is equally evident in the species under discussion. As *Thyrateles* is confined to species with abdomen amblypygous or semi-amblypygous, the species *propitius* can be placed only in the genus *Ichneumon,* unless a new genus would be erected for it. Even though it differs from the norm of this genus in the areolation of the propodeum, its relationship to *Ichneumon* is further confirmed by the pattern of sexual dichromatism of the species, the females having ferruginous, the males yellow hind tibiae with black apex.

8. *Amblyteles (Pterocormus) quadrizonatus* Viereck ♂ = *Pterocormus quadrizonatus* (Viereck) = **Ichneumon subdolus** Cresson ♀, new synonymy.

9. *Ichneumon versabilis* Cresson ♂ = *Pterocormus maius* (Cresson) ♀ = **Ichneumon versabilis** Cresson ♂, syn. resur.

The shape of the deep, transverse gastrocoeli of the male type excludes the possibility of associating it with *maius* female, a species with small and shallow gastrocoeli.

10. *Amblyteles balteatus* Hopper ♂ = *Amblyteles rufizonatus* (Cresson) ♀ = **Ichneumon volesus** Cresson ♀, new synonymy.

The deep, transverse gastrocoeli of the male type exclude the generic placement of the species in *Amblyteles* or *Pseudamblyteles.* The new association of the two sexes is obvious.

11. *Amblyteles (Pterocormus) winkleyi* Viereck ♀ = *Pterocormus instabilis* (Cresson) = **Ichneumon winkleyi** (Viereck) ♀, syn. resur.

I. winkleyi and *instabilis* are two very similar and closely allied but distinct species as I found by careful examination and observation extended over a period of years.

12. *Ichneumon lividulus* Provancher ♀ = *Ichneumon lividulus* Provancher = **Ichneumon zelotypus** Cresson ♂, new synonymy.

Association of sexes concluded from corresponding morphology and from field observation.

13. *Ichneumon juxtus* Cresson ♂ = *Amblyteles juxtus* (Cresson) = **Spilichneumon juxtus** (Cresson) ♂, new comb.
14. *Ichneumon consimilis* Cresson ♂ (preocc.) = *Amblyteles nubivagus* (Cresson) = **Spilichneumon nubivagus** (Cresson), ♂, new comb.
15. *Amblyteles fraternus* Cresson ♂ = *Amblyteles fraternus* Cresson = **Spilichneumon nubivagus** (Cresson) ♂, new comb. and new synonymy.
16. *Ichneumon comes var. aleatorius* Cresson ♂ = *Amblyteles aleatorius* (Cresson) = **Spilichneumon subrufus** (Cresson) ♂, new comb. and new synonymy.
17. *Ichneumon inconstans* Cresson ♂ = *Amblyteles inconstans* (Cresson) = **Spilichneumon subrufus** (Cresson) ♂, new comb. and new synonymy.
18. *Ichneumon koebelei* Swezey = *Pseudamblyteles koebelei* (Swezey) = **Spilichneumon superbus** (Provancher), new comb. and new synonymy.
19. *Ichneumon torvinus* Cresson ♂ = *Chasmias torvinus* (Cresson) = **Chasmias saucius** (Cresson) ♀, new synonymy.
20. *Ichneumon procax* Cresson ♂ = *Ichneumon procax* Cresson = **Thyrateles procax** (Cresson) ♂, new comb.

The female of this species (see below) is amblypygous. Consequently it can not be regarded as an *Ichneumon*. The deep and large gastrocoeli with strongly developed thyridia, the elevated scutellum and the biological fact of parasitism on Nymphalidae establish satisfactorily its position within the genus *Thyrateles* Perkins, although the extremely spinose tarsi of *procax* form a peculiar character not present in the other species of the genus.

21. *Amblyteles torontosus* Davis ♀ = *Amblyteles torontosus* Davis = **Thyrateles procax** (Cresson) ♂, new comb. and new synonymy.

The association of sexes has been proved by a series of both males and females reared from the same host (Canadian National Collection).

22. *Amblyteles mormonus* Cresson ♀ = *Pseudamblyteles mormonus* (Cresson) = **Thyrateles mormonus** (Cresson) ♀, new comb.

This species is closely related to *camelinus* Wesm., the palaearctic type of the genus *Thyrateles*.

23. *Ichneumon marianapolitanensis* Provancher ♀ = *Amblyteles rufizonatus* (Cresson) ♀ = **Ctenichneumon syphax** (Cresson) ♀, new comb. and new synonymy.

This is a dichromatic species, occurring regularly in two differently colored phases, the one with segments 2–7 red (*syphax*), the other with only 2–3 red, 4–7 being black (*rufizonatus*).

24. *Amblyteles perannulatus* Hopper ♀ = *Amblyteles perannulatus* Hopper = **Eutanyacra perannulata** (Hopper) ♀, new comb.

25. *Ichneumon nobilis* Cresson ♂ = *Pseudamblyteles munificus* (Cresson) ♂ = **Eutanyacra munifica** (Cresson) ♂, new comb.

26. *Ichneumon grotei* Cresson ♂ = *Pseudamblyteles grotei* (Cresson) = **Eutanyacra suturalis** (Say) ♀, new comb. and new synonymy.

The association of *propinquus* Cresson ♀ and *grotei* ♂ has been proved by a series of both males and females reared from the same host (Can. Natl. Coll.).—The original description of *suturalis* could be applied to a number of different species, all equally matching it. As the type is lost I accept according to the principle of priority the synonymy of *propinquus* and *suturalis* as established by Townes.

27. *Ichneumon rubellus* Cresson ♂ = *Pseudamblyteles animosus var. rubellus* (Cresson) = **Pseudamblyteles rubellus** (Cresson) ♂.

Differences in the gastrocoeli indicate that *rubellus* is a distinct species, not a mere variety of *animosus*.

29. *Ichneumon infidelis* Cresson ♂ = *Pterocormus infidelis* (Cresson) = **Intermedichneumon calcatorius** (Thunberg) ♂, new synonymy.

30. *Platylabus opacitas* Davis ♂ = *Aoplus opacitas* (Davis) = **Aoplus cestus** (Cresson) ♀, new synonymy.

31. *Ichneumon sitkensis* Ashmead ♂ = *Aoplus vagans sitkensis* (Ashmead) = **Aoplus ruficeps sitkensis** (Ashmead) ♂, new comb.

The type (from Alaska) differs from the eastern subspecies *ruficeps vagans* Provancher only in the lack of the white annulus of flagellum.

32. *Ichneumon helvipes* Cresson ♀ = *Melanichneumon helvipes* (Cresson) = **Melanichneumon anator** (Fabricius) ♀, new synonymy.

33. *Ichneumon blanchardi* Davis ♀ = *Melanichneumon rubicundus* (Cresson) ♀ = **Melanichneumon blanchardi** (Davis) ♀, syn. resur.

M. rubicundus auct. is a complex species, probably better placed in a genus other than *Melanichneumon*, which would also contain *annulicornis* Ashm. The species *blanchardi* ♀ may be separated from *mucronatus* Provancher ♂ and *annulicornis* ♀ by the somewhat shorter propodeum with consequently shorter areae dentiparae and superomedia, and by the lack of teeth of the propodeum. The type of *rubicundus* ♀ has distinct apophyses of the propodeum as has *mucronatus* ♂. Whether both can be associated as sexes of the same species needs to be investigated and seems to be doubtful. If they are not the same, *rubicundus* (preocc.) will have to be renamed.

34. *Ichneumon belfragei* Cresson ♂ = *Pseudamblyteles belfragei* (Cresson) = **Melanichneumon belfragei** (Cresson) ♂, new comb.

35. *Amblyteles ohioensis* de Gant ♂ = *Melanichneumon gestuosus* (Cresson) ♂ = **Melanichneumon nigripes** (Provancher) ♂, new synonymy.

In this species mutants with partially obscure reddish color on the second or second and third tergite, as represented by the type specimen of *nigripes,* are rare in the male sex, but rather common in females.

36. *Cratichneumon pluto* Viereck ♂ = *Melanichneumon gestuosus* (Cresson) ♂ = **Melanichneumon nigripes** (Provancher) ♂, new synonymy.

37. *Ichneumon cordatus* Cresson ♂ = *Melanichneumon cordatus* (Cresson) = **Melanichneumon subcyaneus cordatus** (Cresson) ♂, new status.

I. cordatus evidently is nothing more than the western, less white-marked form of *subcyaneus.*

38. *Ichneumon solitus* Cresson ♀ = *Melanichneumon solitus* (Cresson) = **Melanichneumon subcyaneus cordatus** (Cresson) ♂, new synonymy.

The other sex of the former species.

39. *Ichneumon neutralis* Cresson ♂ = *Ichneumon neutralis* (Cresson) = **Melanichneumon subcyaneus neutralis** Cresson ♂, new comb. and new status.

This is another bluish-black *Melanichneumon* male, distinguished by entirely black hind legs. I suppose that this also belongs to *subcyaneus* as a geographical subspecies.

40. *Ichneumon ornatipes* Cresson ♂ = *Melanichneumon ornatipes* (Cresson) = **Melanichneumon virginicus** (Cresson) ♀, new synonymy.

M. virginicus ♀ has two striking and unique characters: the clypeus is extraordinarily widened and very deeply depressed, and the hind femora are unusually short and thick. The same features are evident in *ornatipes* ♂, except that the clypeal character is developed to a much lesser degree as is to be expected according to the rules of normal sexual dimorphism. The striking difference in color (red abdomen in the female, black abdomen in the male) represents in the Nearctic Region a rather typical phenomenon, well known in the genera *Probolus*, *Ctenichneumon*, *Tricholabus* and *Pristiceros* but until now not observed in *Melanichneumon*. Nevertheless the association of sexes may be considered in all probability as correct.

41. *Ichneumon pusillus* Cresson ♀ = *Cratichneumon paratus* (Say) = **Cratichneumon pusillus** (Cresson) ♀, syn. resur.

The type, a very small specimen from Delaware, shows no trace of the little scopula which, as far as my experience goes, is constantly present in *paratus* females. It also differs from the latter in color pattern of the legs and in size. Therefore I do not believe that the species *pusillus* could possibly be regarded as a synonym of *paratus*. I rather suspect its specific identity with *annulatipes* Provancher ♀. However, even if this should be true, it would probably represent a differently colored southern subspecies. Our knowledge of this extremely difficult group of numerous small *Cratichneumon* species is still so poor and defective that the attempt of subspecific associations should be postponed.

42. *Ichneumon kincaidi* Ashmead ♂ = *Cratichneumon kincaidi* (Ashmead) ♂ = **Cratichneumon citrinops kincaidi** (Ashmead) ♂, new comb.

European specimens of *citrinops* Wesmael differ from Alaskan specimens on *kincaidi* in nothing except the color of femora III which are red with black apex in the former, entirely infuscated in the latter.

43. *Amblyteles (Pterocormus) quintilis* Viereck ♂ = *Cratichneumon quintilis* (Viereck) = **Cratichneumon annulatipes** (Provancher) ♀, new synonymy.

Cr. quintilis ♂ is well distinguished from all similar male species of the genus occurring in the Eastern Canadian Zone by the long row of tyloides beginning on the 2nd or 3rd joint of flagellum, and by the sternauli on the mesosternum unusually strongly impressed. The association of the sexes I concluded from observations in the field and matching characters.

44. *Ischnus volens* Cresson ♂ = *Cratichneumon volens* (Cresson) = **Cratichneumon brevipennis** (Cresson) ♀, new synonymy.

An aberrant species of the genus, unmistakably characterized by the presence of several irregular vertical carinae on the frons, which are strongly developed in the female, weakly in the male.

45. *Ichneumon brevipennis* Cresson ♀ = *Ichneumon brevipennis* (Cresson) = **Cratichneumon brevipennis** (Cresson) ♀, new comb.

46. *Ischnus variegatus* Provancher ♂ = *Cratichneumon W-album* (Townes nec Cresson) = **Cratichneumon variegatus** (Provancher) ♂, syn. resur.

The specimen in the Cresson collection designated as the lectotype of *I. W-album* does not match the original description of the latter in characters of specific distinction. As the collection contains no specimen which does match the description, I have reported the type as to be considered as lost. The specimen wrongly designated as type of *W-album* is specifically identical with *I. variegatus* which therefore is the correct name for the species *W-album* of authors.

47. *Cratichneumon popofensis* Ashmead ♀ = *Cratichneumon popofensis* Ashmead = **Cratichneumon yakutatensis** Ashmead ♂, new synonymy.

I found no reason for separating these two well matched sexes as different species, especially so since a male specimen of *yuka-*

tatensis from Popoff Island (the terra typica of *popofensis*) is in the collection of the U. S. National Museum.

48. *Anisobas nearcticus* Cushman ♀ = *Anisobas texensis* (Ashmead) = *Anisobas texensis nearcticus* Cushman ♀, syn. resur.

The type of *nearcticus* as well as two specimens in my collection, all from Maine, differ slightly in color from the type of *texensis*. They all have the white stripe of the outer orbits considerably abbreviated and the 4th tergite black only at the apex and with white apical band either lacking or strongly reduced. They are all considerably smaller than *texensis* and have the apex of the flagellum a little less sharply attenuated. I therefore would prefer to maintain the name *nearcticus* with subspecific status.

49. *Eurylabus agilis* Cresson ♀ = *Platylabus scutellatus* (Provancher) = **Asthenolabus agilis** (Cresson) ♀, syn. resur. and new comb.

P. agilis is undoubtedly a distinct species, differing from *scutellatus* (a species also belonging to the genus *Asthenolabus* Heinrich) by the lack of white anal markings.

50. *Platylabus metallicus* Bradley ♀ = *Platylabus clarus* (Cresson) = **Platylabus metallicus** Bradley ♀, syn. resur.

There seems to be no doubt that this is a distinct species, constantly different from *clarus* in its smaller size, less extended white marks (for example the upper margin of pronotum never being entirely white, usually entirely blue), and a little more widened flagellum.

51. *Platylabus montanus* Cresson ♀ = *Ichneumon vafer* Cresson "♀" = ♂ (preocc.) = **Platylabus perkinsi** Walkley, new synonymy.

52. *Platylabus consors* Cresson ♂ = *Platylabus consors* Cresson = **Platylabus rufipes consors** Cresson ♂, new comb. and status.

Differs from *rufipes rufipes* Provancher only by lack of the white annulus on flagellum.

53. *Platylabus californicus* Cresson ♀ = *Platylabus californicus* Cresson = **Platylabus rufipes consors** Cresson ♀, new synonymy.

54. *Probolus subdentatus* Ashmead ♂ = *Ectopius subdentatus* (Ashmead) = **Cyclolabus gracilicornis subdentatus** (Ashmead) ♂, new status.

The western subspecies *subdentatus* differs from the eastern *gracilicornis gracilicornis* Provancher only in the lack of the white annulus of the flagellum, thus paralleling *Platylabus rufipes rufipes* Provancher (Eastern) and *Platylabus rufipes consors* Cresson (Western).

55. *Hoplismenus ornatus* Cresson ♀ = *Thaumatoteles ornatus* (Cresson) = **Amblopliusus ornatus** (Cresson) ♀, new comb.

The genus *Amblopliusus* Heinrich was erected in 1930 (Mitt. Zool. Mus. Berlin, XV, 3/4, p. 551) for the Peruvian species *primus* Heinrich, which is congeneric with *ornatus.*

56. *Platylabus foxi* Davis ♂ = *Thaumatoteles ornatus* (Cresson) = **Tropicolabus foxi** Davis ♂, syn. resur. and new genus.

The type of *Platylabus foxi,* made here the type of the new genus *Tropicolabus,* differs morphologically from the genus *Amblopliusus* Heinrich (syn. *Thaumatoteles* Hopper) in the shape of the head, scutellum, propodeum, first segment and gastrocoeli. The gastrocoeli which as a general rule do not undergo considerable sexual dimorphism are deep and extremely wide with just a very narrow interval between them. The species therefore can not be placed in the genus *Amblopliusus* or *Hoploplatystylus* Schmiedeknecht. It could eventually pass as a member of the genus *Platylabus* except for the very strong, long and somewhat upwards curbed apophyses of the propodeum, which may be considered as the character separating *Tropicolabus* from *Platylabus.*

57. *Hoplismenus transversus* Davis ♂ = *Hoplismenus scutellatus* (Provancher) = **Hoplismenus scutellatus transversus** Davis ♂, new status.

There seem to be no morphological differences between *scutellatus* (from Quebec) and *transversus* (from Idaho). The color differences, however, are significant enough to indicate a subspecific differentiation. *H. scutellatus transversus* differs from *scutellatus scutellatus* by its 1) almost entirely red mesonotum, 2) entirely red abdomen, 3) lack of annulus on flagellum.

Some North American Collembola Records

By David L. Wray, Division of Entomology, North Carolina Department of Agriculture, Raleigh, N. C.

During the past number of years I have been working on the Collembola fauna of North America and have been able to examine many collections from most of the region. The following records of the occurrence of Collembola seem worthy of note.

Subfamily Onychiurinae Börner, 1901

Onychiurus cocklei Folsom

One of the most interesting accounts of the occurrence of Collembola, and I might add most intriguing to collectors, is that given by J. W. Folsom entitled "The Golden Snow-Flea, *Aphorura cocklei*, n.sp." This appeared in The Canadian Entomologist (vol. XL) in 1908 and described the swarming in Kaslo, British Columbia of "a minute yellow Collembolan that appears in crowds so dense as to cover the snow with a carpet of gold." It was of particular interest to me when this species was discovered here in the mountains of North Carolina swarming in (7) January 1955. They were found swarming by the millions over logs and over the surface of the water of a 2 acre pond near Black Mountain, N. C. Also strips of them were along the slow moving waters of the stream flowing from the pond. They formed a floating blanket of gold on the surface of the water. In the laboratory they appeared a lemon yellow color. This seems to be the first time this species has been recorded in eastern North America.

Another record of *Onychiurus cocklei* Folsom is from Brightwood, Oregon. Numerous specimens were taken from humus on June 28, 1957 and sent me for identification by Dr. G. F. Knowlton.

Kalaphorura burmeister Lubbock

Among some Collembola sent me for identification were a number of this species which were taken from soil from Wien, Austria and intercepted at Fort Lauderdale, Florida by H. A. Denmark.

Subfamily Isotominae Schäffer, 1896

Pseudanurphorus binoculatus Kseneman

Specimens were taken from soil of a lake bed near Oak Ridge, Tennessee on July 3, 1957 and sent me for determination by S. I. Auerbach. Heretofore this species has only been recorded from Connecticut in 1951, by P. F. Bellinger. I have found another *Pseudanurophorus* with two eyes on each side of head taken in Utah. A description of this form is now in press.

Micrisotoma achromata Bellinger

Specimens of this species were taken from leaf mould at 4200 feet elevation on June 30, 1954 near Highlands, North Carolina. Heretofore this form has only been recorded from Connecticut.

Architomocerura crassicauda Denis

Specimens of this form were taken in leaf mould from London County, Tennessee, April 27, 1952, by T. P. Copeland and sent me for identification.

Subisotoma (Proisotoma) angularis (Axelson)

Specimens of this species were taken from ground cover under a juniper tree at Moab, Utah, March 4, 1955, and sent me by G. F. Knowlton.

Subfamily Entomobryinae Schäffer, 1896

Entomobrya stachi Wray

Entomobrya decemfasciata Packard, Christiansen, 1958, new synonymy

This is one of the largest and distinct species of *Entomobrya* found in North America and can be easily recognized. It was discovered at Highlands, N. C. Since then specimens have been identified from Tishomingo, Mississippi, which were taken from under bark and moss by W. E. Snow, March 23, 1957. Other specimens were taken from tree boles at Oak Ridge, Tennessee, in 1955 by S. I. Auerbach. This form was erroneously listed under *Entomobrya decemfasciata* by Christiansen (1958).

Tomocerus minor Lubbock

Taken from Orchid plants from Guatemala, South America, August 22, 1958. This is an unusual record for this species because heretofore most records have been from Arctic regions, Europe, Canada, northern U. S. (Mass., Washington), and New Zealand.

Subfamily Paronellinae Börner, 1906

Paronellides mjöbergi Schött

This interesting Australian species was intercepted on a plant from Australia, January 1959.

Recent Smithsonian Institution Entomological Accessions

By J. F. Gates Clarke, Curator, Division of Insects, Smithsonian Institution

The collections listed below have been received recently at the U. S. National Museum, Smithsonian Institution. The purpose of publishing this announcement is to inform the entomological public of the availability of these collections for study and to apprise those interested of the location of the types contained.

These newly acquired collections, together with others already assembled in the National Collection, will permit exhaustive studies embracing the biological and distributional features of the groups represented, and will be available to interested students who wish to undertake such studies.

Ernest Shoemaker Collection

The late Ernest Shoemaker, Brooklyn, New York, amateur entomologist and painter of insects, presented his collection of well over 60,000 insects, mostly beetles, to the Smithsonian Institution.

Mr. Shoemaker began collecting insects 75 years ago when he was a young man living in Georgetown and this hobby occupied nearly all his spare time until his death.

His exquisitely prepared specimens are of particular interest because many of them came from collecting grounds in the Eastern United States that have disappeared because of the growth of cities. His fine series are of special value for population and distribution studies.

The collection also contains a large number of lepidoptera, but the most important are the 101 species of *Morpho* butterflies which were favorites of Mr. Shoemaker.

Friedrich F. Tippmann Collection

The Tippmann Collection consists exclusively of Cerambycidae and contains approximately 98,000 specimens and 16,500 spe-

Arrival of Friedrich F. Tippmann Collection at U. S. National Museum. Miss Helena M. Weiss, Registrar, J. F. Gates Clarke, Curator of Insects, Wert T. Bayne, Customs Inspector.

cies. Included in this collection are 615 holotypes and over 1,400 paratypes of such authors as Bruening, Aurivillius, Pic, and Tippmann, as well as many others.

In this collection there are practically no North American species but it is rich in South American forms. Africa, Asia, Europe, New Guinea and the Indo-Malayan area are also well represented.

Paul J. Spangler Collection

The gift of 26,385 specimens from Mr. Spangler has provided much material that should be of interest to students.

This collection, almost wholly coleoptera, is very rich in aquatic forms in which the donor specialized. Although the material is largely North American, there is good representation from the Palaearctic and Neotropical Regions. In addition to types of Spangler's own species there are paratypes of other authors such as J. B. Wallis and Frank Young.

Francisco de Assisi Monrós Collection

Through the kindness of Mrs. Maria Muntañola Monrós, the magnificent world-wide collection of Chrysomelidae, assembled by her late husband, has been received at the U. S. National Museum. The superb condition of the material reflects the meticulous care with which Dr. Monrós worked.

In all, there are 54,245 specimens of which 244 are holotypes and 1,356 are paratypes, cotypes or allotypes; 923 species are represented by types of one sort or another.

Of the 16 subfamilies the Criocerinae, Chlamidinae, Eumolpinae, and Clytrinae, groups in which Dr. Monrós was particularly interested, are especially well represented by types.

A Sex Anomaly of the Introduced Pine Sawfly, Diprion similis (Htg.) (Hymenoptera: Diprionidae) [1]

By Harry C. Coppel [2]

During investigations on the biological control of the introduced pine sawfly, *Diprion similis* (Htg.), in northwestern Wisconsin, in 1958, 1,024 adult sawflies were reared, one of which was a sex anomaly. This specimen emerged from a large cocoon (9.2 mm.), from which one would expect a female adult. The head is typical of the male except for the distinctly yellow clypeus as in the female. The thorax and abdomen are divided laterally, the right side as in the female and the left side as in the male. The genital segments are typically male and the genital capsule appears to have revolved almost a complete 180°. In contrast to the normal male, however, the hypandrium is not broadly rounded posteriorly, but is sharply and deeply indented posteriorly. The base of the hypandrium on the right side is slightly misshapen because of the attachment of a membrane bearing the first and second valvulae and their rami. This structure hangs loosely from the body of the adult. The hypandrium is further misshapen on its right lateral margin by the presence of what appears to be a shrunken and degenerate third valvula. An examination of the internal organs showed no evidence of a female reproduction system or of eggs. Whether the sex anomaly was a functional male is not known.

[1] Approved for publication by the Director of the Wisconsin Agricultural Experiment Station. This work was done in cooperation with the Wisconsin Conservation Department.

[2] Assistant Professor, Department of Entomology, University of Wisconsin, Madison 6, Wisconsin.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Tenebrionidae of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral. San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

Butterflies. Wish to exchange specimens for Japanese species. Please write to Ichiro Nakamura (Boy, age 16), 26 Aza-Nichiyama Obayashi Takarazuka-shi, Hyogo-Ken, Japan.

Phasmidae of nearctic area desired alive. Purchase or trade, drawing on large stock of major orders, worldwide. Domminck J. Pirone, Dept. Entomology, Cornell University, Ithaca, N. Y.

Nitidulidae and Rhizophagidae wanted in exchange for European beetles of all families. O. Marek, Žamberk 797, Czechoslovakia.

Wanted and Needed. We are compiling a history of entomology, and particularly, at present, of the amateur insect clubs that flourished 50 to 75 years ago. Will you who have knowledge of such early clubs or societies advise me, giving facts on the time of existence, members, etc., which you may have. J. J. Davis, Dept. of Entomology, Purdue University, Lafayette, Indiana.

Insects

Subscriptions for 1960 Are Now Due

Subscription Blank Enclosed

ENTOMOLOGICAL NEWS

NOVEMBER 1959

Vol. LXX **No. 9**

CENTENNIAL YEAR
THE AMERICAN ENTOMOLOGICAL SOCIETY
1859—1959

CONTENTS

PUBLISHED MONTHLY, EXCEPT AUGUST AND SEPTEMBER, BY
THE AMERICAN ENTOMOLOGICAL SOCIETY
PRINCE AND LEMON STS., LANCASTER, PA.
AND
1900 RACE STREET, PHILADELPHIA 3, PA.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada.
Second-class postage paid at Lancaster, Pa.

ENTOMOLOGICAL NEWS

ENTOMOLOGICAL NEWS is published monthly, excepting August and September, by The American Entomological Society at Prince and Lemon Sts., Lancaster, Pa., and the Academy of Natural Sciences, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

PHILIP P. CALVERT, Editor Emeritus. R. G. SCHMIEDER, Editor. Editorial Staff: H. J. GRANT, JR., E. J. F. MARX, M. E. PHILLIPS, and J. A. G. REHN.

Subscription price, per yearly volume of 10 numbers: Domestic, $5.00; Foreign, $5.30; Canada, $5.15—U. S. Currency.

SUBSCRIPTIONS: Communications and remittances to be addressed to **Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

ADVERTISEMENTS: Rate schedules available on request. Address, **Fred B. Jacobson, Advertising Manager, Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

MANUSCRIPTS and all communications concerning same should be addressed to **R. G. Schmieder, Zoological Laboratory, University of Pennsylvania, Philadelphia 4, Pa.**

The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. Articles longer than eight printed pages may be published in two or more installments, unless the author is willing to pay the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

ILLUSTRATIONS: Authors will be charged as follows: For text-figures, the cost of engraving; for insert plates (on glossy stock), the cost of engraving plus printing. Size limit, when printed, 4 × 6 inches. All blocks will be sent to authors after printing. It is not advisable to print half-tones as text-figures.

TABLES: The cost of setting tables will be charged to authors.

SEPARATA: Members of the American Entomological Society may elect to receive, gratis, 25 offprints of their contributions. These will be "run-of-form," without removal of extraneous matter.

Those members desiring more than 25 separates, and all non-members, will receive no gratis copies. They must obtain all their separates (as reprints, with extraneous matter removed) from the printer at the prices quoted below. Authors must place their order for such separates with the editor at the time of submitting manuscripts, or when returning proof.

Copies	1–4 pp.	5–8 pp.	9–12 pp.	13–16 pp.	17–20 pp.	Covers
50	$3.95	$6.33	$ 9.89	$10.28	$13.44	$4.31
100	4.74	7.51	11.86	12.65	16.21	5.89
Add'l 100	1.58	2.36	3.94	4.74	5.54	3.16

Plates printed one side: First 50, $3.15; Additional 100's, $2.37.

Transportation charges will be extra.

ENTOMOLOGICAL NEWS

Vol. LXX NOVEMBER, 1959 No. 9

New North American Tachinidae (Diptera)[1]

By H. J. Reinhard, College Station, Texas

The present paper includes descriptions of three new genera and eight new species of muscoid flies from various western and southwestern sources, all cited under the characterizations below.

Myiophasia lasia, n. sp.

A shining black pollenless species with sides of face and front much more heavily pilose than in any related form and the abdomen with discals.

Male.—Front pinched out before triangle, which bears non-divaricate proclinate ocellars; verticals not differentiated and frontals extending from antennal base to mid front; antenna orange yellow, third segment but slightly longer than second; black, micro pubescent arista thickened near base thence slender to tip; parafacial shining black, thickly haired on entire length; vibrissae near mid face level and somewhat approximated; cheek polished black, broad but largely ventral, grooves red and unusually wide; palpus yellow, slender to tip and longer than haustellum; eye densely pilose.

Thorax velvety black, feebly shining above and rather weakly bristled; preacrostichal 2; postdorsocentral 3; sternopleural 2; scutellum with 2 lateral and 1 strong decussate apical pair. Legs rather long and slender; mid tibia with one anterolateral bristle; claws and pulvilli elongated. Wing light brown becoming grayish along hind margin; hind cross vein bisinuate, nearly in

[1] Contribution No. 3174, Department of Entomology, Texas Agricultural Experiment Station.

plane of apical cross vein; first posterior cell open near extreme wing tip; calypters brown.

Abdomen ovate, shiny black and clothed with longish erect hairs over entire surface above; intermediate segments with differentiated discals; first segment with median marginals and usually a second pair differentiated immediately in front of latter, last three segments each with a marginal row but incomplete on second; forceps slender, prongs contiguous to an acute slightly bowed tip; accessory process fingerlike and a little shorter than forceps; fifth sternite lobes broadly exposed.

Length, 6–7 mm.

Holotype, Signal Mt., Wyo., August 3, 1947 (F. A. Cowan & M. R. Wheeler). *Paratypes* 3 males: Breitenbush Lake, Marion Co., Ore., June 23, 1940 (R. E. Rieder); Rainier Natl. For., Washington, Sept. 10, 1935; and Logan, Utah, Aug. 11, 1942 (G. F. Knowlton & W. E. Peay).

Myiophasia sigilla, n. sp.

Male only.—Very similar to the preceding species including distinct median marginal bristles on the first abdominal segment. Parafrontal and parafacial gray pollinose and a little less densely haired; epistoma distinctly shorter, slightly more produced in profile; third antennal segment black; palpus brown with enlarged tip paler or reddish; wing wholly hyaline tinged with yellow near base; calypters pale tawny; abdominal hairs erect on entire surface above, without any differentiated discals.

Length, 7 mm.

Holotype: Snowy Range Mts., 11,600 ft., Wyoming, August 13, 1957 (H. J. Reinhard).

DYSCOLOMYIA, n. g.

Similar to *Meledonus* (type, *latipennis* Ald.) but with normal-sized palpi, more prominent front, larger antennae, etc.

Head nearly as long as high, frontal profile well over the slightly receding facial, antennal axis near eye middle; clypeus very deeply sunk, facialia vertical and bare; full width epistoma produced ventrad from vibrissal level and over half as long as wide; parafacial broad, sparsely beset with micro setae; frontals in a single row stopping at antennal base; ocellars divaricate and but slightly proclinate, inner verticals straight, reclinate; antenna as long as face, first segment elongate with a thin lobe-like expansion on upper lateral extremity, third segment nearly three times length of second; arista rather short, practically bare, second segment a trifle longer than wide; cheek about equal parafacial width, bare except on narrow lower margin; haustellum quite slender but obviously shorter than head height; eye bare, reaching to vibrissal level. Thoracic chaetotaxy; acrostichal 1, 2; dorsocentral 3, 3; intraalar 2; supraalar 3 (only the middle one large); presutural 1 (outer); notopleural 2; humeral 2; posthumeral 1; sternopleural 3; pteropleural not developed; scutellum with 2 large lateral, 1 small decussate apical and 1 hardly differentiated appressed discal pair; postnotal slope bare; propleuron sparsely pilose. Wing clear, veins brown, normal in shape and reaching a little beyond tip of abdomen; third vein with three setulae near base; first posterior cell open a little before extreme wing tip; last section of fifth vein shorter than hind cross vein; cubitulus obtusely angled, without stump or fold; costal spine vestigial; calypters broader than long. Abdomen somewhat narrowed and elongated; one pair of median marginals on proximal segments and a marginal row on last two segments besides a row of strong discals behind middle of fourth; apical sternites shiny and narrowly exposed.

Genotype: *Dyscolomyia lucina,* n. sp.

Dyscolomyia lucina, n. sp.

Male only.—Head with silvery pollen becoming cinereous on occiput; frontalia subequal to width of parafrontal; latter with only sparse short setae outside frontal row; front at vertex 0.375 of head width and scarcely wider at anterior extremity; second antennal segment rufous, third entirely black and widening gradually to a broadly rounded apex; arista black, rather strongly thickened basally tapering strongly to middle thence more slowly so to a sharp tip; palpus fully half as long as haustellum, brown basally becoming paler or reddish near apex; labellum small; occiput glabrous on upper third, remaining surface clothed with short intermixed pale and black hairs.

Thorax and scutellum black, moderately dusted with bluish gray pollen leaving four well defined black dorsal vittae; legs black, subshiny; mid tibia bearing one strong and one weaker bristle on outer front side before middle; fore claws and pulvilli exceeding length of last tarsal segment. Wing gray hyaline; calypters subopaque, white.

Abdomen shining black with last three segments lightly dusted with pale bluish gray pollen on basal half or more; genital segments black largely retracted, fifth sternite with a rather wide U-shaped excision, lobes widely exposed and clothed with black hairs.

Length, 7 mm.

Holotype male, Surprise Canyon, Inyo County, CALIFORNIA, May 9, 1958 (R. M. Bohart).

AGATHOMYIA, n. g.

Differs from *Plagiomima* in having a much shorter and stouter proboscis, larger labella, more retracted hind cross vein, etc.

Head nearly one-third wider than high, frontal profile subequal to slightly receding facial; clypeus moderately depressed, epistoma gently bowed forward from clypeal plane and produced ventrad from vibrissal angle; oral margin axis fully three-fourths length of antennal, which is shortly above eye middle; vibrissae on oral margin well above lower edge of head; bare facialia depressed beneath level of parafacialia; latter setose from lower frontal to cheek groove; palpus equal length of haustellum; ocellars divaricate; cheek bare, one-fifth eye length; eye bare, descending to or a trifle below vibrissal level. Thoracic chaetotaxy: acrostichal 3, 3; dorsocentral 3, 3; postalar 2 (hindmost strong); supraalar 3; intraàlar 3; posthumeral 1; humeral 3; notopleural 2; presutural 2; sternopleural 3; pteropleural vestigial; scutellum with 2 lateral (hindmost very large); 1

decussate apical and 1 weak preapical pair. Wing barely reaching beyond tip of abdomen; first and third veins setulose; hind cross vein joining fourth about its length from small cross vein; first posterior cell open far before wing tip; costal spine minute. Abdomen slightly wider than thorax; one pair of median marginals on second segment and a marginal row on following two plus a discal row well behind middle on last; sternites covered.

Genotype: *Agathomyia cordata*, n. sp.

Agathomyia cordata, n. sp.

Female.—Head densely gray pollinose, occiput gently convex, clothed with rather short sparse pale hairs; front at vertex 0.44 of head width and nearly equibroad downward; frontalia wider than parafrontal; latter with a few scattered short setae and two stout proclinate orbitals; verticals two, outer one nearly as large as inner; lowermost frontal about on level with middle of third antennal segment; short black bare arista thickened well beyond middle, second segment barely longer than thick; basal antennal segments reddish yellow, third black about one-half longer than second; palpus yellow, slender with tip slightly enlarged; labella soft in texture and wider than haustellum.

Thorax and scutellum black dusted with gray pollen and marked with four narrow black vittae above which become obsolete before scutellum base. Legs subshiny black, mid tibia with a row of unequal bristles on outer front side; claws and pulvilli short. Wing whitish hyaline; cubitulus bearing a stump and fold which approximate length of apical cross vein; last section of fifth vein almost twice length of preceding; calypters opaque white.

Abdomen black dusted with gray pollen except on apical third or less of segments two to four which appear darker and shining in most views, hairs on entire upper surface fine and closely appressed; venter shiny; anal orifice, caudo ventral, rounded on upper margin. Male unknown.

Length, 6.5–7.5 mm.

Holotype: Anza Riv. Co., Cal., VII–5–56 (R. M. Bohart).

Paratype: 1 female, Rodeo, N. Mex., Hidalgo Co., VIII–28–58 (R. M. Bohart).

Thelymyia disparis, n. sp.

The present assignment for the species is provisional since it differs from *Thelymyia* in having four postsutural dorsocentrals and lacks abdominal discals. However, the wide male front bearing strong proclinate orbitals, short claws and pulvilli, pilose eyes, etc., seems to indicate an apparent relationship here. The question of restricted generic reference is left open pending accumulation of more material. Perhaps the most nearly related described species is *Zenillia mathesoni* Reinhard (Bul. Brk. Ent. Soc., 32, 1937, 68), which was omitted from Seller's treatment (Proc. U. S. N. M., 93, 1943) of the present and allied genera.

Male.—Head pollen gray faintly tinged with yellow on sides of face and front; vertex 0.33 of head width, front gradually widening forward to antennal base; verticals two pairs; ocellars strong, proclinate; facialia weakly bristled on lower fourth or less; antenna black, third segment about two and one-half times second; arista but slightly thickened to middle, bare; palpus yellow, infuscated basally; cheek black haired, one-sixth eye length; eye distinctly pilose; occiput wholly pale-pilose.

Thorax black, gray pollinose, marked by four notal vittae; chaetotaxy as in *Thelymyia* except as noted above; scutellum largely reddish, with decussate apical bristles directed rearward. Legs black, mid tibia with three anterolateral bristles, hind tibia unevenly ciliated. Wing gray hyaline, third vein with two setulae near base; first posterior cell open shortly before exact wing tip; calypters semitranslucent white.

Abdomen black with dense gray pollen except along median line of last three segments; one pair of median marginals on two basal segments and a marginal row on last two, with irregularly spaced discals on anal segment; hypopygium black, small, retracted. Female unknown.

Length, 9–11 mm.

Holotype: West slope Patagonia Mts., Sta. Cruz Co., Ari-

ZONA, August 9, 1955 (G. D. Butler & F. G. Werner). *Paratypes:* 2 males, same data as type.

ANGUSTIOPSIS, n. g.

Allied to *Angustia* and *Aplomya* as limited by Sellers (Proc. U. S. N. M. 93, 1943) but, as enumerated below, with seemingly important differences in the diagnostic characters which have been ascribed to each.

Front strongly narrowed above middle in male, gradually convergent to vertex in female; second antennal segment subequal to one-half length of third; arista bare, longer than usual, not much thickened on basal half, thence delicate to tip; frontal bristles descending to base of third antennal segment; cheek about one-fifth eye length. Thoracic chaetotaxy: acrostichal 3, 3; dorsocentral 3, 4; intraalar 3; supraalar 3; humeral 4–5; posthumeral 2; notopleural 2; presutural 2; postalar 3; intrapostalar 1 (strong); pteropleural 2 (smaller than hindmost sternopleural); sternopleural 2; scutellum with 3 strong lateral, 1 apical and 1 good-sized appressed discal pair. Hind tibia closely (evenly in male) ciliate; mid tibia with three or four anterolateral bristles. Abdomen broadly ovate, second segment with a pair of median marginals in female, third bearing a marginal row of spinelike macrochaetae and fourth segment with erect smaller bristles and hairs over entire upper surface; no discals on intermediate segments.

Genotype: *Angustiopsis saginata*, n. sp.

Angustiopsis saginata, n. sp.

Male.—Front at vertex 0.22 of head width equibroad on upper third thence widening rapidly downward into facial angle; parafrontal with dense gray pollen becoming darker before vertex, clothed with bristly to fine black hairs outside of main frontal row; frontalia deep reddish brown, wider than parafrontal except at anterior extremity; ocellars proclinate; inner verticals erect, not very long; parafacial subsilvery, bare from lower frontal to cheek groove; vibrissae barely differentiated from bristles next above; antenna wholly black reaching almost to oral margin; facialia with weak bristles and hairs on lower fourth; proboscis short, labella large and fleshy; palpus longer than haustellum, red with basal half brownish; eye thickly pale pilose, reaching to vibrissal level; occiput clothed with ruff of dense pale hairs.

Thorax gray pollinose on black ground color, notum marked with five changeable black vittae; scutellum entirely reddish and lightly dusted with gray pollen; prosternum setose on sides. Wing gray hyaline, veins yellow, third with two to four hairs near base; first posterior cell open shortly before wing tip; hind cross vein two-thirds its length from cubitulus, latter stumpless and only about one-fourth wing width from hind margin; costal spine vestigial; calypters opaque white. Legs black, long but not very slender; mid tibia with three anterolateral bristles, hind tibia closely, evenly ciliated on posterolateral face; pulvilli and reddish black-tipped claws subequal to combined length of last two tarsal segments.

Abdomen black with sides somewhat reddish, last three segments thinly gray pollinose to or nearly to hind margin of each, a narrow dark median vitta visible in most views; hairs on upper surface of three basal segments fine and closely set; hypopygium small, retracted.

Female.—Front at vertex 0.31 of head width gradually diverging to antennal base; abdomen predominantly black with a coarser sparser vestiture of hairs above; one pair of strong erect median marginal bristles; hind tibia ciliate with one longer bristle in row; otherwise as in male except for sexual differences.

Length, 10–12 mm.

Holotype: male and allotype female, Presidio Co., TEXAS, July 13, 1940. *Paratypes:* 2 females, Brownsville, Texas, May 4, 1957 (H. J. Reinhard).

Lydella immissa, n. sp.

Allied to *L. minor* but larger in build, facialia bristled on lower half or less, intermediate abdominal segments with numerous discals, etc.

Male.—Head gray pollinose on dark background, except reddish cheek groove; front at vertex 0.22 of head width, diverging rapidly below middle into facial angle; frontalia striate, wider than parafrontal, deep reddish brown to black; frontal row reaching about to base of third antennal segment, upper two bristles reclinate about as large as erect inner verticals; ocellars large, proclinate; antenna entirely black, second segment over half as long as third and thickly beset with bristly hairs on front margin; long, bare, black arista thickened on basal third or less; parafacial bare on lower half; long decussate vibrissae, slightly above oral margin; proboscis short, labella large, yellow black-haired palpus considerably longer than haustellum; eye bare; cheek three-elevenths eye length; occiput gently convex clothed with pale pilose hairs.

Thorax and scutellum black dusted with gray pollen, notum marked with four rather broad and changeable black vittae before suture and five behind all becoming obsolete before base of scutellum. Chaetotaxy: acrostichal 3, 3; dorsocentral 3, 3; intraalar 3; supraalar 3; postalar 3; humeral 4; posthumeral 1; presutural 2 (outer large); notopleural 2; sternopleural 2, 1; pteropleural 1 (smaller than hindmost sternopleural); scutellum with 3 lateral, 1 longish erect divergent apical and 1 reclinate discal pair barely differentiated among numerous long erect slender bristles; prosternum and postnotal slope setose, propleuron bare. Legs black, long but not very slender; mid tibia with one large and one small anterolateral bristles; claws and pulvilli elongate. Wing gray hyaline with a slight yellowish tinge on costal half; veins brown, bare except four or five setulae near base of third; first posterior cell open considerably before wing tip; bisinuate hind cross vein its length from broadly rounded cubitulus, latter without stump or fold; costal spine vestigial; calypters opaque white tinged with yellow on outer margin.

Abdomen narrower and longer than thorax, black in ground color tinged with red at sides, last third segments with gray pollen extending thinly to hind margin of each; median marginal pair on first segment and a marginal row on last three, besides numerous erect and irregularly spaced discals on each of latter; genital forceps rather short, hind surface very densely clothed with downy yellowish hairs to about apical fourth thence glabrous to blunt apex; accessory process as long as forceps but distinctly wider in profile view; fifth sternite lobes largely retracted. Female unknown.

Length, 9.5–10 mm.

Holotype: Zamora, Mich., Mexico, August 27, 1947 (F. A. Cowan & M. R. Wheeler). *Paratype:* 1 male, same data as type.

Dexodes sartura, n. sp.

Traces here in most available keys differing from the preceding species chiefly as follows:

Male.—Head silvery pollinose, front wider, measuring 0.27 of head width at vertex; third antennal segment fully four times length of second; cheek one-fifth eye length; vibrissae on oral margin; arista thickened on basal fifth or less; thorax and abdomen overlaid with heavy opaque gray pollen with a slight brownish tinge apparent in some angles of view; apical scutellars and inner presutural bristle lacking and only one good-sized preacrostichal; postnotal slope usually bare; legs rather slender, tibiae paler or reddish in ground color; wing clear, with yellow veins; first posterior cell open shortly before extreme wing tip; abdomen bearing fewer discals on intermediate segments; genital forceps slender and recurved on apical half; accessory process fingerlike as long as forceps, gently bowed forward from base to tip.

Female.—Similar to male except for the usual sexual differences.

Length, 7.5–9 mm.

Holotype male and allotype female, Babylon, L. I., New York, May 26, 1935 (Blanton & Borders). *Paratypes:* 1 male and 1 female, same data as type; 1 male, West Hills, L. I., N. Y., June 1, 1935 (Blanton & Borders) and 1 female, Amherst, Ohio, July, 1933 (H. J. Reinhard).

Factors Affecting Larval Migration of the Gypsy Moth

By Robert C. Wallis, The Connecticut Agricultural Experiment Station, New Haven

The gypsy moth, *Porthetria dispar* (L.) is a serious economic pest of New England woodlands because of the defoliation caused by the larvae. The severity of defoliation is in part associated with the migration of the larvae. Consequently, study of factors which influence larval migration is important, and more information is necessary to understand the ecology of the insect.

In 1896 Forbush and Fernald described the positive phototrophism of young gypsy moth larvae, and associated it with practical problems of distribution. Much later, in 1930, in a study of larval behavior, de Lepiney described a stimulation of migratory activity by light and a strong negative geotrophism of the larvae. However, it was not until 1947 that a practical relationship between migratory activity and differences in the amount of defoliation in forest sites was suggested by Bess, Spurr and Littlefield. They reported that in certain forest conditions the larvae migrated down from the woodland canopy into the litter and forest understory where the larvae were more susceptible to predation by small mammals. Under other conditions the larvae did not migrate, but remained in the canopy. Bess and coworkers (1947) suggested that the larvae migrated down into the litter and understory seeking cool moist places in which to rest and pupate. Because of these very interesting observations, when the present study of gypsy moth ecology was initiated in 1953, special attention was given to factors involved in larval migration, and its relationship to defoliation.

Laboratory studies

One of the first goals of this study was to determine experimentally whether larvae exhibited a preference for moist sites, or any tendency to migrate toward such sites in which to rest between feeding periods. This was accomplished by utilizing techniques which permitted observation of larval migration in relation to this factor and others—such as food sources providing olfactory stimuli, the influence of geotrophism, and the effect of light. Tubular plastic cylinders, four inches in diameter, one, two and three feet long, were constructed with an access hatch in the center and both open ends covered with 56 gauge nylon netting. Groups of both laboratory reared and field collected larvae in each larval instar were tested for moisture attraction by placing from 10 to 100 larvae in each cylinder with a moisture gradient. When the laboratory relative humidity was lowered to 30 ± 10 per cent and a wet pad was placed at the bottom end of the cylinder (with the lower end capped and the upper end left open) there was a moist site at one end and a dry one at the other. Larvae were placed in the cylinder through the middle hatch and the direction of their migration observed. Test cylinders of various lengths provided different distances from the wet and dry sites.

For single factor tests of moisture the cylinders were placed in a horizontal position in the presence of balanced light intensity at either end. One hour later the numbers of larvae distributed on the wet and dry side of the middle were counted. Groups composed of each five larval instars were tested and each test replicated three times to rule out chance observations.

This procedure was then repeated with fresh young red oak leaves as a test attractant in place of the moist site. This was followed by substituting a strong light (reflected sunlight intensity, projected through a 1 cm. aperture) at one end of the cyinder.

Tests for interaction of factors and for the effect of geotrophism were conducted by rotating the test cylinders from a horizontal to a vertical position. Thus, first instar larvae exhibiting a negative geotrophism migrated to the dry end when it was in the up position.

In these tests it was found that larvae migrated toward a moist site only when responding to another interacting factor (such as light) or when exhibiting a negative geotrophic response. When test cylinders were in the horizontal position, larvae were randomly distributed between the wet and the dry ends. First and second instar larvae migrated to the moist end of the tube only when it was in the up position of the vertical tests. When the cylinders were inverted, the larvae then migrated to the dry ends which were in the up position. Middle and late instar larvae lost the geotrophic orientation and were distributed randomly within the cylinders regardless of the position of the moist sites. Similar responses were observed when light was substituted as a factor in tests with moist sites, except that young larvae migrated toward light even when it was at the bottom of the cylinders and older instar larvae moved away from the lighted end regardless of whether it was in the up or down position. The positive phototrophism of the young larvae and the avoidance of light by the older larvae were exhibited regardless of the position of moisture in the tube.

The responses to the presence of oak leaves in the tests were similar to those observed with moisture. The food alone elicited no migratory responses, but once food was encountered during random ambulatory movements or in the course of migration stimulated by other factors (light, negative geotrophism) larvae accumulated on the leaves and fed.

Field Study

Study of larval responses was conducted in field experiments at Bethany, Connecticut, in the spring of 1956. A number of trees were selected in various sites within an area of woodland where a high population of gypsy moth larvae existed. The trunks of six red oak trees, and low vertical branches were treated with pairs of four inch rings of *Tree Tanglefoot* covered with loose burlap bands. Thus, larvae travelling up the tree trunks were trapped under the lower bands and those moving down the trunks were trapped under the upper bands. The study area was observed daily during the larval growing season and at bi-weekly intervals larvae trapped under the bands.

Results of field studies were similar to those observed in the laboratory. During the first three-week period almost all of the young larvae trapped under the burlap bands were under lower band, indicating movement upward on the tree trunk. Only occasional young larvae were encountered under the upper bands. However, during the second three-week period when larvae were in later instars, increasing numbers were found trapped under the upper band. By the time the trees had been defoliated and first pupae began to appear, almost equal numbers of late instar larvae were found under the upper and lower bands.

Discussion

The study of factors affecting migration of the gypsy moth larvae is perhaps one of the most fascinating problems confronting insect ecologists in New England. In this problem results of laboratory tests show how larvae react and when this information is applied to migration in the field, it helps explain the movements of the larvae between the forest canopy and understory. While one of the obvious factors which might attract the larvae to the understory is the presence of cool moist places it provides for resting and pupation, the results of this study show that migrations of the larvae are considerably more complicated and a response to any one factor such as moisture. In the laboratory, larvae did not migrate toward moist sites unless some other factor was interacting with the moisture. This was difficult to see in field studies, but in the laboratory manipulation of single factors, both alone and against each other, the importance of interacting factors was demonstrated. In tests conducted in darkness, young larvae exhibited a negative geotrophism and migrated upward. Both food and moisture were encountered when they were located at the top of test cylinders. However, when food and moisture were at the bottom, the larvae migrated away from them unless light was added to the bottom. Then the larvae migrated toward the light, overcoming their negative geotrophism. Thus, it was shown that the upward surge of young larvae was a summation of the reactions to these two factors—and that light was the stronger of the two. Complications arose, however, as the definitive responses which the young larvae exhibited were lost by older larvae. The late instar larvae no longer migrated upward in the dark and lost their positive phototrophism. Essentially there was a reversal of the earlier reactions which resulted in downward movement of larvae. At the present time it is not clear if this was a result of a loss of negative geotrophism and the development of an avoidance of light, or whether the larvae developed an avoidance reaction to the heat which was associated with the light. In 1930 de Lepiney described the stimulation of resting larvae by direct sunlight. This movement resembled an avoidance reaction similar to the activity exhibited in the present experiments by late instar larvae in test cylinders, and to the activity observed in field experiments where the avoidance of light was associated with larvae migrating down out of the trees. There is a possibility that an additional factor is involved—a "hunger drive" brought about by heat from the sun increasing the metabolic activity of the larvae. Further study is necessary of the influence of heat and light on the movement of late instar larvae to determine which factor or factors elicits their avoidance reaction and downward migration. The observation of Bess *et al.* (1947) that larvae did not migrate down from the forest canopy where there was no moist understory is not explained in this study. However, it is suggested that the change in response of older larvae may be involved. Therefore, the entire story of migration by gypsy moth larvae is not settled and further study is necessary.

Summary

Laboratory tests were conducted in which the manipulation of plastic cylinders was utilized to determine the effect of food, moisture, light and geotrophism on migratory activity of gypsy moth larvae. Food was encountered primarily in the process of migration stimulated by these factors and the larvae exhibited no indication of being attracted by it alone. Likewise, no attraction or tendency of the larvae to migrate toward moisture could be observed in laboratory experiments except, as in the case with food, when the larvae were responding to the influence

of other factors. Early instar larvae exhibited the strong phototrophic response described by Forbush and Fernald and the negative geotrophic reaction reported by deLepiney. However, in both field and laboratory tests the migratory movements of late instar larvae appeared quite different from those of young larvae. For this reason, it is necessary to consider larval age and the influence of interacting factors when larval migratory activity is under study.

References Cited

Bess, H. A., Spurr, S. H., and E. W. Littlefield. 1947. Forest site conditions and the gypsy moth. Harvard Forest Bull. No. 22, 1–56.

deLepiney, J. 1930. Contribution à l'étude du complex biologique de *Lymantria dispar*. Bull. 23, Memoirs Soc. Nat. Sci. Morocco. May 15, 1930.

Forbush, E. H., and C. H. Fernald. 1896. The gypsy moth. State Board of Agriculture. Boston, Mass. 495 pp.

An Unusual Occurrence of Rhinoceros Beetles, (Scarabaeidae Dynastes tityus Linn.)

By David L. Wray, North Carolina Department of Agriculture, Raleigh, N. C.

The following record of occurrence in considerable numbers of the Rhinoceros beetle (*Dynastes tityus* Linn.) seems worthy of note. Recently a male and female rhinoceros beetle were received at the State Museum from Mr. Wade Lewis, a student of entomology, who collected them at Thurmond, Surry County, North Carolina on March 10, 1959, "in an old rotten stump of an oak tree." The unusual thing about this is that 62 adults were found in the one stump, the sexual ratio being 31 males and 31 females. Literature on this beetle reveals little in regard to population numbers and sex ratios. I have never found over one or two specimens of this beetle at any one time in all the years of my collecting. Thurmond, North Carolina, is situated on the eastern slope of the base of the Blue Ridge Mountains and hardwoods abound in this area favoring a good habitat for Dynastes.

Collembola from Japan. II. Isotominae [1]

By Harold George Scott [2]

This paper records four species of springtail insects collected by Captain John E. Scanlon [3] while with the 406th Medical General Laboratory (U. S. Army) in Japan. None has been recorded previously from Japan. Specimens will be deposited with the Academy of Natural Sciences, Philadelphia, Pennsylvania.

Isotoma maritima forma **maritima** Tullberg, 1871

The Japanese specimens agree with the original description and with the redescriptions by Schott (1893) and Agren (1903).

Japanese Records. From rodent nests (7–iii–1952, Tokyo; and 19–iii–1952, Akabane), Honshu, by J. E. Scanlon.

Distribution. Form *maritima:* Japan, northern Europe (seashores), southern Europe (caves), Costa Rica (caves). Form *pseudomaritima* Stach, 1947: central and southern Europe (moss, under bark, under stones).

Isotoma viridis Bourlet, 1839

This species, extremely variable in body color, has been divided into ten color forms (summarized by Stach, 1947). Based upon my experience, both in this and other studies, such a division is not valid. For example, each of the two Japanese collections contain f. *viridis;* f. *arctica* Schott, 1893; and f. *pallida* Nicolet, 1841. Dr. Harry D. Pratt (same address as author) suggests that f. *pallida* represents individuals which have recently molted. This is supported by the fact that specimens of f. *pallida* are almost entirely white, and when mounted by techniques which leave other forms undamaged their exo-

[1] Part I appeared in Ent. News, 70(6): 161–163.

[2] Training Branch, Communicable Disease Center, Bureau of State Services, Public Health Service, U. S. Department of Health, Education, and Welfare, Atlanta, Georgia.

[3] Medical Service Corps, U. S. Army. Present address: Department of Entomology, University of Maryland, College Park, Maryland.

skeletons shrink and warp. The similarity in appearance between this species and *Isotoma gracilliseta* described from Japan by Yosii (1939) is recognized, but the Scanlon specimens are clearly *I. viridis*.

JAPANESE RECORDS. Soil from rodent burrows (2 separate collections), 23–x–1952, Shizuoka, Subashiri, Honshu, by J. E. Scanlon.

DISTRIBUTION. Eurasia (Japan to France, Spitzbergen to Malta), Iceland, Greenland, North America (Alaska to Mexico, Nova Scotia to California). Usually under objects on ground; in humus, grass, or moss; or atop snow.

Folsomia octoculata Handschin, 1925

Only one individual of this species is present in the Scanlon collections, but it agrees with the original description.

JAPANESE RECORD. Berlese funnel sample of soil from bamboo grove in woods, 677 meters altitude, 20–vi–1952, Beppu, Oita Ken, Kyushu, by J. E. Scanlon.

DISTRIBUTION. Japan, India, Indonesia.

Folsomia decemoculata Stach, 1946

Only one individual of this species is present in the Scanlon collections, but it agrees with the original description.

JAPANESE RECORD. Soil from rodent burrow, 23–x–1952, Shizuoka, Subashiri, Honshu, by J. E. Scanlon.

DISTRIBUTION: Japan, Europe.

Key references to Japanese Isotominae are: Borner, 1909; Folsom, 1899; Stach, 1947; Yosii, 1939, 1953.

SUMMARY

Isotoma maritima f. *martima*, *I. viridis*, *Folsomia octoculata*, and *F. decemoculata* are recorded for the first time from Japan. The invalidity of defining color forms of *I. viridis* is discussed.

Japanese Summary

(By Dr. Nobuo Sakurai, Department of Bacteriology, School of Medicine, University of Chiba, Chiba, Japan.)

3種の Collembola が日本本州における齧歯類の巣から記録された。すなわち *Isotoma maritima* f. *maritima*（東京，赤羽）*Isotoma viridis*（静岡，須走）および *Folsomia decemoculata*（静岡，須走）である。このほか，*Folsomia octoculata* が九州，大分縣別府の竹やぶの土から記録された。これらのいずれもがかって日本から報告されていない。*Isotoma viridis* のいろわけによるいみづけが役にたゝないことを論じた。

References Cited

Agren, H. 1903. Stett. ent. Zeit., 64: 113–176.

Borner, C. 1909. Sitz. Ges. naturf. Freunde, Berlin, 2: 99–135.

Bourlet, A. 1839. Mem. Soc. Sci. Agr. Lille, 1: 377–417.

Folsom, J. 1899. Proc. American Acad. Arts Sci., 34: 261–274.

Handschin, E. 1925. Treubia, 6: 225–270.

Nicolet, H. 1841. Bibl. Univ. Geneve, 32.

Schott, H. 1893. Kgl. Svenska Vet.-Akad. Handl., 25: 1–100.

Stach, J. 1946. Acta Mus. Hist. Nat. Acad. Polska, no. 5, 40 pp.

——. 1947. Acta Monogr. Mus. Hist. Nat., Polish Acad. Sci. Lett., 595 pp.

Tullberg, T. 1871. Ofv. Kgl. Vet.-Akad. Forhandl., 28: 143–155.

Yosii, R. 1939. Tenthredo Acta Ent., 2: 348–392.

——. 1953. Annot. Zool. Japon., 26: 67–72.

Obituary

Professor Doctor HERMANN HAUPT of the Martin Luther University in Halle-an-der-Saale died on June 2nd, in the 86th year of his life. He was the author of important papers on Pompilidae, on which family he was a leading world authority, and certainly the most eminent in Europe. He was also a noted authority on Homoptera.

A New Journal

"**Pacific Insects,**" the first issue of which has just appeared, is planned to consist of four issues per volume of at least 400 pages. It is being published by the Entomology Department, Bernice P. Bishop Museum, Honolulu, Hawaii, U. S. A., and is to be the organ of the program "Zoogeography and evolution of Pacific insects," sponsored by that Department. It is intended primarily for monographs or for zoogeographical papers on insects and other terrestrial arthropods from the Pacific area, including eastern Asia, Australia, and Antarctica. It is edited by Dr. J. L. Gressitt (Editor) and an editorial committee including the names of Hardy, Lieftinck, Maa, Mackerras, Quate, Szent-Ivany, Usinger, and Yasumatsu. The editors should be consulted before submitting manuscripts, of which there should be two copies, original and carbon.

Subscription, per volume, in North America $5.00, payable to the Bishop Museum (mail to Dr. Carl M. Yoshimoto), or Yen 1,700 or £1/15/6 Stg., payable to Dr. Keizo Yasumatsu, Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan.

Critical Remarks on a Recent Contribution to the Taxonomy of the Acridoidea (Orthoptera) by V. M. Dirsh

By JAMES A. G. REHN and HAROLD J. GRANT, JR.,
Department of Insects, Academy of Natural
Sciences of Philadelphia

In 1956 there appeared an important paper by V. M. Dirsh on the phallic complex of the Acridoidea in relation to the taxonomy of this group.[1] The work reviews the structure and terminology of the phallic complex, describes it for each family and subfamily in the Acridoidea, figures the epiphallus of a great many genera and species and the whole phallic complex of a selected few, and erects several new families or subfamilies. After having worked with this paper since its receipt we have become aware of certain errors and misconceptions which should, we feel, be brought to the attention of others interested in the subject. The major character of this contribution should not be minimized, and it is not our intent to do so here. However, it is important that students who lack the necessary materials (i.e., comprehensive collections and libraries) to verify some of the conclusions reached, or facts presented, be made aware of some of the errors which have crept into the work. It is in the spirit of constructive criticism that we offer the following remarks.

Concerning the definition of the subfamilies Acridinae (in the usual sense) and Oedipodinae there have always been areas of doubt and uncertainty. Dirsh has removed the tribe Truxalini from the Acridinae and elevates it to the rank of a subfamily. Further, he places the subfamily Oedipodinae with the remaining genera of the Acridinae (that is, the tribe Acridini) in one subfamily which he calls the Acridinae. These assignments are not based on genitalic characters. Indeed, both Dirsh and, much earlier, Roberts[2] point out that the Acridinae-Oedipodinae cannot be separated on the basis of differences in the phallic com-

[1] Trans. Roy. Entom. Soc. London, 108, pp. 223-356 (1956).

[2] Proc. Acad. Nat. Sci. Phila., XCIII, p. 225 (1941).

plex. Instead, Dirsh maintains that the Acridinae (in his sense) may be separated from the Truxalinae (in his usage) by characters of the external morphology. Thus the Acridinae (of Dirsh) are characterized as lacking "stridulatory pegs" on the internal side of the hind femur and "in most cases" possess a "more or less well developed intercalary vein in the medial area of the elytron." The Truxalinae are said to possess the stridulatory pegs and lack the intercalary vein. It would thus appear to the neophyte that the decades-old problem of Acridinae vs. Oedipodinae has been at last settled. But let us look further into the facts of the case.

On the basis of the total of morphological characteristics it is not logical to lump the Oedipodinae with many of the genera of the Acridinae. To do so results in having forms of such diverse structure and obviously different phylogeny as *Dissosteira* and *Acrida* in the same subfamily. Nor are there characters to support such an obviously artificial system. In order for a morphological character (other than one primarily of the sexual organs) to be the sole criterion for the separation of subfamilies it should be present and evident in both sexes, and, unless it is an alar structure, should not be qualified by the degree of development of the wings. Unfortunately, the character advanced by Dirsh as the means to separate these subfamilies does not answer these requirements. For example, in the Truxalinae (*sensu* Dirsh) the single character advanced by Dirsh as a means of separating them from the Acridinae—the presence of stridulatory pegs—is absent in the females of many genera (among others *Drepanopterna, Ageneotettix, Ligurotettix*). According to his system, then, only the males can be placed in the Truxalinae. Again, in the Acridinae *the* diagnostic character is said to be "the absence of stridulatory pegs" and included in this subfamily is the genus *Radinotatum*. In fact, *R. carinatum carinatum* possesses stridulatory pegs in the male, but lacks them in the female. Interestingly, the unreliability of this character is demonstrated further by its variability in the same genus and species. The subspecies *R. c. peninsulare* lacks the stridulatory pegs in both sexes. The point at issue, as we see it, is whether great taxonomic weight can be given to a character which is sex correlated in many cases, variable even at the subspecific level, and primarily of a functional rather than phylogenetic nature. This last point is well demonstrated by *R. c. peninsulare* (among several others). In this subspecies the tegmina are very short and the effectiveness of femoral teeth for stridulation, if present, would probably be nil. Again, in the genus *Mecostethus* (olim *Stethophyma*) the functional nature of this character is well illustrated. In this genus the nodes or asperities are developed on the intercalary and adjacent cross-veins, while the internal carina of the caudal femur is smooth, but strongly developed as a sublamellate ridge.

In his key to the families based on external characters (p. 267) Dirsh makes two errors of fact in the first two alternatives given. The Proscopiidae (most of the known genera of which are before us) certainly cannot be characterized as having "hind legs almost cursorial." In 1952, Rehn [3] pointed out their saltatorial nature from personal observations of living material made in the field. Further, any casual examination of a number of proscopiid genera (such as *Proscopia, Apioscelis, Epigrypa, Stiphra, Astroma*) will illustrate that the caudal limbs are structurally saltatorial, being proximally expanded or inflated. In all respects, the caudal femora of the Proscopiidae are more definitely saltatorial in structure than those of the Pneumoridae which Dirsh separates in his key as having "Hind legs saltatorial."

The second error in the key concerns the presence of Brunner's organ on the hind femora. In the category of families said to possess Brunner's organ in Dirsh's key is listed the Pneumoridae. However, a survey of three of the four genera included in this family shows Brunner's organ to be absent. This was pointed out by Rehn in 1952 [4] and we have rechecked the observations he then recorded. Also included as possessing this organ is the Pyrgomorphidae (Pyrgomorphinae of most au-

[3] Entom. News, LXIII, p. 5.
[4] Entom. News, LXIII. p. 8.

thors), but Rehn in 1952 (vide supra, p. 8) and again in 1953[5] pointed out that it may be present or absent in species of the genus *Psednura* which is a member of this assemblage.

In addition to these errors, certain omissions are evident. For example, in writing of the family Pauliniidae (Pauliniinae of most authors) Dirsh says (p. 248) that it ". . . includes only two South American genera." However, he mentions only *Paulinia* leaving us to assume that the second included genus is *Marellia*. Again, in erecting the subfamily Euryphyminae not even the number of included genera is given. Plate 46 illustrates 14 species of this subfamily belonging to as many different genera but whether or not these are all the genera included is not stated. The omission of an explanation for the abbreviate labels used in plate 1, figure 7, may cause considerable confusion. The specimen depicted in this figure is *Amblyphymus rubripes* (Euryphyminae) which is rare in collections. No explanation exists for the labels "Say" and "Sgp," but these obviously refer to the supra anal plate and subgenital plate, respectively. However, the abbreviation "Cr" used in this figure is defined in the explanation of terms (p. 226) as "crest on the dorsal surface of the spermatophore sac (occurs in *Euschmiditia* of Eumastacidae)." The structures bearing this label in the figure are the cerci, but these are of such unusual form in the species of the genus *Amblyphymus* that the erroneous label could cause confusion.

The captions of plates 51 and 61 have been reversed. Plate 51 depicts *Acrida turrita* while plate 61 illustrates *Truxalis nasutus*. References to these plates in the text are correct, however.

The geographic summaries of distribution of certain families (pp. 267, 268) are misleading and sometimes incorrect. For example, the Proscopiidae are not confined to South America (as stated), but reach Panama and Costa Rica which are definitely in Central America. The Eumastacidae do not occur over the "whole world" being absent from Europe and all but

[5] "Grasshoppers and Locusts of Australia," II, p. 21.

a limited portion of North America. Also it is misleading to give the distribution of the Xyronotidae as North America, when they occur only in Mexico, or to state that the Pneumoridae occur in "Africa" when they are restricted to south and east Africa, being absent from the major part of that continent. The same is true of the Pyrgomorphinae which are really not found over the "whole world," being absent from the West Indies and the greater part of North America.

Finally, it is obvious to us that much literature, especially of the last decade, has been overlooked by Dirsh. This is attested to by the general lack of documentation throughout the paper. It has resulted in numerous misstatements (some of which have been cited above) and may be illustrated by the following example (among the many which could be chosen). In 1906, Rehn [6] pointed out that the presence or absence of an intercalary vein, while usually a stable character, varied in the genus *Scyllina* (= *Rhammatocerus*), being present or absent in individuals of the same species. In some cases it was present on one tegmen of an individual while being absent from the other. Dirsh, however, places without qualification the genus *Scyllina* in the Truxalinae because of ". . . the absence of an intercalary vein" (p. 258).

Reviews

Nouvel Atlas d'Entomologie. Hyménoptères de France. By L. Berland, Sous-Directeur honoraire de Laboratoire d'Entomologie, Muséum national d'Histoire naturelle. Editions N. Boubee et Cie., Paris, 1958. Vol. 1. Tenthrèdes, parasites, port-aiguillon (béthylides). Vol. 2. Port-aiguillon (fin.).

American naturalists may well envy those of France in the possession of such an admirable compendium of the native Hymenoptera. No one other than its author can speak with equal knowledge and experience on those insects; he is already the

[6] Proc. Acad. Nat. Sci. Phila., 1906, p. 41.

author of several parts of the more detailed Faune de France (1925–1947) dealing with Hymenoptera, and of La Fauna de la France, Hyménoptères, 1940.

One is immediately impressed by the wealth of illustrations, and in particular by the excellent water-colors of 366 species finely reproduced and assembled on 28 very glossy plates. These are the painstaking work of Miss Germaine Boca, artist on the staff of the Laboratory of Entomology.

Mr. Berland tells us that some 1100 genera and 11,000 species comprise the hymenopterous fauna of France, a richness due to the diverse climate and biotopes ranging from arctic-alpine to the hot, sandy terrain of the Mediterranean shores. It is obvious that 340 octavo pages cannot cover all these species —that would require an average of some thirty species to a page. The reader who must have complete treatment will find it in the more detailed volumes above referred to. The skill of the author has successfully chosen what to include. Most species figured occur over all of France. Tables are included to all families, sometimes to subfamilies, but not to genera and species, except in the case of social wasps and bees, where exceptional interest and abundance makes specific differentiations particularly desirable. The work is made readable by the inclusion of biological data, recounted in interesting style, and it is made intelligible to those little acquainted with these insects by the diverse illustrations. The taxonomy and nomenclature, being handled by an expert authority, are up to date, but in general conservative. Yet one encounters some surprises, as, for example, in the placing of the Oryssidae at the end of the Symphyta, remote from the Siricidae, from which they stem. But this is due to the difficulty of linear arrangement, for the Apocrita in turn stem from them. Raising the Pompilidae to a superfamily (done in the text but not in the scheme of classification on page 37 of volume 1) conceals their relationship with the Vespidae, but is perhaps necessary if the latter, the ants, the bethylids and the scoliids are each to be dealt with as a superfamily. It does not seem conservative, nor taxonomically sound, to split the Pompilidae into five families. I do not understand why the name "homonotides" has been adopted for one of these when *Homotus* is cited as a synonym of *Wesmaelinius*. I also find it strange that in volume two the superfamily "vespoides" is inserted between "sphecoides" and the bees, concealing the extremely close relationship between the last two groups, but again this is *not* done in the Table of Classification on page 37 of volume 1. The last color-plate, depicting the species of bumblebees, strikes American eyes as being especially beautiful, for some of the French species bear a richness of color which our bumblebees do not attain.—J. Chester Bradley.

Manual of Insect Morphology by E. Melville DuPorte. Pp. xi + 224, 14 illus. Reinhold Publishing Corp., New York, Chapman, Hall, Ltd., London. Price $5.00.

In this laboratory manual, a very competent insect morphologist has given teachers of entomology the benefit of his own experience of over 40 years of teaching. The careful planning and the precise and clear language throughout make it evident that this book must indeed be the result of years of use and of gradual perfecting.

There is a total of 19 chapters, in which each region or organ system is taken up in turn, and its morphology thoroughly gone into. In most chapters, to stimulate interest, there is first provided information on the origin and development of the region or system and a summary of pertinent morphological theory; after which follow careful, exact directions for practical study by means of dissections, and, for internal organs, by microscopic study of sectioned material. In each case, not one but a number of representative insects are used. Thus, in the study of the abdominal segments (taken up *before* the thorax and head), for example, seven different species are employed. Here, too, the muscles are considered, as exemplified by those of the cricket abdomen. For the thorax, only four species are studied, a stonefly, a grasshopper, a cricket, and, as an example of a specialized form, the crane-fly. Attention is given to the morphological interpretation of the pleura and to the internal skeleton. There follow shorter chapters on the wings, legs, and genitalia. Finally, the first main region, the head, is taken up, and it is followed by chapters on the two chief types of mouth parts, and one on the integument. The histology and molting of the latter are studied by means of sectioned material.

The remaining one-third of the book is given to the study of the morphology and histology of the internal organ systems as seen in dissections and in histological sections. Chapter 18, for example, devotes 15 pages to the nervous system, including detailed instructions for dissection of the brain, stomodaeal system, and the incretory organs of the head, as well as for histological study.

There is no doubt that Professor DuPorte amply succeeded in his objectives which, as stated in the preface, are: to give the student a reasonably balanced foundation in the elements of insect morphology, and, to enable the student to work intelligently with a minimum of assistance from the instructor. Finally, the arrangement is such that, in actual use by students, it is an easy matter to select exercises to fit the length of the course and still provide a good cross section of the subject matter, or to reduce the requirements as to drawings in the matter of number and preciseness of detail.—R. G. Schmieder.

Insects

Have you paid your subscription?

January and subsequent issues for 1960 positively not mailed unless subscription has been paid.

ENTOMOLOGICAL NEWS

DECEMBER 1959

Vol. LXX No. 10

CENTENNIAL YEAR
THE AMERICAN ENTOMOLOGICAL SOCIETY
1859—1959

CONTENTS

PUBLISHED MONTHLY, EXCEPT AUGUST AND SEPTEMBER, BY
THE AMERICAN ENTOMOLOGICAL SOCIETY
PRINCE AND LEMON STS., LANCASTER, PA.
AND
1900 RACE STREET, PHILADELPHIA 3, PA.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada.
Second-class postage paid at Lancaster, Pa.

ENTOMOLOGICAL NEWS

ENTOMOLOGICAL NEWS is published monthly, excepting August and September, by The American Entomological Society at Prince and Lemon Sts., Lancaster, Pa., and the Academy of Natural Sciences, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

Subscription price, per yearly volume of 10 numbers: Domestic, $5.00; Foreign, $5.30; Canada, $5.15—U. S. Currency.

SUBSCRIPTIONS: Communications and remittances to be addressed to Entomological News, 1900 Race Street, Philadelphia 3, Pa.

ADVERTISEMENTS: Rate schedules available on request. Address, Fred B. Jacobson, Advertising Manager, Entomological News, 1900 Race Street, Philadelphia 3, Pa.

MANUSCRIPTS and all communications concerning same should be addressed to R. G. Schmieder, Zoological Laboratory, University of Pennsylvania, Philadelphia 4, Pa.

The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. Articles longer than eight printed pages may be published in two or more installments, unless the author is willing to pay the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

ILLUSTRATIONS: Authors will be charged as follows: For text-figures, the cost of engraving; for insert plates (on glossy stock), the cost of engraving plus printing. Size limit, when printed, 4 × 6 inches. All blocks will be sent to authors after printing. It is not advisable to print half-tones as text-figures.

TABLES: The cost of setting tables will be charged to authors.

SEPARATA: Members of the American Entomological Society may elect to receive, gratis, 25 offprints of their contributions. These will be "run-of-form," without removal of extraneous matter.

Those members desiring more than 25 separates, and all non-members, will receive no gratis copies. They must obtain all their separates (as reprints, with extraneous matter removed) from the printer at the prices quoted below. Authors must place their order for such separates with the editor at the time of submitting manuscripts, or when returning proof.

Copies	1–4 pp.	5–8 pp.	9–12 pp.	13–16 pp.	17–20 pp.	Covers
50	$3.95	$6.33	$ 9.89	$10.28	$13.44	$4.31
100	4.74	7.51	11.86	12.65	16.21	5.89
Add'l 100	1.58	2.36	3.94	4.74	5.54	3.16

Plates printed one side: First 50, $3.15; Additional 100's, $2.37.

Transportation charges will be extra.

ENTOMOLOGICAL NEWS

Vol. LXX DECEMBER, 1959 No. 10

Further Notes on the Taxonomy of the Centipede Scolopendra morsitans Linnaeus (Scolopendridae)

By B. S. Jangi, Department of Zoology, College of Science, Nagpur, India

In a discussion of the possible taxonomic status of the two variants 'A' and 'B' of the centipede, *Scolopendra morsitans* Linn. from Nagpur, I suggested that they might be two different species:[1] this suggestion was based on certain differences between them, seen to be invariably present, e.g., color-pattern, average body-size at maturity and a number of correlated morphological characters without any visible intergradation. Observations recorded by me subsequently on their breeding habits,[2] behavior,[3] and ecological requirements[4] do now seem to justify the splitting of this famous Linnaean species.

Linnaeus included *Scolopendra* under "Insecta Aptera" in the tenth edition of his monumental "Systema Naturae" published in 1758[5] and mentioned the following characters of *Scolopendra morsitans:*

> Pedibus utrinque XX. Oculi utrinque quaterni.
> Articuli corporis 22, antennarum 20.

It is impossible to identify the species on the basis of this meager description. Newport in his paper published in 1844[6] tells us that very few of the myriapods were known to Linnaeus and many of those few were confounded by him under a single name. This certainly would seem to be true at least in respect of his *Scolopendra morsitans* as substantiated by an extremely interesting remark of Newport who after examining the specimens from the Linnaean cabinet wrote in 1845:[7] "I have not a doubt . . . that Linnaeus included several species of nearly the same size under the common name of *Scolopendra morsitans*. . . ."

Attems, in his revisional monograph on Scolopendromorpha published in 1930,[8] catalogued several species names as synonymous with *S. morsitans* Linn. A perusal of the literature referred to in Attems' catalogue shows that after the publication of the account of this species by Linnaeus, it has been repeatedly described under the same or different names by various authors on Chilopoda, on the basis of specimens collected from a number of localities in the tropical and sub-tropical parts of North America, South America, Africa, Asia and Australia. Obviously, there is a very wide range of variation in respect to several characters enumerated by Attems under the name *Scolopendra morsitans* Linn., and there can hardly be any doubt that in a revisional monograph such an account had naturally to be a composite one based on the descriptions—mostly poor—given by various authors who had dealt with specimens from distant localities all over the tropical and sub-tropical world.

Attems included many species in the synonymy of *S. morsitans* purely on speculation since it was impossible to refer them to the Linnaean *morsitans* on the basis of their original descriptions which were too poor to be of any taxonomic value. However, in some cases he was guided by the characters of anal legs, e.g., the secondary sexual character displayed by them and three rows of spines on the underside of their prefemora. Attems regarded the secondary sexual characters of the anal legs as the specific character of *Scolopendra morsitans* Linnaeus. These, in my opinion, are the characters of supraspecific level in the sense that they may be present in more than one species of the same genus. I have already pointed out that the presence or absence of the tarsal spur on the twentieth pair of walking legs is the most important character separating the two local variants in question[9] and as such should be regarded as the specific character but unfortunately a majority of the authors mentioned with reference to *S. morsitans* in the Attems' catalogue ignored this character and hence it is impossible to find out from their descriptions whether their material consisted of specimens with or without this tarsal spur. Consequently, one is placed at a great disadvantage in ascribing their descriptions to one or the other of the two variants. This character was referred for the first time by Haase in 1887 [10] but his account of *S. morsitans* was obviously based on a heterogeneous material and so was subsequently Kraepelin's published in 1903.[11] The latter author, however, again described *S. morsitans* in 1908 [12] and gave an account based on the collections from South-West Australia. His description apparently deals with a reasonably homogeneous material as would appear from his observation: "Der Tarsalsporn war am 20. Beinpaar bei allen westaustralichen Exemplaren wohlenwickelt; nur bei einem Exemplar fehlte er einerseits." Excepting this single aberrant specimen showing the tarsal spur on one side only, the material dealt with by Kraepelin appears fairly homogeneous in respect of the tarsal spur.

I think that Kraepelin's material from South-West Australia in no case represents more than one species. Whether or not it is *S. morsitans* of Linnaeus could only be decided if it is proved that Linnaeus had definitely designated a specimen as the type and above all, if the latter was still available and until these issues are finally settled, it seems to me that the best course would be to treat the variant 'B' as *Scolopendra morsitans* since under this name we come across, for the first time, an adequate description of what can be, with reasonable accuracy, called a species.[12] The species *Scolopendra morsitans* should, for the time being, be attributed to Linnaeus. Thus, the local variant 'A' which does not carry the tarsal spur on the twentieth pair of walking legs and which obviously represents a different species, must have a name. Attems recorded in 1930 [13] *S. morsitans* Linn. from Angola and treated the specimens as belonging to a new variety which he named *fasciata* and which undoubtedly agrees with the variant 'A.' Although Attems did not categorically state in his paper whether he regarded *fasciata* as a subspecies or an infra-subspecific variant it is patently clear that he treated it as a form of the latter rank because in his monograph on Scolopendromorpha published during the same year just prior to the publication of his description of *fasciata,* he has distinctly treated the category "variety" belonging to a level lower than that of the subspecific realm. Since the form *fasciata* represents a new species, its variety name, i.e., *Scolopendra morsitans* var. *fasciata,* could now be elevated to the specific rank but it could rank in its new status *Scolopendra fasciata* only from the date on which it is so elevated.[14]

The subspecies, *Scolopendra morsitans amazonica,* described on the basis of specimens from Brazil by Bücherl in 1946[15] represents the same species as the variant 'A' and the form *fasciata*—all being without tarsal spur on the twentieth pair of walking legs. As such, *Scolopendra morsitans amazonica* Bücherl, 1946 when raised to a specific status *Scolopendra amazonica* Bucherl, 1946 will have priority over *Scolopendra fasciata,* the latter not having been elevated to the specific rank prior to 1946. Hence, *Scolopendra amazonica* Bücherl is, under the circumstances, the appropriate name for the variant 'A.'

The subspecific treatment of *Scolopendra morsitans* Linn. and *Scolopendra amazonica* Bücherl is proposed to be undertaken later.

I should like to place on record my sincere gratitude to Drs. Ralph E. Crabill, M. A. Moghe and S. M. H. Khatib for very kindly reading through the manuscript. My thanks are due to Drs. J. L. Cloudsley-Thompson and G. Owen Evans for making inquiries, on my behalf, in connection with the type of the Linnaean *S. morsitans.*

Addendum

Since this paper was submitted for publication, Mr. C. R. Puttanna, who has been working on the cytology of the two variants 'A' and 'B' of *Scolopendra morsitans* Linn. at the College of Science, Nagpur, and Central College, Bangalore, has been able to detect interesting cytological differences between them. The details are being worked out and will be published in due course.

References

1. Ann. Mag. Nat. Hist., VIII, p. 604 (1955).
2. Ibidem, X, p. 239 (1957).
3. Bull. Zool. Soc. Coll. Sci. Nag., I, p. 17 (1958).
4. Ibidem, II, pp. 73–75 (1959).
5. Systema Naturae, I, p. 638 (1758).
6. Ann. Mag. Nat. Hist., XIII, p. 94 (1844).
7. Trans. Linn. Soc. London, XIX, p. 385 (1845).
8. Das Tierreich, lief. 54, pp. 23–24 (1930).
9. Ann. Mag. Nat. Hist., VIII, p. 605 (1955).
10. Abh. Mus. Dresden, V, p. 53 (1887).
11. Mitt. Naturh. Mus. Hamburg, XX, pp. 250–253 (1903).
12. Fauna Südwest-Australiens, II, pp. 123–124 (1908).
13. Rev. Suisse. Zool., XXXVII, p. 372 (1930).
14. Methods and Principles of Systematic Zoology, p. 257 (1953).
15. Mem. Inst. Butantan, XVI, pp. 135–138 (1946).

Two New Genera of Phytoseiid Mites with a Note on Proprioseius meridionalis Chant (Acarina: Phytoseiidae)

By Donald De Leon, Erwin, Tennesee

In general, phytoseiids are fast moving, wide ranging mites and are not found in colonies. The habits of the two species described below differ in these respects—they are rather sluggish and are gregarious. One species lives in close colonies within flowers, the other in loose colonies between flower heads. I have been unable to determine what the mites feed on, but believe *A. hebetis* may feed on pollen.

In the following descriptions all measurements are in microns.

ANTHOSEIUS, n. gen.

Phytoseiids with short, setiform, smooth setae, except last lateral which is expanded at tip; with five pairs of anterolateral setae; with dorsal shield postad rounding over sides and rear of hysterosoma, and with the peritremata very coarse. Larva with a pair of short setae enlarged at tips on posterior dorsal shield and without a posterior pair of long whip-like setae; protonymph with an anterior and a posterior dorsal shield; legs of both proto- and deutonymph without macrosetae, and legs of all stages very short and stout.

Type of genus: *Anthoseius hebetis,* n. sp.

Anthoseius most closely resembles *Typhlodromus s. str.,* but differs from that genus chiefly in having peritremata very coarse, the last lateral seta expanded at tip, and the larva without a posterior pair of long whip-like setae.

Anthoseius hebetis, n. sp.

Female: Dorsal shield convex (more strongly postad), 325–344 long, 180–201 wide (three specimens), widest at about L8, indistinctly imbricate, rather strongly sclerotized, light brown in color and with ten lateral (five anterolateral), two median, and six dorsal pairs of setae. L1–L10 11 to 19 long, L3 the shortest, L10 the longest; most of the setae about 15 long, all setae distinctly shorter than distance between their bases; L10 simple with tip enlarged; M1 11, M2 15 long (simple); D1–D5 11–14 long; S1 15, S2 13 long. Sternal shield with two pairs of setae; genital shield 78 wide near posterior margin; ventrianal shield with sides concave, 101 long, 69 wide near anterior margin and 77 wide at a level slightly anterior of anus, with three pairs of preanal setae and a pair of small pores all normally arranged (the shape of the ventrianal shield varies considerably, rarely approaching bilateral symmetry); two pairs of metapodal shields, the primary 34 long, about 5 wide, the accessory 16 long, about 2 wide; four pairs of interscutal setae including VL1 which is 18 long and six pairs of platelets bordering the ventrianal shield. Peritremata extending forward to about level of L1 and very coarse (about 7 wide), the shield extending back around coxa IV as a large blunt hook. Movable digit with a small subapical tooth, some specimens with a minute tooth proximal of subapical tooth; fixed digit with a blunt subapical tooth and a smaller tooth between it and *pilus dentilis*. Legs heavy, short, and without macrosetae; tarsus IV, excluding pretarsus, 55 long.

MALE: Resembles female; dorsal shield 250 long, 135 wide (three specimens); ventrianal shield with three to five (usually five) pairs of preanal setae and three pairs of faint pores. Spermatophore bearer about 30 long, slightly curved, with a slight twist, and tapering gradually towards tip, tip slightly flared.

LARVA: Idiosoma 195 long. Anterior dorsal shield with nine pairs of setae (4 laterals, 1 median and 4 dorsals) normally arranged, the four laterals and D1 of about the same lengths (L2 10 long) and longer than the others (D2 5 long). Posterior dorsal shield with one pair of setae enlarged at tips and about 30 long. One pair of preanal setae and a pair of pores about 2½ times the length of the preanals anterolateral of them; no lateroventral or posteroventral setae; anal shield with a pair of minute pores anterolateral of paraanals. Movable digit without teeth; fixed digit with small knob near base of terminal hook. Legs without macrosetae.

PROTONYMPH: Idiosoma 226 long. Anterior dorsal shield with nine pairs of setae arranged as for larva and with a tenth pair of setae just off the shield at its posterolateral angles; S1 off shield between the third and fourth lateral setae. Two pairs of setae (apparently L7 and D5) on the interscutal membrane between the anterior and posterior dorsal shields, S2 slightly anterolateral of L7. Five pairs of setae on the posterior dorsal shield (L8, L9, L10, D6, and M2) M2 at side between L8 and L9; L8 and L10 with tips enlarged. Peritremata coarse, extending forward to a point about even with fourth lateral seta. Three pairs of intercoxal setae. Four pairs of setae and sometimes two pairs of shieldlets bordering anal shield. Anal shield with a pair of pores as for larva. Movable digit with a trace of a tooth, fixed digit with teeth as for adult but not as developed. Legs without macrosetae.

DEUTONYMPH: Dorsal shield 285 long with setae as for adult, L8 and L10 with tips enlarged; L10 about 21 long. Peritremata coarse, extending forward to a point about even with L2.

Five pairs of intercoxal setae. Seven pairs of setae and four pairs of shieldlets surrounding anal shield. Legs without macrosetae.

Holotype: Female, Key Largo, FLORIDA, December 6, 1958 (D. De Leon), from within the flower of *Heliotropium parviflorum*. *Paratypes:* Four males, four females, same data as for holotype.

This mite colonizes a single flower, all stages occurring within the throat. The throat of the flower is about a millimeter in diameter and two millimeters long. I have taken 35 mites from four flowers. When collected the mites were covered with pollen. This might be partly caused by disturbance when collecting them, but as the flowers appeared to be uninjured and no other arthropods were observed within or on the outside of the flowers, it seems quite possible that these mites were feeding on the pollen.

PHYLLODROMUS, n. gen.

Phytoseiids with dorsal shield smooth to faintly imbricate; with most of the lateral setae and M2 gradually enlarged towards the tips and with the tips abruptly constricted; with all setae simple, and with six pairs of dorsal setae. Peritremata very wide. Larva without a pair of long whip-like setae; protonymph with two dorsal shields, and legs of all stages without macrosetae.

Type of genus: *Phyllodromus leiodis,* n. sp.

Phyllodromus resembles *Asperoseius* Chant and *Proprioseius* Chant in having club-shaped lateral setae, but the club-shaped lateral setae of those two genera are strongly serrate, moreover they have five pairs of dorsal setae.

Phyllodromus leiodis, n. sp.

FEMALE: Dorsal shield smooth to faintly imbricate, 335–362 long, 162–193 wide (seven specimens), with nine lateral (four anterolateral), two median, and six dorsal pairs of setae; except for L5, those of the lateral series and D1, S1, and S2 slightly club-shaped and abruptly constricted at tips, L5 and the remaining setae of the dorsal shield slender and tapering from bases to tips; all setae smooth. The lengths of these setae follow: L1 29, L2 34, L3 29–36, L4 36–45, L5 18, L6 40, L7 26, L8 27, L9 52; D1 16, D2 16, D3 14, D4 18, D5 14, D6 8; M1 11, M2 46; S1 31, S2 29. L1–L3 about as long as distance to base of seta next behind. Peritremata coarse (about 7 wide), extending forward to about level of L1, the shield extending round behind coxa IV and forming a blunt hook. Sternal shield with three pairs of setae, the posteriormost pair set on small angular-shaped projections which in some specimens are cut off from the sternal shield, posterior margin of shield evenly, shallowly concave in middle two thirds and abruptly recessed at sides; genital shield 70 wide near base; ventrianal shield constricted behind posterior pair of preanals, 105–115 long, 65 wide near anterior margin and scarcely wider at level of anus, with two pairs of preanal setae and without pores; two pairs of metapodal shields, the primary 41 long, about 3.6 wide, the accessory 18 long, about 2 wide. A pair of setae between genital and ventrianal shields and four pairs of interscutal setae, including VL1 which is 29 long and shaped like L9, bordering ventrianal shield laterad. Fixed digit with *pilus dentilis* and four teeth (excluding terminal hook), the distal and proximal ones bidentate; movable digit with two minute teeth. Legs rather short but slender and without macrosetae; leg IV from base of coxa to end of claw 270 long; tarsus IV, excluding pretarsus, 72 long.

MALE: Dorsal shield 293–322 long (two specimens); resembles female in chaetotactic pattern, but D1, L7, L8, and VL1 tapering from bases to tips. Ventrianal shield with four to six (usually six) pairs of preanals and without pores. Spermatophoral process L-shaped with tip of foot bent away from body, shaft 19 long, foot 12 long. Primary and accessory metapodal shields coalesced.

LARVA: Idiosoma 181 long. Except for possibly L1, lateral setae and D4 of anterior dorsal shield with tips expanded; posterior dorsal shield with a single pair of setae, 56 long, rather coarse, and with tips expanded. Posteroventral setae 30 and 34 long and with tips expanded. Legs without macrosetae.

PROTONYMPH: Idiosoma 208 long, with an anterior and a posterior dorsal shield; anterior shield with four lateral, one median and four dorsal pairs of setae; posterior shield with three pairs of lateral setae and pairs M2 and D6, the posteriormost lateral seta 26 long; three pairs of setae in membrane between the two shields and three pairs of shieldlets, the anteriormost the largest; S1 and S2 present. Legs without macrosetae.

DEUTONYMPH: Idiosoma 302 long; resembles adult, with most of the lateral setae coarse, but tapering slightly from bases to tips. Seven pairs of setae, including VL1, surrounding anal shield, all but VL1 very short.

Holotype: Female, Miami, FLORIDA, September 20, 1958 (D. De Leon), from *Waltheria americana*. *Paratypes:* One male, four females, two nymphs, February 4, 1959, other data as for holotype. Specimens have also been taken from the same plant species in Everglades National Park and on Key Largo in March 1959. The mite occurs in numbers in among the flower heads which form dense clusters along the stem.

The holotypes of these two species are in the author's collection. Paratypes will be deposited in the University of Florida Collections, Gainesville.

Proprioseius meridionalis Chant 1957

P. meridionalis described from four adults collected from *Psychotria* at Homestead, Florida in 1949 is a common mite in Everglades National Park having been taken from *Guettarda scabra, Pluchea odorata,* and a malvaceous plant. It was also found in numbers on *Dryopteris* and on *Trema floridana* growing along the highway to the Keys about five miles south of Florida City. I have not collected it on the Keys, but to the north have taken it on *Callicarpa americana* at Coral Gables. The larva has a posterior pair of long whip-like setae, the protonymph an anterior and a posterior dorsal shield.

LITERATURE CITED

CHANT, D. A. 1957. Descriptions of two new phytoseiid genera (Acarina: Phytoseiidae), with a note on *Phytoseius* Ribaga, 1902. Canad. Ent., 89 (8): 357–363.

Characters Separating Archips rileyanus and cerasivoranus as Two Species (Lepidoptera, Tortricidae)

By Nicholas S. Obraztsov [1]

The two North American tortricid species, *Archips rileyanus* (Grote) and *A. cerasivoranus* (Fitch), have a great external resemblance to each other, and rather similar bionomics. This circumstance gave Freeman (1958, pp. 21–22) the reason for treating them recently as two subspecies of one species which intergrade one with the other in intermediate zones of their range. The present author cannot approve this point of view since there are some important differences in morphology of the imaginal and larval stages of *rileyanus* and *cerasivoranus,* which it is quite difficult to explain by an intraspecific variation. The following lines show the most important characters distinguishing these two species. The figures of the genitalia are given in a generic revision of the Nearctic Tortricidae, prepared by the present author for publication. The data on the larvae were gathered from the paper of Peterson (1948, pp. 174–175). Their chaetotaxy has been described on the basis of Peterson's figures, under application of the terminology of Gerasimov (1952), used recently by Swatschek (1958) for the Tortricidae.

Archips rileyanus (Grote)

Cacoecia fervidana Walker, 1863, List of the specimens of lepidopterous insects, pt. 28, p. 313. Type locality: Georgia (lectotype, male without abdomen, and lectoallotype, female; British Museum). Subjective homonym of *Archips fervidanus* (Clemens, 1860).

Tortrix rileyana Grote, 1868, Trans. Amer. Ent. Soc., vol. 2, p. 121; Robinson, 1869, *ibid.,* vol. 2, p. 271, pl. 4, fig. 28; Riley, 1869, Rept. Insects Missouri, vol. 1, p. 153, pl. 2, figs. 3, 4. Type locality: America (the type specimen is probably lost).

Tortrix (*Loxotaenia*) *rileyana* Zeller, 1875, Verhandl. zool.-bot. Gesell. Wien, vol. 25, p. 221.

[1] Research fellow of the American Museum of Natural History. This work has been done under the auspices of the National Science Foundation.

Lozotaenia rileyana Walshingham, 1879, Illustrations of typical specimens of Lepidoptera Heterocera, vol. 4, p. 9.

Cacoecia rileyana Fernald, 1882, Trans. Amer. Ent. Soc., vol. 10, p. 11; Grote, 1882, New check list of North American moths, p. 57, no. 35.

Archips rileyana Fernald, 1903 (1902), Bull. U. S. Natl. Mus., vol. 52, p. 479, no. 5361; Forbes, 1924 (1923), Cornell Univ. Agr. Exp. Sta., Mem. 68, p. 496; Peterson, 1948, Larvae of insects, vol. 1, pp. 174–175, figs. L 32, H to J.

Homona rileyana Meyrick, 1912, *in* Wagner, Lepidopterorum catalogus, pt. 10, p. 14; 1913, *in* Wytsman, Genera insectorum, fasc. 149, p. 19.

Homona fervidana Barnes and McDunnough, 1917, Check list of the Lepidoptera of Boreal America, p. 175, no. 7283; McDunnough, 1939, Mem. Southern California Acad. Sci., vol. 2, p. 55, no. 7310.

Archips carasivoranus [sic!] *rileyanus* Freeman, 1958, Canadian Ent., vol. 90, Suppl. 7, p. 22.

Archips cerasivoranus rileyanus Freeman, 1958, *ibid.*, vol. 90, Suppl. 7, p. 80, figs. 115, 116.

MOTH: Forewings with veins R_4 and R_5 connate or stalked; vein Cu_1 often from slightly before the lower angle of middle cell. Their ground-color ocherous-orange, sometimes slightly suffused with grayish brown to mallow-pink. Pattern of small, brown spots arranged in transverse rows arched outward. Basal row of three or four spots at the distal part of the first quarter of forewing. Middle row, shortly before the middle of forewing, of a larger costal spot and some further, smaller spots from the lower part of middle cell to dorsum. Submarginal row of a small costal spot and some further dots from the third quarter of costa to the upper part of tornus. Terminal row of small dots, parallel to the former, half-way between it and wing apex. Sometimes some more little dots along costa and at wing apex, forming no rows. None of the above spots overcrosses the veins, although some of the spots are slightly elongated longitudinally. Some of the spots often paler than the others, obliterate, or missing. Franges concolorous with wings. Length of the forewing 10 to 15 mm. Hind wings orange; franges concolorous.

Male Genitalia: Uncus somewhat dilated at base, then more or less narrowed and dilated again at tip. Middle process of gnathos broad in basal two-thirds and abruptly narrowed distad. Distal process of sacculus rather thin, forming with its base a triangle lying down.

Female Genitalia: Signum moderate, pointed.

Larva: Full grown larva greenish yellow with a near black head, a deep brown to black cervical shield, deep brown to black anal plate, thoracic legs and prolegs, and conspicuous, brown to black pinacula about all setae. Microspines numerous, pigmented in folds of cuticle. Length of the body about 23 mm.

All teeth of the mandibles blunt; no additional tooth below the first lateral one. Metathorax with setae I and II almost on the same level; IIIa dorsocraniad from III; V ventrocraniad from IV. Fourth abdominal segment with two setae (III and IIIa) dorsad from stigma; seta IV ventrocraniad from V, both of them almost directly ventrad from stigma; seta VI dorsad from proleg.

Range: Pennsylvania, Ohio, Missouri, North Carolina, Georgia, Mississippi, Texas, Washington, California.

Archips cerasivoranus (Fitch)

Lozotaenia cerasivorana Fitch, 1856, Trans. New York State Agr. Soc., vol. 16, p. 382, pl. 2, fig. 3; 1859, Nox. Insects New York, p. 64, pl. 2, fig. 3; Riley, 1893, Insect life, vol. 5, p. 351. Type locality: State of New York (the type specimen is probably lost).

Tortrix cerasivorana Robinson, 1869, Trans. Amer. Ent. Soc., vol. 2, p. 275, pl. 6, fig. 47.

Tortrix (Cacoccia) cerasivorana Zeller, 1875, Verhandl. zool.-bot. Gesell. Wien, vol. 25, p. 217.

Cacoccia cerasivorana Fernald, 1882, Trans. Amer. Ent. Soc., vol. 10, p. 11; Grote, 1882, New check list of North American moths, p. 57, no. 34; Riley, 1890, Insect life, vol. 3, p. 308; Dyar, 1894, Ann. New York Acad. Sci., vol. 8, p. 206; Lugger, 1899 (1898), Fourth Ann. Rept. Ent. State Exp. Sta. Univ. Minnesota, p. 228, fig. 212, pl. 8, fig. 212; Meyrick, 1912, *in* Wagner, Lepidopterorum catalogus, pt. 10, p. 20; 1913, *in* Wytsman, Genera insectorum, fasc. 149, p. 25; Barnes and

McDunnough, 1917, Check list of the Lepidoptera of Boreal America, p. 177, no. 7349.

Archips cerasivorana Fernald, 1903 (1902), Bull. U. S. Natl. Mus., vol. 52, p. 479, no. 5360; Holland, 1903, Moth book, p. 422, pl. 48, fig. 21; Mosher, 1916, Bull. Illinois State Lab. Nat. Hist., vol. 12, pp. 55, 58; Forbes, 1924 (1923), Cornell Univ. Agr. Exp. Sta., Mem. 68, p. 496; McDunnough, 1939, Mem. Southern California Acad. Sci., vol. 2, p. 56, no. 7384; Peterson, 1948, Larvae of insects, vol. 1, pp. 174–175, figs. L 32, E to G; Craighead, 1950 (1949), U. S. Dept. Agr., Misc. Publ., no. 657, p. 477.

Archips cerasivoranus Freeman, 1958, Canadian Ent., vol. 90, Suppl. 7, p. 21, figs. 15, 64, 113, 114.

Moth: Forewings with veins R_4 and R_5 separate; vein Cu_1 from the lower angle of middle cell. Their ground-color ochrerous-orange suffused with brown, crossed by pinkish transverse lines or irregular areas with a silky gloss. Basal quarter of forewing either completely dark brown or outlined by a dark brown line divided sometimes in spots, or not indicated by any sign. Costa before the middle and between this latter and wing apex with two large, more or less dark, brown spots. Sometimes small, dark, broad costal dots or short lines in the interspaces of the above large spots and between the outer of them and wing apex. A large, subquadrate, dark brown spot below the distal part of middle cell, and a vertical, linear spot above dorsum at tornus. A rather narrow, pale brown line from the outer, larger, costal spot to the upper part of tornus. Occasionally, some brownish spots or dots in other wing areas, or, some or all of the spots are lacking. Franges orange, paler than the ground of forewings. Length of the forewing 8 to 13 mm. Hindwings orange, usually suffused by brown, especially dorsad from middle cell; franges paler than the wing ground.

Male Genitalia: Uncus almost equally broad from base to tip. Middle process of gnathos narrowed gradually from base to tip. Distal process of sacculus rather thick, forming together with its base an erect triangle.

Female Genitalia: Signum large, blunt.

Larva: Full grown larva yellowish with a black head and near black or dark brown cervical shield, anal plate, lateral areas on anal prolegs, and two pinacula on prothorax. No distinct pinacula on remaining segments. Microspines on cuticle inconspicuous, light colored. Length of the body about 15 mm.

Mandibles with all lateral teeth more or less distinctly pointed, and with a small, additional tooth on oral surface immediately below the first lateral tooth. Metathorax with seta II distinctly ventrocraniad from I; IIIa dorsocaudad from III; V directly ventrad from IV. Fourth abdominal segment with only one seta (III) dorsad from stigma; seta IV distinctly ventrocraniad from V, both of them ventrocraniad from stigma; seta VI dorsocaudad from proleg.

RANGE: Quebec, Ontario, New Brunswick, Nova Scotia, Manitoba, Alberta, Saskatschewan, British Columbia; Maine, New Hampshire, Massachusetts, Connecticut, New York, New Jersey, Ohio, Illinois, Michigan, Minnesota, Missouri, District of Columbia, Mississippi, Montana, Idaho, Wyoming, Colorado, Utah, Nevada, Washington, Oregon, California.

REFERENCES

FREEMAN, T. N. 1958. The Archipinae of North America (Lepidoptera: Tortricidae). Canadian Ent., vol. 90, Supple. 7, 89 pp., 258 figs.

GERASIMOV, A. M. 1952. Fauna SSSR. Nasekomye cheshuekrylye, vol 1, fasc. 2. Gusenitsy, pt. 1 [Fauna of the USSR. Insecta Lepidoptera, Caterpillars]. Moscow and Leningrad, 338 pp., 140 figs.

PETERSON, A. 1948. Larvae of insects. An introduction to Nearctic species. Pt. 1: Lepidoptera and plant infesting Hymenoptera. Columbus, Ohio, (3) + 315 pp., 14 + 58 + 12 figs.

SWATSCHEK, B. 1958. Die Larvalsystematik der Wickler (Tortricidae und Carposinidae). Abhandlungen zur Larvalsystematik der Insekten, no. 3. Berlin, 269 pp., 276 figs.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Tenebrionidae of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral. San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

Butterflies. Wish to exchange specimens for Japanese species. Please write to Ichiro Nakamura (Boy, age 16), 26 Aza-Nichiyama Obayashi Takarazuka-shi, Hyogo-Ken, Japan.

Phasmidae of nearctic area desired alive. Purchase or trade, drawing on large stock of major orders, worldwide. Domminck J. Pirone, Dept. Entomology, Cornell University, Ithaca, N. Y.

Nitidulidae and Rhizophagidae wanted in exchange for European beetles of all families. O. Marek, Žămberk 797, Czechoslovakia.

Wanted and Needed. We are compiling a history of entomology, and particularly, at present, of the amateur insect clubs that flourished 50 to 75 years ago. Will you who have knowledge of such early clubs or societies advise me, giving facts on the time of existence, members, etc., which you may have. J. J. Davis, Dept. of Entomology, Purdue University, Lafayette, Indiana.

INDEX TO VOLUME LXX

(* Indicates new genera, names, etc.)

GENERAL SUBJECTS

OBITUARIES

PERSONALS

REVIEWS

GEOGRAPHICAL DISTRIBUTION

COLEOPTERA

DIPTERA

HEMIPTERA

HOMOPTERA

HYMENOPTERA

LEPIDOPTERA

ODONATA

ORTHOPTERA

SMALLER ORDERS

NON-HEXAPODA

ACARINA

CHILOPODA

DIPLOPODA