The numbers of *Entomological News* for 1953 were mailed at the Post Office at Lancaster, Pa., as follows:

No. 1—January .................. January 29, 1953
No. 2—February .................. February 17, 1953
No. 3—March .................. March 16, 1953
No. 4—April .................. April 6, 1953
No. 5—May .................. May 13, 1953
No. 6—June .................. June 19, 1953
No. 7—July .................. July 20, 1953
No. 8—October .................. October 1, 1953
No. 9—November .................. October 30, 1953

The date of mailing the December, 1953, number will be announced on the last page of the issue for January, 1954.
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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.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act
of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in para-
graphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
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, ADVERTISEMENTS: All communications and remittances to be addressed to ENTOMOLOGICAL NEWS, 1900 Race Street, Philadelphia 3, Pa.

MANUSCRIPTS and all communications concerning same should be addressed to R. G. SCHMIEDE, 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. If not accepted, authors will be so advised and postage requested for return of manuscripts. Articles longer than six printed pages may be published in two or more installments, unless the author is willing to pay for the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

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Supplement to the Myriapoda of the Philippine Islands

By Yu-hsi Moltze Wang, Division of Biology, University of Utah

The following notes are based upon a collection of Myriapods sent to me for study through the kindness of Dr. Willis J. Gerstch. The specimens with which this paper is concerned were collected by Mr. Borys Malkin and deposited at the American Museum of Natural History, New York. To both of these men I am grateful.

Class CHILOPODA

Order Geophilida

Mecistrocephalus rubriceps Wood 1863

1 female 42 mm. in length, taken at Baquio, Mountain Province, Luzon, El. 4200–4400, Nov. 3, 1945. The coxae of the anal legs have pores variable in size, the larger ones being about 20 in number, the smaller ones numerous.

Order Scolopendrida

Cryptops melanotypus Chamberlin 1941

1 female 15 mm. in length, taken at Mt. Maquilin, Laguna Province, Luzon, El. 1200, Nov. 25, 1945.

Cryptops brunneus Chamberlin 1921

1 female 19 mm. in length, taken at Mt. Maquilin, Laguna Province, Luzon, El. 1500, Dec. 30, 1945. In the key for dis-
tistinguishing these two species given in The Myriapoda of the Philippine Islands (Serica, vol. 1, p. 48), there was a misprinting in the key of couples 4a and 4c, which should be corrected to read as follows:

“4a. . . . the third tergite having the spiracles large and longitudinally ellipic .................. Cryptops brunneus.
4c. . . . the third tergite having the spiracles as usual ............. Cryptops melanotypus.”

Otostigmus astenus Kohlrausch 1881

1 female 45 mm. in length, taken at Mt. Maquiling, Laguna Province, Luzon, El. 600–1200, Oct. 1945. 1 female 36 mm. in length, taken at Baguilo, Mountain Province, Luzone, El. 4200–4400, Nov. 3, 1945.

Rhysida nuda brevicornuta Wang 1950

1 female 22 mm. in length, taken at Alabang, Rizal Province, Luzon, Dec. 1945. It was formerly found at Mindanau. The name of this species is misprinted on pages 42 and 55 respectively in Serica, vol. 1, as R. N. brevicornis.

Scolopendra subspinipes subspinipes Leach 1815

1 female 30 mm. taken at Mt. Maquiling, Paguna Province, Luzon, El. 1100–1400, Sept. 29, 1945.

Scolopendra morsitans L. 1758

1 male 50 mm. in length, taken at Ft. W. McKinley, Jan. 10, 1946, 1 female 62 mm. in length, taken at Alabang, Sept. 1945, 2 females 55 and 65 mm. in length, taken at Alabang, July 1945, all at Rizal Province, Luzon.

Order Scutigerida

Parascutigera philippina Chamberlin 1921

1 male 9 mm. in length, taken at Los Banos, Laguna Province, Luzon, July 1945.
Class Diplopora
Order Polydesmida

Chondromorpha xanthotrica (Attems) 1898
1 male 1.5 mm. in breadth, taken at San Fernando, Lu Uni Province, Luzon, Nov. 2, 1945. 1 female 2.1 mm. in breadth, taken at Alabang, Rizal Province, Luzon, Jan. 1946. This is the new record in distribution since the Genus Chondromorpha is mainly distributed in India; only one species has been recorded from Upolu, New Caledonia. This species was formerly recorded from Ceylon, Kandy.

Pratinus quatuor-puteus (Wang) 1950
1 male 38 mm. in length, 3.5 mm. in breadth; 1 female 31 mm. in length, 3 mm. in breadth, taken at Mt. Maquiling, Laguna Province, Luzon, El. 1100–1400, Sept. 29, 1945. This genus was first designated as Prionopelitis Pocock 1895 but was changed to Pratinus by Attems in 1937, because the former name is preoccupied by a trilobite Prionopelitis, Hawle and Corda 1847. Accordingly, montanus Chamberlin and insulatus Wang are thus to be placed under the new name.

Pratinus montanus (Chamberlin) 1921
5 females, 1 male 27–45 mm. in length, 2.5–4 mm. in breadth taken at Mt. Maquiling, Laguna Province, Luzon, El. 600–3200, Oct., Nov., Dec. 1945; 1 female 41 mm. in length taken at Mariveles Res., Zambales Mts., Zambales Province, Luzon, El. 700–1000, Nov. 27, 1945.

Strongylosoma philippina Chamberlin 1921
1 male taken at Mt. Maquiling, Laguna Province, Luzon, El. 1100–1400, Sept. 29, 1945.

Platyrhacus margaritiferus Gervais 1847
1 male, 1 female taken at Mt. Maquiling, Laguna Province, Luzon, El. 1100–1500, Sept. 29, 1945, Jan. 13, 1946.

Platyrhacus dorsalis Peters 1864
1 female from the Philippines in the University of Utah Collection.
Order Spirobolida

**Trigoniulus laminifer docens** Wang 1950
1 male, taken at Mt. Maquiling, Laguna Province, Luzon, El. 1500–3200, Nov. 21, 1945.

**Spirostrophus socius socius** Chamberlin 1921
1 female each taken at Mt. Maquiling, Laguna Province, Luzon, El. 800–3000, Nov. 18, 1945, and at Dolores, Tayabas Province, Luzon, El. 1200, Nov. 13, 1945.

**Spirostrophus socius mindanaunus** Wang 1950

**Spirostrophus socius sumarinus** Wang 1950

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**Improved Technique for Rearing Chigger Mites**¹ ²

(Acarina: Trombiculidae)

By Louis J. Lipovský

A culture tube and a dish for rearing chiggers have been used successfully for the past four years. The tube and dish are used without any material other than a mixture of charcoal and plaster of Paris which line the tube and dish. The tube is used primarily for engorged larvae held for transformation into nymphs; however, rearing may be continued through the adult stage using the 3- or 5-dram vial described below. The culture dish is especially useful and convenient for observations and ease of manipulation of the post-larval stages.

¹ The studies upon which this paper is based were conducted under contract, N6 or 220 Task Order II, between the University of Kansas and the Office of Naval Research.

² Contribution number 792 from the Department of Entomology, University of Kansas.
The culture tube is a modification of the tube described by Farrell and Wharton (1948, Jour. Parasit. 34: 71) for shipping larval trombiculids; however, it is made with a 3- or 5-dram, Kimble "Opticlear," plastic-stoppered vial instead of a cork-stoppered shell vial. This plastic-stoppered vial is suitable for shipping all stages of chiggers as well as the collembolans which are cultured as food for the nymphs and adults (Lipovsky, 1951, Jour. Parasit. 37: 324-326).

The vial, 3- or 5-dram, is lined completely with a charcoal and plaster of Paris mixture. This mixture is prepared as follows: mix 600 c.c. of dry, slow-setting (common) plaster of Paris with 50 c.c. of powdered charcoal; blend thoroughly by shaking in a capped jar. This amount of plaster mixture will be sufficient for many vials. The same mixture is used to make the culture dish.

Seven cubic centimeters (slightly compacted) of this dry mixture is placed in the 3-dram vial and to this 3 c.c. of water are added and mixed until plastic but not fluid; if it flows add a little more dry mixture. Then the plastic stopper is placed tightly in the vial, and, holding the inverted vial between thumb and forefinger, the stoppered end is tapped sharply 6 to 8 times on a flat, solid, wooden surface. Turned upright again, the vial is tapped 3 to 4 times (relax hold on vial during moment of impact to avoid injury if vial should break).

At this point the top and sides of the vial should be lined with a thin, uniform coat and the bottom of the vial should contain about 15 mm. of wet plaster. After the plaster has set, the stopper is slowly removed. The plaster lined vial should have a thin seal at the opening of the tube, just beneath the bottom level of the plastic stopper. This seal is removed carefully and then discarded. For the admission of light within the tube, 4 or 5 longitudinal slits are made in the plaster on the sides of the tube. The culture tube is now ready for use.

Stoppered tubes will maintain a uniform humidity for many months and no water need be added when chiggers are first placed in the tubes. When these tubes are used for shipping, 3 or 4 pin holes should be made in the bottom portion of the
stopper; and if the top of the cap is also solid, pin holes should be made here also to compensate for the changes in temperatures and pressures encountered during shipment. If a tube is opened frequently for observations, a few drops of water may be added as needed but care should be taken to avoid adding water in excess of that absorbed by the plaster.

The dish is a stender dish with an inside diameter of 65 mm. and 20 mm. in depth. It is lined inside with the same plaster mixture used in making the culture tube. The wet mixture is blended and shaped against the sides of the dish up to the top edge, then the bottom of the dish is tapped until the mixture forms a level bottom with a thin plaster lining on the sides. When set, the plaster should be smooth, free of pits and cavities. The upper 6 mm. of plaster lining should be removed to form a plaster-free zone. This plaster-free band must be kept clean and smooth to act as a barrier to the nymphs and adults.

Coating the outside of the dish and the entire lid with paraffin as well as covering the lid with waxed paped is recommended. As the paraffin solidifies on the lid, the dish and lid are fitted together tightly. The lid is then covered with a sheet of thin waxed paper by placing the waxed paper over the open dish, pressing the lid snugly to the dish, lifting the edges of the paper over the top of the lid and fusing it to the paraffin coating with a hot spatula. The inner central portion of the paper should remain free, leaving a space between the waxed paper and the lid.

Farrell and Wharton (1949, Jour. Parasit. 35: 435) recommend the use of vermiculite, a mica, as a “substrate” over a charcoal-plaster mixture. Hyland (1951, Ann. Ent. Soc. Amer. 44: 297-301) reported on the use of a small stender dish as a microculture dish, with the charcoal-plaster mixture covered with a thin layer of sterilized soil. The writer has found that two grooves cut into the plaster surface about 2 mm. in depth and 2 mm. wide, in the form of a cross, and centrally located, is all that is needed. These straight grooves provide a protective niche into which nymphal and adult chiggers may crawl, where they may transform and yet be visible under the microscope. In dishes which contain both collembolans and chiggers for periods
of weeks or months, the grooves become filled with eggs, exuviae, and some debris under which chiggers may conceal themselves. These grooves, therefore, should be cleaned out periodically to avoid possible injury to specimens when trying to locate them.

This culture dish is ideal for individual rearing of chiggers or for as many as 50 adults of the same species. In the latter instance, food must be available at all times or they may eat their own eggs for they are cannibalistic. Their own eggs are frequently eaten even when other food is available.

In addition, this culture dish has been used successfully for rearing other small arthropods including mites of the families Oribatidae, Tyroglyphidae, Trombidiidae, Phytoseiidae, Macrochelidae, Anoetidae, Uropodidae, and Cheyletidae as well as insects of the families Cryptostemmatidae (Hemiptera), Staphylinidae and other coleopterous species, and Stratiomyiidae, Sciaridae, Mycetophilidae and other Diptera.

Catches of Euplexoptera and Elateridae in Light Traps in South Dakota

By H. C. Severin, South Dakota State College

Light traps have been operated in representative areas in South Dakota for many years and during this time much valuable information concerning insects has been accumulated. In this article, catches dealing only with Euplexoptera and Elateridae will be discussed.

The earwig, Labia minor (L.) is the only species of Euplexoptera that can be reported as occurring in South Dakota at the present time. This earwig is not common in South Dakota and strange to say we have been able to collect it only through light traps or from illuminated show windows of store buildings in southeastern South Dakota. Diligent search has been made for this species of earwig in what should have been very favorable environments, but we have not been able to collect a single
specimen in such areas. However, by means of light traps, we have taken as many as fifteen specimens of this earwig in a single night. While specimens were taken from illuminated show windows of store buildings, it has not been possible for us to collect more than three of four earwigs from such windows in a single evening.

The light traps, through which we collected this species of earwig, were suspended by means of wires from cross arms attached to posts. The bottom of each trap was about seven feet from the surface of the soil. The environment in which the largest numbers of earwigs were collected was adjacent to a cattle feeding yard which contained quite a large accumulation of cow manure. Contrary to the conclusion of S. W. Frost,* we are forced to believe that at times, at least, Labia minor (L.) is attracted through light supplied by Mazda frosted lamps of 60, 100, or 200 watts or by fluorescent day-light tubes of 15 watts.

Twenty species of adult Elateridae were taken thus far in South Dakota in light traps.** The species collected are the following:

1. Conoderus vespertinus (Fab.)
2. Conoderus auritus (Hbst.)
3. Drasterius dorsalis (Say)
4. Limonius ursinus (VanDyke)
5. Athous cucullatus (Say)
6. Hemicrepidius mennonius (Hbst.)
7. Glyphonyx recticollis (Say)
8. Ampedes obliquus (Say)
9. Ampedes arcolatus (Say)
10. Megapenthes stigmosis (Lec.)
11. Melanotus decumanus (Er.) = M. canadensis (Cond.) acc. to Dietrich.
12. Melanotus ignobilis (Melsh.)
13. Melanotus communis (Gyll.) Var. “A” of Dietrich
14. Melanotus communis (Gyll.) Var. “B” of Dietrich
15. Melanotus divarcarinus (Blatchley)
16. Melanotus fissilis (Say)


17. *Melanotus infaustus* (Lec.)
18. *Melanotus cribrulosus* (Lec.)
19. *Cardiophorus convexus* (Say)
20. *Horistonotus uhleri* (Horn)

Of the species listed, those numbered 1, 3, 6, 7, 11, 12, 13, 16, and 19 were taken in large numbers in the light traps. None of the traps were located under or in trees or under structures from which the beetles might have fallen by accident into the traps. Consequently, the conclusion must be drawn that most of the specimens taken were attracted to the traps by the light.

It should be stated that the number of specimens of a particular species of Elateridae that are taken in a light trap may depend upon many factors, only two of which will be mentioned. One of the most important factors is the effect of the ecological environment upon the abundance of the Elaterid. As an example of this *Hemicrepidius memnonius* (Hbst.) may be mentioned. In one of the traps located in a low area that was poorly drained and adjacent to a pond, it was not uncommon to take fifty to seventy-five specimens of this species every warm, rainless, calm night during the month of July.

Another important factor which may determine the number of specimens of a particular species of Elaterid that may be taken in a light trap is the time of year when the traps are run. We have taken specimens of Elateridae in traps from May through September, but in general, June, July, and August were the most favorable months, with July being the peak month.

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**An Acknowledgment**

Entomological News wishes to express its thanks and appreciation to the Academy of Natural Sciences of Philadelphia for contributing a portion of the time of its Librarian, Mrs. Phillips, for compiling its "Current Entomological Literature." This generous action by the Academy assures the continuance of a unique and valuable feature of the News, one upon which many of its readers have come to depend for keeping abreast of current developments in entomology.
Earwigs at Light

The infrequency of observations and scarcity of records on the 15 or so species of Dermaptera in the United States have suggested that these insects are not attracted by light. Although a few collectors have taken earwigs at light,* as evidenced by collection labels and literature notes, I submit the following cases where earwigs have definitely been attracted to light or were scavenging under lights.

*Doru lineare* (Escholtz) has been most commonly recorded at light. Both sexes of this earwig regularly flew in to 3 Coleman lanterns set up before a sheet in many localities in Arizona and Texas, from May through September, 1948. During the same season in Mexico, from the state of Nuevo Leon south to Vera Cruz, Puebla, and Guerrero, they often came to the lights by the hundreds.

*Spongovostor apiccedentatus* (Caudell). Both sexes were taken at lights in Sabino Canyon, Santa Catalina Mts., Arizona, July, 1948.

*Labia minor* (L). In Lexington, Mass., June, 1952, one female was caught in erratic, spiraling flight around an indoor light, similar to that shown by many moths and beetles.

*Labidura riparia* (Pallas). One female was observed running about, probably scavenging, on a broad, well-lighted expanse of concrete in Dayton, Texas, September, 1949.

*Forficula auricularia* (L). Dr. K. A. Christiansen took several nymphs and one female in a light trap at Palouse, Washington, June, 1950.

The last two records are probably cases of scavenging at light, although the others indicate that certain species of earwigs are definitely attracted by light. Since many winged males of such photophobic insects as roaches are well known to be attracted to light, it does not seem surprising that earwigs might also be so attracted.

—W. L. Nutting, Biological Laboratories, Harvard University.

Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian

Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1952 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

Notes: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*) if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol ($) . Papers published in Entomological News are not listed.


ENTOMOLOGICAL NEWS 15


Chorabik, S.—(See Anatomy.)


Lepesme, P.—(See General.)

MacSwain, J. W.—A synopsis of the genus Gnathium, with de-

List of Titles of Publications Referred to by Numbers in Entomological Literature in Entomological News.

10. American Journal of Tropical Medicine & Hygiene. Baltimore, Md.
34. Bonner Zoologische Beiträge. Bonn, Germany.
43. Canadian Entomologist. Ottawa, Ont.
44. Canadian Journal of Zoology. Ottawa, Canada.
48. Dusenia. Curitiba, Parana, Brazil.
49. Ecological Monographs. Durham, N. C.
52. Entomological Society of America, Annals. Columbus, Ohio.
61. Eos; Revista Española de Entomologia. Madrid.
63. Faune de l'Union Française (Formerly Faune de l'Empire Français).
64. Florida Entomologist. Gainesville.
72. Institut Scientifique de Madagascar, Mémoires, Ser. E. Tananarive.
83. Kansas University, Science Bulletins. Lawrence.
85. Lepidopterists' News. New Haven, Conn.
88. Mexico Univ. Instituto de Biologia, Anales. Mexico City.
90. Microentomology. Stanford University, California.
91. Mocambique; Documentario Trimestral. Lourenço Marques.
93. Musei Zoologici Polonici, Annales. Warsaw, Poland.
94. Musei Zoologici Polonici. Fragmenta Faunistica. Warsaw, Poland.
95. Naples Univ. Instituto e Museo Zoologico, Annuario.
97. Natural History Miscellanea (Chicago Academy of Sciences).
103. Notulæ Entomologicae. Helsingfors, Finland.
111. Pan-Pacific Entomologist. San Francisco, Cal.
114. Polskie Pismo Entomologiczne. Wroclaw, Poland.
121. Rio de Janeiro. Instituto Oswaldo Cruz, Memorias.
123. Rivista di Parassitologia. Rome, Italy.
125. Royal Entomological Society of London, Proceedings, Ser. B.
126. Royal Entomological Society of London, Transactions.
129. Sao Paulo, Brazil. Instituto Biologico, Arquivos.
131. Smithsonian Miscellaneous Collections. Washington, D. C.
134. Sociedad Mexicana de Historia Natural, Revista. Mexico City.
139. Société Fouad I d'Entomologie, Bulletin. Cairo, Egypt.
146. Systematic Zoology. Washington, D. C.
149. Tijdschrift voor Entomologie. Amsterdam.
150. Tohoku University. Science Reports, Ser. 4. Tohoku, Japan.

Notice. The December 1952 issue of Entomological News was mailed at the Post Office at Lancaster, Pa., on December 15, 1952.
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.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Köenigsberg, Krs. Wetzlar 16, Germany.


Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.


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.

W. S. Blatchley Books for Sale
Rhyncophora of N. E. America, 1916, 682 pp., Paper ............... $4.00
Orthoptera of N. E. America, 1920, 784 pp., Paper ............... 5.00
Heteroptera of E. N. America, 1926, 1116 pp., Cloth ............... 10.00
Coleoptera of Indiana, when available ......................... 50.00
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The Society offers for sale the 14 numbers of this important and steadily growing series of longer monographic works, all numbers of which are still in stock.

1. Cresson (Ezra T.)—The Cresson Types of Hymenoptera (141 pp., 1916) .......................................................... $ 3.00
2. Hebard (Morgan)—The Blattidae of North America, North of the Mexican Boundary (284 pp., 10 pls., 1917) ................. 5.50
3. Munz (Philip A.)—A Venational Study of the Suborder Zygoptera (Odonata), with Keys for the Identification of Genera (78 pp., 20 pls., 1919) ................................................................. 2.00
4. Hebard (Morgan)—The Blattidae of Panama (148 pp., 60 pls., 1920) ................................................................. 3.00
5. Cresson (Ezra T.)—The Type of Hymenoptera in the Academy of Natural Sciences of Philadelphia other than those of Ezra T. Cresson (90 pp., 1928) ................................................................. 2.00
6. Rivnay (Ezekiel)—Revision of the Rhipiphoridae of North and Central America (Coleoptera) (68 pp., 4 pls., 1929) ............. 2.00
7. Leonard (Mortimer D.)—A Revision of the Dipterous Family Rhagionidae (Leptidae) in the United States and Canada (182 pp., 3 pls., 1930) ................................................................. 4.50
8. Rehn (James A. G. and Rehn, John W. H.)—The Eumastacinae of southern Mexico and Central America (84 pp., 6 pls., 1934) ................................................................. 2.50
9. Pate (V. S. L.)—The Generic Names of the Sphecoid Wasps and their type species (103 pp., 1937) ................................................................. 2.50
10. Huckett (H. C.)—A Revision of the North American species belonging to the genus Pegomyia (131 pp., 9 pls., 1941) ............ 3.00
11. Townes (Henry K., Jr.)—Catalogue and reclassification of The Nearctic Ichneumonidae (925 pp., 1944) ................................................................. 15.00
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THE AMERICAN ENTOMOLOGICAL SOCIETY
1900 RACE STREET, PHILADELPHIA 3, PA.
ENTOMOLOGICAL NEWS
FEBRUARY 1953
Vol. LXIV No. 2

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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.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act
of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in para-
graphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
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, $5.50; Canada, $5.15—U. S. Currency.

SUBSCRIPTIONS, ADVERTISEMENTS: All communications and remittances to be addressed to 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.

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The Wasps of Penikese Island, Buzzards Bay, Massachusetts (Hymenoptera)

By Kenneth W. Cooper, University of Rochester,
Rochester, N. Y.

Penikese Island is a roughly L-shaped, tiny remnant of the Falmouth (or Buzzard Bay) terminal moraine, woodless and windswept, lying in the waters of Buzzards Bay approximately one mile north of Cuttyhunk. Thus it is nearly at the end of the Elizabeth chain of islands that extends west southwest from Woods Hole, Massachusetts, and that separates the waters of Buzzards Bay from Vineyard Sound. The larger limb of Penikese runs due south and is no more than five-eighths of a mile in length and but a quarter of a mile in greatest width. The smaller limb, known as Tub Point, is joined to the main island by a barrier beach, runs to the southeast somewhat less than three-eighths of a mile, and is not quite a quarter of a mile wide at its greatest breadth. The island is low in profile, rising at no point more than 85 feet above sea level. Perhaps 80 acres of land lie above the limits of high tide, and fully half of Penikese’s acreage lies between sea level and the 20-foot contour line. More or less temporary fresh-water ponds, as well as brackish ponds, stand in certain hollows of the island, and nearly two acres of marsh occupy the northeastern margin of the main body of Penikese (map in Lewis, 1924). The closest reach of the mainland of Massachusetts is Mishoom Point, south of New Bedford, approximately 4.4 miles NNW of Penikese. Further details of Penikese may be found in the accounts by Jordan (1874), Hollick (1901), Lewis (1924), Coker (1926), Fogg
Hollick has summed up the island's attributes, declaring Penikese to be "... about as barren and unattractive a pile of gravel and bowlders as can well be imagined."

It was on Penikese, in 1873, that Louis Agassiz founded the first seaside laboratory in North America, the Anderson School of Natural History, and interest in the island and its fauna and flora stems partly from its biologically notable past. When Agassiz brought his students there, Penikese was treeless, virtually shrubless, and covered with little more than common types of flowering plants and grassy pasturage for the sheep grazed there (Jordan, 1874), although when first known, at the start of the 17th Century, it appears to have been covered with woods in which a cedar predominated (v. Fogg, 1930).

Since Agassiz' time the island has been employed as a turkey farm (in the early 1890s at least; see Morse, 1894), as a sheep pasturage until 1910, and from 1905–1921 a leper colony was maintained on Penikese. Not unexpectedly a sizeable floral change came about in this period, man probably being the primary agent of dissemination. Shaw (in Lewis, 1924) and, especially, Fogg (1930) give valuable and detailed accounts of the flora of Penikese, and discuss in considerable detail the extent and nature of the floral changes that have occurred there. Today the island has a few introduced poplars and other trees, and a fair number of shrubs are established, including staghorn sumach, scrub willows, and common elder, which provide potential nesting sites for twig-dwelling wasps. As a whole the flora is still overwhelmingly an herbaceous one, and along with the large colony of common and roseate terns that nest at the north end of Penikese, common plants such as Agrostis alba, Agropyron repens, Anthoxanthum odoratum, Holcus lanatus, Plantago, Cakile, Capsella, Rumex, Nepeta and Achillea are today fully as typical floral elements of Penikese as they were in Agassiz' time, nearly 80 years ago. Daucus carota, at the flowers of which so many wasps were captured in 1947, is a newcomer to Penikese since Agassiz' day.
On August 7, 1923, biologists from Woods Hole celebrated the fiftieth anniversary of the founding of Agassiz' laboratory by undertaking a one-day biological survey of Penikese, the results of which have been brought together in interesting catalogs of the flora (Lewis, 1924) and fauna (Coker, 1926). Again, on August 3, 1947, a similar party of biologists commemorated (somewhat prematurely) the 75th anniversary by another collecting trip on Penikese. The day was sunny and hot but, unhappily for the hymenopterist, a stiff, unrelenting breeze made the survey of flying insects difficult, except in protected hollows and lees. Collecting began at approximately 11:30 AM and was over by 3:30 PM. The wasps listed below were collected by Drs. C. Nelson, H. Knudsen, J. A. Moore, P. W. Whiting and myself, and remained in my possession for identification; most specimens are now on deposit in the U. S. National Museum. The nomenclature in the following list is that of Muesebeck, Krombein and Townes (1951) for all but the ants; for the latter I have followed Creighton (1950). In each instance bracketed initials identify the collector.

**Chrysididae**

*Chrysis (Chrysogona) perpulchra* Cresson.—1 ♂ (PWW). I have also taken this chrysid at Woods Hole in July; the normal host is said to be *Sceliphron*, a common wasp of Penikese.

*Chrysis (Tetrachrysis) coerulans* Fabr.—1 ♂, at flowers of *Daucus carota* (KWC); also common at Woods Hole from June through mid-September.

**Tiphiidae**

*Tipha intermedia* Mall.—1 ♀, 4 ♂♂ at *Daucus* (CN; KWC). Fairly common at Woods Hole, Barnstable and Acoaxet during August; identifications by kindness of K. V. Krombein.

*Myzinum 5-cinctum* (Fabr.).—4 ♀♀, 3 ♂♂ at flowers of *Achillea millefolium* (JAM; KWC); very common at Woods Hole from July through August.
Mutillidae

Dasymutilla gibbosa (Say).—1 ♀, 2 ♂♂ on beach near Typha Pond (KWC); also taken at Woods Hole in early September.

D. lepeletieri (Fox).—1 ♂, flying over beach in lee of embankment (KWC); frequent at Woods Hole during August.

Formicidae

Myrmica americana Weber.—(KWC); also recorded from Woods Hole by Sturtevant (1931).

M. emeryana Forel.—Recorded from Penikese by W. M. Wheeler; see Coker, 1926.

Pheidole pilifera (Roger).—(KWC); Wheeler (1906) records this ant from Naushon Island of the Elizabeth chain.

Crematogaster lineolata (Say).—(KWC); both Wheeler (1906) and Sturtevant (1931) record this ant from Woods Hole, where I too have taken it commonly.

Lasius (Lasius) alienus americanus Emery.—Recorded from Penikese by W. M. Wheeler, see Coker (1926); Wheeler (1906) and Sturtevant (1931) record this ant from Woods Hole, where I also have taken it.

Lasius (L.) niger neoniger Emery.—(KWC); recorded by Sturtevant (1931) from Woods Hole, where I too have taken it.

Lasius (Chthonolasius) brevicornis Emery.—(KWC); recorded from Penikese by W. M. Wheeler in Coker (1926), and from Woods Hole by Wheeler (1906), Sturtevant (1931), and myself.

Vespidae

Rygchium hidalgo boreo-orientalis (Bequaert).—1 ♀, 1 ♂ from flowers of Achillea and Daucus (CN; KWC). I have taken this wasp at Woods Hole (Cooper, 1950) and on Noneset Island of the Elizabeth chain from July through mid-September.

Stenodynerus (Stenodynerus) anormis (Say).—4 ♂♂, 1 ♀ at flowers of Daucus and Nepeta cataria (HK; KWC); also taken at Woods Hole in August.

Stenodynerus (St.) clypeolatus (Dalla Torre).—2 ♂♂ at flowers of Daucus (HK; KWC); also taken at Woods Hole in June.
Stenodynerus (Parancistrocerus) pennsylvanicus (Saussure).—1♂, (CN); rather common at Woods Hole and on Nonamesset Island from July through mid-September.

Pompilidae

Episyron biguttatus (Fabr.).—1♀, 2♂♂ at flowers of Daucus (KWC); common at Woods Hole and on Nonamesset Island from July through August.

E. quinquenotatus (Say).—1♂ at flowers of Daucus (CN; KWC); occurs at Woods Hole from June through August, and I have also taken this species at Acoaxet in August.

Anoplius (Anoplius) ithaca (Banks).—1♀ (JAM); identification of this wholly unexpected wasp was very kindly verified by H. E. Evans.

Anoplius (Arachnophroctonus) marginalis (Banks).—2♀♀, 1♂ at flowers of Daucus, as well as one female hunting at grassy margin of beach (KWC); very common at Woods Hole in July and August.

Anoplius (Ar.) relativus (Fox).—2♂♂, at flowers of Achillea and Daucus (KWC); also taken at Woods Hole in August.

Anoplius (Pompilinus) marginatus (Say).—2♀♀, 2♂♂ at flowers of Daucus (KWC); very common at Woods Hole and on Nonamesset and Naushon of the Elizabeth chain from July through mid-September.

Anoplius (Lophopompilus) atrox (Dahlbom).—1♀, 1♂ at flowers of Daucus (KWC); also taken at Woods Hole and on Nonamesset Island in August and early September.

Sphecidae

(Larrinac)

Lyroda subita (Say).—6♀♀, 3♂♂ on sandy patch of grassy beach at northeastern end of the main body of Penikese (CN; KWC). One female wasp was captured while dragging a paralyzed juvenile female Nemobius fasciatus through a patch of exposed grassroots. Also common on Nonamesset Island in August.

Tachysphex tarsatus (Say).—1♀ (KWC); also taken at Woods Hole, Nonamesset Island, and Barnstable dunes in July and August.

Tachysphex terminatus (Smith).—2♀♀, 3♂♂ (including 1 mated pair) in company with Lyroda (KWC); common at Woods Hole and on Nonamesset Island (also in the company of Lyroda) in August.
**Sphex (Priononyx) pubidorsus** (Costa).—1 ♀, hunting among grassroots in protected hollow (KWC); I have also taken this wasp at Barnstable in August.

**Sphex (Sphex) ichneumoneus** (Linn.).—1 ♀, 2 ♂♂ at *Daucus* and *Nepeta* (CN; KWC); common everywhere on the Cape in my experience.

**Podalonia violaceipennis** (Lepel.).—1 ♀, 2 ♂♂ (CN; HK); frequent at Woods Hole July through mid-September.

**Ammophila kennedyi** (Murray).—1 ♂ at flowers of *Achillea* (KWC).

**Ammophila placida** Smith.—1 ♀ (CN); common at Woods Hole and Nonamessett Island from mid-June through mid-September.

**Sceliphron caementarium** (Drury).—1 ♀, 2 ♂♂ at *Daucus* flowers, and nesting on old buildings and ruins (CN; KWC); abundant at Woods Hole from June through mid-September.

**Epibembix spinolae** (Lepel.).—4 ♀♀, 4 ♂♂, common on all sandy patches, and at *Daucus* and *Nepeta* (CN; HK; KWC); common at Woods Hole, Nonamessett Island, Barnstable, Provincetown, and Acoaxet from July to September.

**Philanthus gibbosus** (Fabr.).—3 ♀♀ at *Daucus* flowers (KWC); common at Woods Hole through the summer.

**Lestica (Solenius) interrupta** (Lepel. et Brullé).—1 ♂ at flowers of *Daucus* (KWC); frequent at Woods Hole in July and August.

**Oxybelus emarginatus** Say.—1 ♀ (KWC); also collected at Provincetown, Barnstable, and Nonamessett Island in August, as well as at Woods Hole in July and August.

**O. quadrinotatus** Say.—1 ♀ (KWC); also occurs at Woods Hole in August.

It is difficult to guess how complete this list may be for August’s wasps on Penikese. Certainly it is a complete record for every species seen by me on the island, for none was seen that was not captured. But the wind was so strong and per-
sistent that only larger wasps, or those small ones whose niches included protected hollows, were on the wing. Although the inhabitants of a small island such as Penikese are always of special interest, a glance over the list of those wasps found produces few surprises, lest it be that so many forms were found in an environment that seems so unpromising. All of the species are known from immediately adjoining localities and states, and the fauna is largely Transitional.

The one genuinely surprising record is that of *Anoplius ithaca* which, on the basis of a very extensive collecting experience and study, had seemed to Evans (1948, 1951) to be a wasp of local occurrence, confined to the very special habitat of rocky stream beds (as, for example, along the Westfield River in Hampshire Co., Mass.). Now Penikese lacks streams and running waterways but, owing to its morainal origin and the persistent harshness of wave and wind action, possesses extensive rocky tracts, especially along its western margins. Perhaps, then, stretches of exposed boulders, scattered rocks and gravels provide *ithaca*’s special environmental needs. If this be the case, then streamside habitats would be the most frequent mainland but inland localities of the sort *Anoplius ithaca* requires, for only along waterways would rocky beds and stretches commonly be found that remain uncovered by soil and organic debris. Along the coast, *A. ithaca* may be expected to frequent some boulder strewn, stony beaches.

**Literature Cited**


Collection and Laboratory Maintenance of Dytiscidae (Coleop.)

By Edward S. Hodgson, Department of Zoology, Barnard College, Columbia University

Certain species of Dytiscidae, notably *Laccophilus maculosus* Germ., have recently proven to be excellent experimental animals for studies on the physiology of chemoreception (Hodgson, 1951; Physiol. Zool. 24: 131-40). The smaller forms such as *Laccophilus* and *Coptotomus* can usually be collected in large numbers from grassy banks of permanent ponds as are usually found at fish hatcheries. They are easy to transport alive in water or in containers half filled with wet grass.
When the beetles are being used in the laboratory, it is often desirable to keep large stocks on hand, and due to the cannibalistic habits of the beetles, this poses a considerable problem. The following method has been used with success in our laboratory for two years. Aquaria are filled with tap water and bricks placed on the bottoms of the aquaria; the bricks are stood on edge. The water is kept in motion by bubbling air from a compressed air line or aquarium aeration pump through the water. When the beetles are introduced into the aquarium, they cling to the bricks and move about very little. This is an important factor in reducing the mortality rate in stocks over periods of several weeks, since much of the mortality results from chance encounters of swimming beetles. An aquarium holding 40 gallons of water will accommodate about 1000 beetles in this fashion without overcrowding—smaller aquaria holding proportionately less. With such an arrangement, only about 10% of the beetles will fall victim to cannibalism each month. Care must be taken to make sure that the water is not moving so rapidly that the beetles cannot reach the surface periodically to replenish their air supplies. In our cultures, wooden floats were provided, which permitted the beetles to dry themselves at intervals during feeding. Wire screening must be used over the aquaria to prevent the escape of flying beetles.

Meat scraps and fish food ("Tropicala No. 2") were fed daily, and the aeration stopped only for a feeding period of one hour. The formation of a surface film is prevented by the aeration and resulting currents of water, and any excess food accumulating on the bottom of the aquarium seems to do no particular harm.

The beetles have frequently been observed mating but no larvae have been seen in the cultures; possibly any larvae which appeared were eaten by the adults. Because of the abundance of the adults, no attempt has been made to find special methods of rearing the beetles through a complete life cycle.
Two New Species of Milichiidae, with Miscellaneous Notes on the Family (Diptera)

By Curtis W. Sabrosky, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, U. S. Department of Agriculture

In a recent study of the dipterous family Milichiidae, two new species have been recognized and some miscellaneous notes accumulated. Revisionary work is being continued on two large genera, Desmometopa and Milichiella, but the notes presented here are not relevant to that study.

Eusiphona flava, new species

Like the genotype, Eusiphona mira Coq., in habitus and structural characters, but predominantly yellow.

Female.—Yellow to orange-yellow, only the arista, front, upper half or more of occiput, mesonotum except laterally, basal portion of disk of scutellum, and metanotum black in ground color: front densely pollinose and appearing golden yellow from certain aspects; mesonotum dull, yellowish-gray pollinose with a suggestion of three brown stripes, when viewed from behind: lateral yellow areas of mesonotum include the humeri and notopleural and supra-alar areas.

Head in profile as in mira (cf. Curran, 1934, "The Families and Genera of North American Diptera," p. 335, fig. 12), but the proboscis proportionately longer, each section 1.5 times the height of the head; wing approximately as figured by Curran (I.e., fig. 5), but the first posterior cell only slightly broadened opposite the hind crossvein, the anterior crossvein directly behind the junction of first vein with costa, and thus the penultimate section of fourth vein nearly ⅓ the length of that of the third vein.

Length, 3 mm.

Holotype, Kanab, Utah, Aug., 17, 1950 (G. F. Knowlton). Type No. 61616 in the U. S. National Museum, deposited through the courtesy of the collector.
No other species of the genus has been described since Coquillett (1897) erected it for a single species, *mirae*, then presumed to belong to the Larvaevidae (Tachinidae). The genotype is an entirely black fly and thus strikingly contrasted with the new species.

**Stomosis** Melander

Type, *Desmometopa lutcola* Coquillett (Monobasic.)  

The description and the figures of head and wing of *Siphonomyiella*, described from Rio de Janeiro, Brazil, agree completely with the North American *Stomosis*. I have seen no Brasilian material of the genus, and cannot comment on the status of *Stomosis rufula* (Frey) [new combination]. The genotype, *lutcola* (Coq.), was described from Williams, Arizona, has been recorded from Texas (Melander, 1913), and is known to me from Lafayette, Indiana, Falls Church and Alexandria, Virginia, and East Lansing, Michigan. At Falls Church, Virginia, April 15, 1951, it was reared from debris in the crotch of a tree (W. W. Wirth). In the U. S. National Museum there is a long series from Higuito, San Mateo, Costa Rica (Pablo Schild), which was apparently correctly determined by J. M. Aldrich as *lutcola*.

**Hemeromyia washingtona** (Mel.)

*Hemeromyia washingtona* (Melander) Melander, 1913 (Oct.),  
Psyché 20: 169.  
(Melander’s statement that "*Hemeromyia nitens* Malloch" is a synonym of *washingtona* was based on the type of *nitens*, but the latter had not yet been published and the name must therefore be credited to Melander. When Malloch’s paper did appear, the name was given as *nitida*.)  
As far as I am aware, only two specimens of this species have been reported, the types of *washingtonana* and *nitida*. A new record of this rare species suggests that its obscure habitat is the reason why it has not been found more often. Four specimens were reared by H. B. Morlan on April 19, 1952, at Santa Fe, N. Mex., from pupae collected on March 27, 1952, in a nest of *Peromyscus truci*.

**Neophyllomyza anuda** (Curran), new combination


Hennig (1939, Arb. über Morph. u. Taxonom. Ent. Berlin-Dahlem 6: 88) suggested that *anuda* was probably a subspecies of *Desmometopoa palpalis* Meijere, but I find from a paratype kindly loaned me by Dr. Curran that the species is a *Neophyllomyza*. As now recognized, the latter is characterized by having two divaricate upper orbital bristles, and the third and fourth costal sectors equal in length. I may point out also that in the species known to me, the crossveins are approximated compared with the related genus *Phyllomyza*.

Several specimens of *anuda* are before me from Guadalcanal Island, 1944 and Jan. 28–Feb. 2, 1945 (C. O. Berg). A number of species of *Neophyllomyza* are known from Java and Formosa, but I have no material available for comparison to determine further the status or relationships of *anuda*.

**COSTALIMA** new genus

Near *Microsimus* Aldrich, and somewhat more distantly related to *Phyllomyza* and *Neophyllomyza*, but with two pairs of divergent upper orbitals, three pairs of strong and widely-spaced dorsocentral bristles, no prescutellar acrostichals, and a pair of strong proclinate bristles on the lunule.

Head broad and short; occiput strongly concave, viewed from above; front broad, over half the width of the head, with broad shining parafrontals and a shining frontal triangle that reaches to the lunule; eyes sparsely short haired; face concave; palpi slender, not unusually enlarged and only slightly projecting be-
yond the oral margin, approximately the same in both sexes, sparsely and finely bristled; proboscis short, fleshy, inconspicuous; antennae porrect, second and third segments subequal in length, third broader than long, subquadrate; arista pubescent; two pairs of well-separated laterocline upper orbitals and two pairs, one strong and one short slender, of convergent lower orbitals; lunule with a pair of strong, widely separated bristles that are convergent at tips; the procline and divergent ocellars, cruciate postvertexals and divergent outer and convergent inner vertical bristles all well developed.

Thoracic chaetotaxy: Three equally strong and widely spaced dorsocentral bristles, the anterior one opposite the end of the mesonotal suture; no prescutellar acrostichals; 1 long humeral, 1 presutural, 1 + 1 notopleural (weak), 1 supra-alar (in the prealar position), 1 intra-alar, 2 postalar (the posterior much weaker than the anterior), 2 scutellar. 1 propleural and 1 stigmal (both pale and weak, and almost hairlike), 1 sternopleural; mesopleuron bare: scutellum bare outside the bristles; mesonotal hairs sparse.

Wing similar to Microsimus and Phyllomyza, costa extending to fourth vein, and the second vein long and curving throughout its length, the third costal sector notably shorter than the fourth: crossveins well out on the disk of the wing, beyond the apex of first vein, the fore crossvein at approximately the outer two-thirds of the discal cell, and separated from the hind crossvein by approximately the length of the latter: discal cell broad distally, the hind crossvein well over twice the length of the fore crossvein.

Type of genus: Costalima myrmicola, new species.

The genus is dedicated to the distinguished Brasilian entomologist, Dr. A. M. da Costa Lima.

Costalima myrmicola new species

♂, ♀—Reddish yellow to brown, the intensity of color possibly depending on the maturity of the specimens; in the darkest individual, the arista black, frontal triangle, occiput and small spot at base of arista brown, mesonotum, scutellum and abdomen
dark brown, and the rest of body and legs yellow; in paler specimens the head and dorsum of thorax reddish yellow.

Head broad, its length only one-third the breadth and only slightly less than its height; width of cheek nearly three-tenths the height of an eye and half the breadth of the third antennal segment. Thoracic bristles long, strong and conspicuous except for the notopleural, supra-alar, intra-alar and posterior postalar; apical scutellar bristles long, over twice the length of the basal scutellars. Fifth abdominal segment with long and strong marginal bristles, those on the other segments ordinary.

Length, 1.5–2 mm.

Holotype female, allotype, and three paratypes (♂, 2 ♀♀), Viçosa, Minas Gerais, Brasil, June 10, 1944, in nest of Azteca ant in Cecropia tree trunk (H. L. Parker, No. 953.20). Type No. 61617 in the U. S. National Museum.

A single female from Barro Colorado Island, Panama Canal Zone, January 1947 (N. L. H. Krauss), is similar to the above, but I am not sure whether it is myrmicola or represents a new but very closely related species.

Polyvinyl Alcohol with Lacto-phenol, a Mounting and Clearing Medium for Chigger Mites 1, 2

By Louis J. Lipovský

Polyvinyl alcohol with lacto-phenol has been used as a mounting medium for chiggers at the University of Kansas since 1947. Early preparations were made without specific attention given to the heat or the amount of heat applied to clear the medium, or to the age of the medium; however, the proportions were generally as given by Wilbur G. Downs, 1943 (Science 97 (2528): 539–540). These mixtures were unpredictable. Of approximately 15,000 chiggers mounted, hundreds have required re-
mounting for several reasons: the medium retreated from the
specimen, sometimes forming maze-like air spaces around it;
not infrequently, the refractive index became unsatisfactory; fol-
lowing prolonged drying, the medium contracted sufficiently to
fracture the cover glass over the specimen by drawing it too
close to the slide. These were the most serious difficulties ex-
perienced other than some crystallization of the phenol, which
can be serious when the specimen is extensively involved.
These inconsistencies have been eliminated by following a
standardized procedure in the preparation of the medium.

The polyvinyl alcohol (PVA) used (Grade RH-349, E. I. du
Pont de Nemours Company) is a fine white powder. It is wet-
table in cold water but will not wet or disperse in warm or hot
water. The ingredients and proportions are those given by
Downs: 22 c.c. of 85 per cent lactic acid (analytical agent),
22 c.c. of pure phenol, and 56 c.c. of water saturated with PVA
powder. The PVA is sifted slowly through a fine mesh screen
onto the surface of the water to insure an even and gradual dis-
ersion; the screening also removes undesirable foreign mat-
er as well as the larger granules of PVA, thus eliminating the
problem of filtering. The amount of PVA added to the water
is limited to the total amount wetted with stirring, and until the
mixture becomes a thick, crumbly, milky paste. It is not nec-
essary to clear this mixture in a hot water bath.

The phenol, generally crystalline, is heated slightly until
liquified; the lactic acid (which prevents the recrystallization
of the phenol) is added to the phenol and mixed. This mixture of
acids is then added to the PVA paste and stirred. This com-
bination should not be heated to clear; clearing will take place
gradually. Soon after the acids are added, the PVA lacto-
phenol mixture becomes extremely viscous and mucoid; how-
ever, as it continues to clear, the viscosity of the mixture de-
creases and it liquifies within a few hours to the consistency of
a light syrup. This final mixture is stored in dark bottles or
jars to prevent discoloration and other undesirable changes re-
sulting from prolonged exposure to light. The mixture is now
ready for use and should be dispensed only in small quantities
as needed for several week periods. When exposed to light for
a number of months, it becomes brown in color, appears to
thicken without apparent evaporation, and becomes unsatisfactory for mounting chiggers.

It is known that some workers who have used PVA in some form or another have commented upon the erratic results often obtained, and for this reason have discontinued its use in slide preparations. Total acids in excess of 50 per cent by volume will result in a medium which may remain tacky and unhardened. With less than the recommended amount of acids the medium may not clear sufficiently to produce satisfactory mounts either in refractive qualities or in the embedding qualities, although the medium becomes appreciably harder upon drying. Furthermore, slides prepared with medium deficient in acids require an excessive number of hours to soak the cover glasses free for remounting; in addition, strands of undissolved medium on the specimens cannot be removed readily, and when remounted the medium does not appear to be as refractive around the edges of the specimens. This condition is especially noticeable when examined under the phase-contrast microscope. The fracturing of cover glasses over the embedded specimens is the result of an inadequate amount of PVA in the mixture.

Better preparations are obtained from specimens which have been preserved for at least a week in 70 to 80 per cent alcohol than from fresh material; however, fresh specimens can be mounted when quick determinations are needed. The mounting of fresh specimens usually results in poor definition.

The following procedure for mounting chiggers and other micro-invertebrates has proved very satisfactory. Chiggers are removed individually from alcohol and centered on a clean slide. A fine tipped medicine dropper may be used for this operation and the excess fluid may be blotted off the slide. The mounting medium is then placed on the centered specimen followed by the placement of the cover glass. The slide is then heated to remove all bubbles which may be present or which may form upon heating. A temperature controlled hot plate is best suited for this purpose. After the bubbles are removed, gentle heating is continued on a slide warmer. After approximately 24 hours, the specimen should be sufficiently cleared and the cover glass will be set for immersion oil use. Exposure to heat seems necessary for good quality slide preparations.
A Bibliographic Note on Three Species of Ephemeroptera Described by Say

The place of publication of the original description of three species of mayflies described by Thomas Say apparently has been consistently mis-cited for more than 80 years. The species involved are Siphlonurus alternatus, Hexagenia bilineata, and Ephoron album. They were described by Say in the Appendix to Volume II of Keating’s Narrative of an Expedition to the Source of St. Peters River, Lake Winnipeck, Lake of the Woods &c., &c. by order of The Hon. J. C. Calhoun, Secretary of War, under the command of Stephen H. Long Major U. S. T. E. (Cary and Lea, Philadelphia, 1824), pp. 303–305 (Reprinted by LeConte, 1859, in: The complete writings of Thomas Say, Vol. 1, pp. 203–205). An account of the swarming of Ephoron album appears on pp. 114–115 of the same volume. Correct citations were given by Hagen (1861) in his Synopsis of the Neuroptera of North America, but apparently starting with Eaton (Trans. Ent. Soc. London, 1871: 8) the citation is given as Volume 2 of the Western Quarterly Reporter, and dated variously as 1823 or 1824. Eaton (loc. cit.) indicates that he did not see the original of Say’s work and apparently has made an error in reading the LeConte reprint. The error has been faithfully repeated by numerous writers since that time.

—George F. Edmunds, Jr., University of Utah.

Pseudocneorrhinus bifasciatus Roelofs Extending Its Range in New Jersey (Col. Curculionidae)

This weevil which is the P. setosus of American authors, according to the Blackwelders’ “Fifth Supplement to the Leng Catalogue of Coleoptera of America, North of Mexico” (1948), is extending its range in New Jersey. It is listed in the Leng & Mutchler “Catalogue of the Coleoptera of America, North of Mexico” (1927), from Connecticut and Japan. Introduced from Japan, it was reported from Connecticut in 1923. It was first noted in New Jersey at South Orange during September,
1947, the adults having been taken while feeding on the leaves of privet, mimosa, Japanese barberry, rhododendron and a few other ornamental plants. Shortly afterward it was collected at West Orange, Maplewood, Orange and Newark, all in New Jersey. It has also been reported from New York City.

During September, 1952, Mr. Robert J. Sim collected the species at Morrestown, N. J., where it was doing considerable damage to the foliage of azaleas and other shrubs. In spite of its injury to foliage, it does not appear at present to be an insect of prime economic importance. During the thirty years since it was reported from Connecticut, the species has no doubt invaded a larger area of New Jersey than is indicated by the localities mentioned.—Harry B. Weiss.

The Lone Star Tick in Staten Island, New York (Acarina: Ixodidae)

By John W. H. Rehn, First Army Area Medical Laboratory, New York 7, N. Y.

The Lone Star Tick, *Amblyomma americanum* (Linnaeus) is usually considered to breed as far north as southern New Jersey and Pennsylvania. The only records of this species north of this area are either very old, 1740–1830, or clearly represent accidental importations.¹

In May, 1952, a partially engorged female *Amblyomma americanum* was removed from a child at Fort Wadsworth, Staten Island, and sent to this laboratory for identification. The child had not been off this island for several months and left the military installation only to go to school. Therefore, the tick was undoubtedly picked up on this island. Investigation failed to recover additional examples. However, it seems probable that individuals have been introduced from the south and the species may now be established on Staten Island.

Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian
Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Neartic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1952 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.


Corbet, P. S.—(See Smaller orders.)


Klots, A. B.—Marguerite S. Forsyth. [85] 6: 76-77. (Obit.) Knowlton,


ANATOMY, PHYSIOLOGY, MEDICAL

Applegarth, A. G.—(See Arachnida.)

Audy, J. R.—(See Arachnida.)


Bartlett, B. R. and J. C. Ortega.—(See General.)

Beall, G.—(See Lepidoptera.)


Brian, A. D.—(See Hymenoptera.)

Bruneau de Miré, P.—(See Orthoptera.)

Campbell, W. V. and R. E. Hutchins.—(See General.)

Clark, A. M. and C. J. Mitchell.—Effects of x-rays upon haploid and diploid embryos of Habrobracon.
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Grindley, D. N.—The composition of the body fat of small green chironomids.

Haas, A.—Die Mandibledrüse als Duftorgan bei einigen Hymenopteren.


Howe, R. W.—Miscellaneous experiments with grain weevils. [Resistance of adults to starvation.]


Hughes, G. M.—Differential effects of direct current on insect ganglia.

Illies, J.—(See Smaller orders.) Jekot, C. B.—Lethal mutations produced in Drosophila melanogaster by the auxin, gamma-indole-3-n-butyric acid.

Jones, G. D. G.—The responses of the honey bee to repellent chemicals.

Kéler, S. v.—Ueber die Wachstums-Progression bei Pseudomenopon rowanae Keler. (Mallophaga).

Lippert, W. und K. Gentil.—Elektronenmikroskopische Studien über micellare Strukturen bei Schmetterlingschuppen vom Morpho-Typ.

Lloyd, D. C.—(See Hemiptera.) Longanecker, D. S. and A. L. Burroughs.—Sylvatic plague studies. IX. Studies of the microclimate of the California ground squirrel burrow and its relation to seasonal changes in the flea population.


**LEPIDOPTERA**—Beall, G.—Migration of the monarch butterfly during the winter. [85] 6: 69–70. Beard, E.—(See General.) Belkin, J. N. and W. A. McDonald.—(See


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This is an outstanding book dealing with the natural history of the parasites of birds. It is written by an authority on bird fleas and an authority on the feather lice, but includes an account of all bird parasites: insects, mites, worms, microorganisms, and the skusas and cuckoos. The first part is a splendid general account of commensalism, symbiosis and parasitism, with many striking examples that whet the appetite for the chapters on the special groups. Amazingly, these special chapters are even more fascinating, and the many strange and often incredible facts on every page leave the reader with never a dull moment. Not only are the facts themselves intrinsically exciting but the crisp presentation, figures of speech, and excellent literary style are such as to provide pleasurable reading. Ornithologists will be amazed and captivated, along with entomologists and parasitologists and zoologists generally, for the book will be most enjoyed by those with some background in natural history. There is a good index of popular and scientific names.—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.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Koenigsberg, Krs. Wetzlar 16, Germany.


Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.


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.

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13. — Braun (Annette F.) — Elachistidae of North America (Microlepidoptera) (110 pp., 26 pls., 1948) ........................................ 4.50

14. — Rehn (John W. H.) — Classification of the Blattaria as indicated by their Wings (134 pp., 13 pls., 1951) .............................. 5.00

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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.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in paragraph (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
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. SCHMIEDE, Editor. Editorial
Staff: E. J. F. MARX, V. S. L. PATE, M. E. PHILLIPS, and J. A. G. REHN.

Subscription price, per yearly volume of 10 numbers: Domestic, $5.00; Foreign,
$3.50; Canada, $5.15—U. S. Currency.

SUBSCRIPTIONS, ADVERTISEMENTS: All communications and remittances to be addressed to 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.

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Thomas Say's Home at New Harmony, Indiana

By Harry B. Weiss

Each of the first four numbers of Entomological News for 1895, contains a brief paper by Professor F. M. Webster dealing with the visit that he made to New Harmony during the winter of 1888, at which time he was a guest of "the late Col. and Mrs. Richard Owen" both of whom lived in New Harmony and knew Thomas Say during the nine years (1826-1834) that he lived there. During Webster's visit Col. Owen, who was close to ninety years old, and his wife showed him many places with which Thomas Say was associated. Webster's papers are illustrated by photographs and the one in the February, 1895 News shows "Say's Home at New Harmony," before he moved into the Maclure house where he died Oct. 10, 1834. In the March News, the Maclure house is illustrated and it is stated that at one time this property "seems to have been transferred to Mr. and Mrs. Say, probably by either Alexander or William Maclure, and later sold by the Says to David Dale Owen."

In "Thomas Say, Early American Naturalist" (1931), both of these photographs were reproduced together with an additional one entitled "Rappite House, Number 5, New Harmony, Indiana. Said to have been the home of Thomas Say in 1829-1830," that was supplied by Professor J. Speed Rogers and Dr. Charles P. Alexander who had obtained it during a visit to New Harmony.

A little over seven years after the appearance of "Thomas Say, Early American Naturalist" or on March 9, 1938, I received a letter from Miss M. E. Fauntleroy of New Harmony saying that she was shocked to find, in that book, a picture of
the old Schnee home labelled as a former home of Thomas Say. When the book had appeared in 1931 she had gone to Mrs. Nora C. Fretageot, librarian of the Workingman's Institute at New Harmony, and demanded an explanation for advising me that the old Schnee house had been occupied by Thomas Say. No explanation was forthcoming. As a matter of fact the photograph and caption were supplied to me by Professor J. Speed Rogers and not by Mrs. Fretageot.

In subsequent letters received from Miss M. E. Fauntleroy during March, 1938, at which time Miss Fauntleroy was eighty years of age and Mrs. Fretageot had died about a year previously, it is claimed that Mr. and Mrs. Say lived in the Old Fauntleroy Home. An aunt, of Miss Fauntleroy, who lived to be ninety-four often spoke of her association with the Says while they were living in No. 53, as it was known during the early times. A Dr. Murphy who came to New Harmony during the regime of the Rappites lived in the Old Fauntleroy Home for seven years during his old age and he too spoke to Miss Fauntleroy of the Says living in No. 53 and of their removal from No. 53 to Maclure's home, which burned in 1843. When George B. Lockwood's "The New Harmony Communities" appeared in 1902, it referred to the Old Fauntleroy Home as the home of Thomas Say. According to Miss Fauntleroy, Mr. and Mrs. Say lived in No. 53 soon if not directly after they were married and Cornelius Tiebout and his daughter Caroline lived with them. Later, they moved to No. 5 (the old home of George Rapp, built in 1815) that was burned in 1843.

From this it would appear that the following changes should be made in the illustrations in "Thomas Say, Early American Naturalist." The illustration facing page 40 which Miss Fauntleroy called the Schnee house and which was copied from Webster should be replaced by the illustration of the Old Fauntleroy Home, that accompanies these notes. The photograph facing page 146 of Rappite House No. 5 should be captioned as follows, "Rappite House No. 5, the old home of George Rapp and later of William Maclure. This was partly destroyed by fire in 1843 and then rebuilt with architectural changes. Thomas
Say died in this house.” The photograph facing page 158 should be captioned, “The Maclure residence in New Harmony after being rebuilt following a fire in 1843.”

A printed leaf sent to me by Miss Fauntleroy states that the Old Fauntleroy Home built by the Rappites in 1815 had been the dwelling place of Franz Phiel, a Rappite and his family. Following them it was the home of Thomas Say and his wife; Cornelius Tiebout, engraver, and his daughter Caroline Tiebout; Oliver Evans, Jr., an inventor and his wife; Louisa Neef, a Pestalozzian teacher; Robert Henry Fauntleroy, an officer of the Southern Coast and Geodetic Survey, and his wife; Jane Dale Owen, daughter of Robert Owen; Constance Owen Fauntleroy, founder of “The Minerva Society”; Prof. Geo. Davidson, a scientist, and his wife; Ellinor Fauntleroy; Dr. David Dale Owen, first U. S. Geologist, and his wife; Caroline Neef, a Pestalozzian teacher; Robert Dale Owen, statesman, author, diplomat, and his wife; Mary Jane Robinson; and Rachel Homer Fauntleroy.
In 1841 Robert Henry Fauntleroy purchased the property and remodeled it. After that it remained in the family and was known as the Old Fauntleroy Home. In 1938 it was owned by the Indiana Federation of Clubs and Miss M. E. Fauntleroy was its hostess.

It is difficult to believe that Col. and Mrs. Richard Owen, both of whom knew Say, could have misinformed Webster when he visited them in 1888. However over a period of 55 or 60 years memories may become dim. It is also not perfectly clear why Miss M. E. Fauntleroy waited seven years or until one year after the death of Mrs. Nora C. Fretageot to advise me of the error, unless it was because there was a long standing feud between these two women over the historical importance of the Old Fauntleroy Home and of Mme. Marie Louise Duclos Fretageot, who joined the New Harmony community and managed William Machre's affairs there during his absences. Miss Fauntleroy was not an admirer of Mme. Marie Duclos Fretageot and Mrs. Nora C. Fretageot was not impressed by Miss Fauntleroy's claims for the Old Fauntleroy Home.

My failure to correct the mistake, if mistake it is, until 15 years after the receipt of Miss Fauntleroy's letters may be easily explained. The correspondence was put away so carefully that it remained "lost" until recently when it was found.

The Trichodectid of the Hog-nosed Skunk, Conopatus leuconotus Lichtenstein (Mallophaga: Trichodectidae) ¹

By Edwin F. Cook, University of Minnesota

The following new species of Neotrichodectes was collected by Dr. James R. Beer of the University of Minnesota Museum of Natural History Expedition to Mexico in December 1951 from a single specimen of Conopatus leuconotus Lichtenstein.² This specimen was found to be very heavily infested with all

¹ Paper No. 2876, Scientific Journal Series, Minnesota Agricultural Experiment Station, St. Paul 1, Minnesota.
² Identified by Dr. James R. Beer, University of Minnesota.
stages of the mallophagan. Fresh material was collected in alcohol at the time of capture of the host, and additional specimens were removed from the skin after it was brought back to the University.

**Neotrichodectes spatulatus** n. sp.

This species closely resembles *N. chilensis* Werneck and *N. arizonae* Werneck, but the female differs in the structure of the gonopophyses and in the chaetotaxy of the pregenital sclerite, while the male differs in the wider sclerotization of the basal plate.

**Female:** (Figures 1 and 3D)

Total length 1.72 mm., width at the widest part of the abdomen .93 mm., rather short and stout. The length of the female paratypes varies from 1.50 to 1.75 mm. with an average length of 1.62 mm. Head wider than long; length .46 mm., width .62 mm., the anterior margin gently rounded with a broad shallow median notch leading into the hair groove; temples not salient and without notably large setae. The rather short antennae are set in small fossae, are three-segmented and beset with setae as in the illustration; segment one is the largest in diameter and segment three the longest. The eyes are small but obvious.

The thorax is short and wide but rather narrower than the head. The prothoracic tergum is divided medially into two lateral tergites each of which bears at its lateral margin a single stout seta and medially, on the posterior margin, a somewhat longer but more delicate seta. Medially, between the two prothoracic tergites and the posterior margin of the head there is a small fusiform sclerite which may be the true tergum. The thoracic spiracles are located immediately ventrad of the lateral margins of the tergites just posterior to the prothoracic legs. The tergum of the pterothorax is deeply emarginate posteriorly and expanded laterally into prominent wing-like lobes. These

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a The figures were drawn with the air of a microprojector, and the chaetotaxy is as nearly identical with that of the specimen figured as possible.
lobes bear three short, stout, marginal setae and a long, posteriorly directed medial seta.

The legs are without noteworthy features.

NEOTRICHODECTES SPATULATUS N.SP. FEMALE

The abdomen is somewhat pyriform, narrowed posteriorly, nearly as wide as long, almost entirely membranous. Only the paratergal plates of abdominal segment one and parts of the eighth
segment are sclerotized. The spiracles are vestigial, visible only as minute dorsolateral punctures on abdominal segments one to six. This is at variance with the statement by Werneck (1948) that the abdominal spiracles are completely lacking in Neotrichodectes. The abdomen terminates in a pair of prominent cones, each bearing a stout seta at its apex.
The gonopophyses arise from segment eight (Fig. 3D), each gonopophysis with a large serrate inner lobe, several of the serrations tipped with a small seta; apex of the gonopophysis expanded, spatulate and apically irregularly serrate. The sternite of segment eight is rather lunate and bears a cluster of long setae on each side of the midline; the tergite with a pair of laterally located, "C"-shaped sclerotizations, each surrounding three stout setae.

The female of this species is separable from N. arizonae and N. chilensis by the spatulate, apically serrate gonopophyses, by the lunate eighth sternite and by the presence of the paired clusters of seven long setae on each side of the midline of sternite eight. Compare with illustrations of Werneck (1948, Fig. 184 to 188).

**MALE:** (Figures 2A and B)

Total length 1.75 mm., width at widest part of the abdomen .71 mm., longer and more slender than the female. The length of the male paratypes varies from 1.56 to 1.75 mm., with an average length of 1.68 mm. The head is wider than long; length .37 mm., width .53 mm.; the anterior margin almost completely rounded with little evidence of any median notch; antennal fossae larger than in the female; temporal lobes smaller but more rounded and prominent than in the female, each lobe with a conspicuous seta postero-dorsally. The antennae are modified for clasping the female; segment one much enlarged and femora-shaped, segment two rather small, segment three with the inner face tuberculate and a pair of short stout apical setae.

The thorax and appendages are as in the female; chaetotaxy similar.

The abdomen is longer and more slender than in the female, largely membranous and with no evidence of paratergal plates. Spiracles as in the female. The subgenital phragma with the lateral margins strongly sclerotized, thus appearing as a pair of parallel sclerotizations on the ventral surface of the abdomen from segment five to the opening of the genital chamber. The posterior margin of the genital opening is sclerotized and beset
with short setae. Dorsally, the apparent eighth segment bears a question-mark-shaped sclerite on either side of the midline.

The male genitalia are much as in *N. arizonac* Werneck (1948, Fig. 189). The pseudopenis or fused endomeres are in
the form of a long-stemmed "Y" and the median plate (fused parameres?) is almost identical with that illustrated by Werneck. The greatest difference between males of this species and of *N. arizonae*, *N. chilensis* and *N. interrupto-fasciatus* lies in the much wider lateral sclerotizations of the basal plate.

**Type host:** *Conopatus leuconotus* Lichtenstein, M.M.N.H. No. 3224, collected in tropical evergreen forest at the edge of Rio Cajones (Rio San Marcos), Rancho el Ajengibre, Km. 264, Mexico City-Tuxpan Highway, Puebla, Mexico, December [14], 1951. Col. Dwain W. Warner.

**Specimens examined:** holotype female, allotype male, 19 female and 8 male paratypes and 24 nymphs representing the three nymphal instars. All specimens are in the collections of the University of Minnesota.

**Notes on the Immature Stages**

**Eggs:** (Figure 3C)

Length .50 to .62 mm.; glued to the hairs near the base, between the shoulders and along the sides of the host just posterior to the forelegs. The surface of the eggs smooth with no cuticular sculpturing that can be detected. Much like the eggs of *Trichodectes canis* (DeGeer) (Crystal, 1949) except for the smaller size.

**First instar nymph:** (Figure 3A)

Length .60 to .71 mm.; head and thorax together as long as the abdomen; setae fewer than adult, only a single longitudinal row on each side dorsally (one seta on each side of the midline per segment), a triple row ventrally and a double row laterally; legs with fewer setae than in adult; pterothorax with a single pair of long setae.

**Second instar nymph:** (Figure 3B)

Length .89 to 1.15 mm.; abdomen relatively larger than in the first instar and with more setae on each segment; head and antennae much as in the adult female; no evidence of genitalia.
Third instar nymph: (not illustrated)

Length 1.32 to 1.41 mm.; head and thorax much as in the adult female but less heavily sclerotized. Seta number intermediate between that of the second instar and the adult female; no evidence of the external genitalia. Crystal (1949) indicates that in *T. canis* (DeGeer) the external genitalia do not appear until the final moult. The number of nympha1 instars in that species is identical with the one herein described.

Werneck (1948) indicates that it is difficult to separate the males of *N. interupto-fasciatus* (from *Taxidia taxus*), *N. chilensis* (from *Conopatus chinga, C. humboldti* and *C. chilensis amazonicus*), *N. arizonae* (from *Conopatus mesoleucus*) and *N. mephitidis* (from various species of *Mephitis*). He also indicates that he hesitates in considering the various species of *Neotrichodectes* described from the genus *Conopatus* (including *N. wolffhügel* Werneck from *Conopatus chinga*) as good distinct species because the differences in the females are very small. However, the differences in the females are distinct and constant even though small, and these differences correlate (except in the case of *N. wolffhügel*) with differences in hosts. There is little reason then, to doubt that these various species of *Neotrichodectes* are good (again with the exception of *N. wolffhügel*). It is, furthermore, interesting to note that there is a different species of Trichodectid on each of the two species of *Conopatus* of Central and North America while a third and possibly a fourth species occurs on the several South American species of the genus.

**Literature Cited**


A Check List of the Trichoptera (Caddis Flies) of New Hampshire

By WALLACE J. MORSE and ROBERT L. BLICKLE ¹ ²

This report sets forth the results of six years (1946–1951) collecting with light traps. The traps were operated in ten different towns. However, over 75 per cent of the material taken in the traps was from the towns of Durham and Lee, in the southeastern part of the state. The number of specimens taken in the light traps totaled over 15,000, not including many unknown specimens.

The list of Trichoptera, as given, contains published records and collection records by methods other than by light traps. The list is a record of adult specimens.

Much credit must be given to Dr. Lorus J. Milne for the use of his unpublished doctorate thesis in which he compiled all known North American Trichoptera distributional records up until 1936. Further appreciation is expressed to Dr. Cornelius Betten, Dr. Herbert H. Ross, and Dr. Donald G. Denning, for their cooperation and help in identifying and checking many of the light trap specimens.

The following abbreviations are used in connection with literature records:

Nathan Banks, NB; Cornelius Betten, CB; Donald G. Denning, DGD; Lorus J. Milne, LJM; Herbert H. Ross, HHR. Collectors: Robert L. Blickle, RLB; James G. Conklin, JGC; Wallace J. Morse, WJM; Philip R. Lowry, PRL; H. F. Sheffield, HFS; David Laddey, DL; Carl F. French, CFF; light trap, It.

The dates listed indicate the first and last date on which specimens were taken.

The list of Trichoptera is arranged in the same manner as used by Ross (1944).

Future collecting and the identification of undertermined species should bring the list total to nearly three hundred species.

² Scientific Contribution No. 147.
Nearly half of the unknowns on hand are in the family Hydroptilidae.

*A List of New Hampshire Trichoptera*

**Rhyacophilidae**

*Rhyacophila* Pictet

*acropedes* Banks, Mt. Washington (DGD), July 31–Aug. 4; *atrata* Banks, Mt. Washington (DGD), July 31–Aug. 4; *banksi* Ross, Mt. Washington (DGD), Warren, Woodstock (DGD, HHR), June 21–July 4; *carolina* Banks, Mt. Washington (DGD), Durham, Lee (lt), July 4–30; *carpenteri* Milne, Mt. Washington (LJM, DGD), Franconia, Gorham, Randolph (LJM), June 30–Aug. 4; *fuscula* (Walker), White Mountains (LJM), Durham, Lee (lt), June 15–Sept. 14; *glaberrima* Ulmer, Mt. Washington (LJM), July 31–Aug. 15; *minora* Banks, White Mountains (LJM, CB), Colebrook (WJM, RLB), June 19; *torva* Hagen, White Mountains (LJM, RLB), June 4–July.

**Glossosoma** Curtis

*americanum* Banks, Franconia (LJM, CB); *nigrior* Banks, Lee, Plymouth (lt), May 8–July 26.

*Agapetus* Curtis

*iridis* Ross, Lee, Plymouth (lt), June 1–July 3; *pinatus* Ross, Hopkinton, Lee (lt), June 27–July 10; *rossi* Denning, Durham, Lee, Plymouth, Rumney (lt), June 5–Aug. 30.

**Protoptila** Banks

*maculata* (Hagen), Newport (lt), July 8; *palina* Ross, Hopkinton, Durham, Lee, Plymouth (lt), June 9–July 14.

**Philopotamidae**

**Dolophilodes** Ulmer


**Wormaldia** McLachlan

*moesta* (Banks), Bow (lt), Colebrook (WJM, RLB), Durham, Lee (lt), June 19–July 6; *shawnee* Ross, Lee (lt), June 18–30.

* Unidentified female, may be the same as *G. nigrior.*
Chimarra Stephens

aterrima Hagen, Berlin, Franconia (LJM), Durham (WJM; lt), Freedom, Hopkinton, Lee, N. Conway, Rumney (lt), May 18-Aug. 30; obscura (Walker), Milford (LJM), Durham (WJM, RLB; lt), Hopkinton, Lee (lt), May 29-Sept. 3; socia Hagen, Bow, Durham, Lee (lt), June 9-July 28.

PSYCHOMYIIDAE

Phylocentropus Banks
carolinus Carpenter, Durham, Lee (lt), June 22-July 30; lucidus (Hagen), N. Conway, Squam Lake (LJM), Durham, Hopkinton, Lee, Newport, Plymouth, Rumney (lt), May 8-Aug. 30; placidus (Banks), Bow, Durham, Freedom, Hopkinton, Lee (lt), Northwood (JGC), Plymouth, Rumney (lt), May 8-Sept. 7.

Neureclipsis McLachlin
bimaculatus (Linnaeus), Durham, Freedom, Plymouth (lt), June 16-July 26; crepuscularis (Walker), Durham, Lee (lt), June 18-Aug. 30.

Polycentropus Curtis
albipunctus (Banks), Durham (WJM; lt), Lee (RLB, lt), June 15-Sept. 28; aureolus (Banks), Hampton (CB, HHR), Bow, Durham, Hopkinton (lt), Lee (RLB; lt), Plymouth (lt), June 10-Aug. 6; cinereus Hagen, Dublin, Gorham, Milford, Pinkham Notch, Squam Lake (LJM), Bow (lt), Durham (WJM; lt), Freedom, Hopkinton (lt), Lee (RLB; lt), Plymouth (lt), June 2-Sept. 10; confusus Hagen, Franconia, Pinkham Notch (LJM), Durham, Hopkinton, Lee (lt), June 14-Aug. 30; crassicornis Walker, Hampton, Squam Lake (LJM), Bow, Durham, Freedom, Hopkinton (lt), Lee (RLB; lt), Plymouth (lt), Rye (RLB), June 10-Aug. 24; flavus (Banks), Bow, Durham, Freedom, Hopkinton, Lee, Plymouth, Rumney (lt), June 1-Aug. 30; grellus (Milne), Durham, Lee (lt), July 10-19; interruptus (Banks), Hampton, Squam Lake (LJM), Durham, Lee, Plymouth, Rumney (lt), Rye (RLB), June 9-Aug. 30; maculatus Banks, Mt. Washington (HHR), Lee, Plymouth (lt), July 15-Aug. 6; nascotius Ross, Durham, Lee (lt), June 18-Aug. 31; pentus Ross, Mt. Washington (HHR), June 22; pixi Ross, N. Woodstock (HHR), June; remotus Banks, N. Woodstock (HHR), Durham (RLB; lt), Hopkinton, Lee, Plymouth, Rumney (lt), Rye (RLB), May 5-Sept. 7; smithae Denning, Mt. Washington (DGD), July 17.
Nyctiophylax Brauer
  uncus Ross, Woodstock (HHR), Durham, Freedom, Lee, Plymouth (lt), June 16–July 25; vestitus (Hagen), Dublin, Milford, Squam Lake (LJM), Barrington (WJM), Bow (lt), Durham (WJM; lt), Freedom, Hopkinton, Lee, Newport (lt), Northwood (JGC), Plymouth, Rumney (lt). June 2–Sept. 7.

Cernotina Ross
  pallida (Banks), Freedom, Hopkinton (lt), July 6–10; spicata Ross, Durham (WJM; lt), Lee (lt). June 5–Aug. 27.

Lype McLachlin
  diversa (Banks), N. Woodstock (HHR), Durham, Freedom, Lee, Plymouth, Rumney (lt), May 8–Aug. 30.

Psychomyia Pictet

Hydropsychidae

Parapsyche Betten
  apicalis (Banks), Franconia (CB), Mt. Washington, Randolph (LJM), June 22–30.

Arctopsyche McLachlen
  ladogensis (Kolenati), White Mountains (LJM), June.

Diplectrona Westwood
  doringa Milne, White Mountains (LJM), July 3; modesta Banks, Etna (HHR), Lee (lt), July 8.

Hydropsyche Pictet
  alternans (Walker), Franconia, Pinkham Notch (LJM), July 26; betteni Ross, Bow, Durham, Lee, Plymouth (lt), May 8–Sept. 10; bifida Banks, Durham, Hopkinton, Lee (lt), June 5–Sept. 6; diantha Ross, Hopkinton (lt), July 10–30; morosa Hagen, Durham (lt), Aug. 18–25; slossonae Banks, Franconia (LJM, DGD), Durham (lt). July 28; sparna Ross, Durham (RLB; lt), Hopkinton (lt), Lee (RLB; lt), N. Conway, Plymouth (lt), May 8–Sept. 1; vexa Ross, Plymouth (lt). June 9; walkeri Betten & Mosley, Durham, Plymouth (lt), June 24.

Cheumatopsyche Wallengren
  analis (Banks), Durham (HHR; lt), Freedom (lt), Hanover (WJM), Hopkinton (lt), Lee (RLB), Plymouth, Rumney (lt),
June 9–Sept. 7; **campyla** Ross, Bow, Durham, Hopkinton, Lee, Newport, Plymouth (It). Strafford (WJM), June 5–Aug. 28; **minuscula** (Banks), Durham (It). Lee (RLB; It), Newport (It), June 22–Aug. 13; **oxa** Ross, Colebrook (WJM, RLB), June 19; **pasella** Ross, Lee, Plymouth (It), June 9–Aug. 7.

**Macronemum** Burmeister

**zebratum** (Hagen), Durham (WJM; It), Lee, Plymouth (It), June 15–Aug. 31.

**HYDROPTILIDAE**

**Agraylea** Curtis

**multipunctata** Curtis, Durham, Hopkinton, Lee (It), May 8–Aug. 26.

**Ithytrichia** Eaton

**clavata** Morton, Durham, Hopkinton, Lee (It), June 5–Aug. 8.

**Stactobiella** Martynov

**delira** (Ross), Colebrook (WJM, RLB), Durham, Lancaster, Lee, Plymouth (It), May 31–Aug. 13; **palmata** (Ross), Bow, Durham, Lee, Plymouth (It), June 1–July 4.

**Ochrotrichia** Mosley

**shawnee** (Ross), Plymouth (It), June 9–10.

**Oxyethira** Eaton

**forcipata** Mosely, Bow, Durham, Lancaster, Lee, Plymouth (It), May 8–Sept. 10; **grisea** Betten, Durham, Hopkinton, Lee, Plymouth (It), May 8–Aug. 28; **pallida** (Banks), Durham, Lee, Plymouth (It), June 18–Sept. 10; **serrata** Ross, Bow, Durham, Hopkinton, Lee, Plymouth (It), May 8–Sept. 23; **zeronia** Ross, Bow, Lee (It), July 4–Aug. 5.

**Orthotrichia** Eaton

**americana** Banks, Durham, Hopkinton, Lee, Plymouth (It), June 16–Aug. 13; **cristata** Morton, Bow, Durham, Hopkinton, Lee, Plymouth, Rumney (It), June 5–Aug. 28.

**Hydroptila** Dalman

**amoena** Ross, Lee (It), Aug. 25; **callia** Denning, Durham, Hopkinton, Lee (It), May 31–July 28; **gunda** Milne, Durham, Lee (It), June 18–Aug. 4; **hamata** Morton, Bow, Durham, Lee. Newport (It), June 18–Aug. 28.
Neotrichia Morton
  *vibrans* Ross, Lee, Plymouth, Rumney (It), June 24–Aug. 24.

**Phryganeidae**

*Agrypnia* Curtis
  *improba* var. *sackeni* Banks, Franconia, White Mountains (NB); *vestita* (Walker), Hampton (LJM), Rye (RLB), June 16.

*Oligostomis* Kolenati
  *ocelligera* (Walker), Dublin, Franconia (LJM), NH (Hagen’s type) (CB), Durham (RLB, HFS, DL), Lee (RLB), May 3–21.

*Eubasilissa* Martynov
  *paradalis* (Walker), Franconia, White Mountains (LJM, CB).

*(To be continued)*

**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.

**Some Notes on the Role of Epidermis in Insects and Ticks**

Within recent years a number of isolated observations have indicated a degree of importance to the epidermis not previously suspected. The first surprising development came when Lees¹ was reporting on the hygroscopic uptake of water in ticks, that is, on the absorption of water vapor from moist air to increase the amount of fluid water in the animal (a phenomenon also known in certain grasshoppers, fleas, beetles, bedbugs and moth pupae). He found that injuries to the cuticle extensive enough to require repair were accompanied by cessation of the uptake of atmospheric water. Perhaps this means that the power to absorb and concentrate water vapor is a property of the living epidermis, and that when the epidermis has to stop to repair damage

it has to cease, temporarily, the active absorption of water. Presumably the water absorption requires expenditure of energy (it does not occur in killed specimens), and the epidermis does not expend energy for both repair and absorption simultaneously. Alternatively, more than the epidermis is involved, and an injury needing repair affects the whole organism or at least the epidermis plus endocrine system as may be indicated by the next set of data.

In pupae of the giant silkworm moths (cecropia, promethia, etc.), Williams has shown that an abdominal shell of integument from which all internal organs have been removed can complete development to a normal-appearing adult abdomen provided that the appropriate endocrine glands are implanted into it. In other words, the pupal epidermis plus its associated somatic musculature is fully capable of forming the adult skin and scales except for needing whatever is supplied by the hormones. Perhaps the hormones supply only a stimulus to develop, perhaps they supply some necessary chemicals for the development (Williams has shown that the hormones influence re-establishment of the cytochrome enzyme system but whether or not these particular enzymes play an important direct role in differentiation of the integument is unknown). Whatever the endocrines supply, this plus the epidermis is adequate for adult development—inervation and the presence of more muscles and other internal organs are needed to make a complete moth but not to make a complete moth's skin. The integument is thus shown to be an amazingly competent and independent organ system.

Surgical operations such as are needed for obtaining the preceding data automatically involve injury comparable to the injury referred to in the first paragraph. Perhaps it is not surprising, then, that differentiation of an isolated abdominal integument does not proceed until after healing of the wounds. In other words, healing comes first whenever the injury is extensive and takes precedence over phenomena such as water absorption and differentiation (metamorphosis).

More recently, Suessman found in the course of injection experiments that perforation of the integument of a cecropia pupa by a hypodermic needle caused an immediate jump in oxygen consumption (30%) and that the increased rate was maintained for several days. It is not known whether this great increase in respiration is due to the whole animal or to the integument alone. Be that as it may, obviously a small injury to the integument can call forth a large and lasting response expressed as an altered metabolic rate. However, this particular response does not seem to be a general phenomenon because no such increased oxygen consumption was found in fly larvae (Phormia) injected by Buck, Keister, and Posner or in beemoth pupae (Galleria) injected by Mr. John Heron in this laboratory.

Older and therefore more generally known is the fact that specific pattern determination is at least largely under control of the individual epidermal cells. It was shown many years ago that the entire cuticle is capable of being sclerotized, and, accordingly, that the sclerotization pattern must be somehow controlled by the immediately underlying epidermal cells. Recently it has been shown that this control is accomplished by the local passing out into the cuticle of substrate for sclerotization only in those areas that are to be sclerotized. In wound healing the nature of the regenerating integument has also been shown to be controlled by the nature of the cells that are doing the healing. In effect, these data simply push the basic developmental problem back one step; namely, to the question of why certain epidermal cells become determined to do one thing in development while nearby cells become determined to do something else. On this problem little progress has been made but the

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importance of the individual epidermal cells in the process seems apparent.

No novelty is involved in saying that the integument is an important organ system of insects and other arthropods. Obviously it conditions most exchanges with the environment (notably water loss), and mosaics and gynandromorphs long since demonstrated that there must be a large degree of autonomy in its development. Novel are the facts that the epidermis can condition such seemingly over-all processes as oxygen consumption and the hygroscopic uptake of water, that wound healing takes precedence over the uptake of water and over differentiation, and that the individual cells of the general epidermis have so much individuality.

A. Glenn Richards.

Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian

Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1952 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol ($) . Papers published in **ENTOMOLOGICAL NEWS** are not listed.


ANATOMY, PHYSIOLOGY, MEDICAL—Baker, W. K. and C. W. Edington.—The induction of translocations
vaire de la larve de chironome et quelques réactions com-
binées des polysaccharides. Présence de phosphatase alcali-
zhansky, T., B. and N. Spassky.—A comparative study of mutation rates in two ecologically diverse species of Dro-
chevaia spetsializatsiia i znachenie ee v zhizni nasekomykh.
Sause.—The occurrence of demodectic mites, Demodex folliculum, in the internal tissues and organs of the dog.
and F. E. McClelland, Jr.—Pneumonyssus caninus in a dog in Western New York (Acarina). [Cornell Vet.] 42:
337–38, ill. Mercer, E. H. and M. F. Day.—The fine structure
E.—A quantitative study of the growth of the central ner-
vous system of a holometabolous insect, Drosophila melano-
Reeves, W. C. and W. McD. Hammon.—California en-
cephalitis virus, a newly described agent. 111. Mosquito
Rizki, M. T. M.—Ontogenetic distribution of genetic lethal-
pitaushchikh rastenii v biologii krestotsvetnykh klopov


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.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Koenigsberg, Krs. Wetzlar 16, Germany.


Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.


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.

Parasitic Mites Wanted

Many, thick, well-fed parasitic mites from Spring Odonata and from other aquatic insects from all parts of the World. They must be removed from their hosts without injury, placed in well-dampened cotton in a glass vial (a separate vial for each host insect), packed in cotton in a metal mailing tube and sent by airmail to Dr. Paul Münchberg, (21b) Soest, Windmühlenweg 93, Germany. Place date, locality and name of host in each vial. Correspondence in English and German.
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3. — Munz (Philip A.) — A Venational Study of the Suborder Zygoptera (Odonata), with Keys for the Identification of Genera (78 pp., 20 pls., 1919) ........................................... 2.00
4. — Hebard (Morgan) — The Blattidae of Panama (148 pp., 60 pls., 1920) 3.00
5. — Cresson (Ezra T.) — The Type of Hymenoptera in the Academy of Natural Sciences of Philadelphia other than those of Ezra T. Cresson (90 pp., 1928) ........................................... 2.00
6. — Rivnay (Ezekiel) — Revision of the Rhipiphoridae of North and Central America (Coleoptera) (68 pp., 4 pls., 1929) ........................................... 2.00
7. — Leonard (Mortimer D.) — A Revision of the Dipterous Family Rhagionidae (Leptidae) in the United States and Canada (182 pp., 3 pls., 1930) ........................................... 4.50
8. — Rehn (James A. G. and Rehn, John W. H.) — The Eumastacinae of southern Mexico and Central America (84 pp., 6 pls., 1934) 2.50
9. — Pate (V. S. L.) — The Generic Names of the Sphecoid Wasps and their type species (103 pp., 1937) ........................................... 2.50
10. — Huckett (H. C.) — A Revision of the North American species belonging to the genus Pogonomyia (131 pp., 9 pls., 1941) ........................................... 3.00
11. — Townes (Henry K., Jr.) — Catalogue and reclassification of The Nearctic Ichneumonidae (925 pp., 1944) ........................................... 15.00
12. — Phillips (Venia Tarris) — The Biology and Identification of Trypetid Larvae (161 pp., 16 pls., 1946) ........................................... 5.00
13. — Braun (Annette F.) — Elachistidae of North America (Microlepidoptera) (110 pp., 26 pls., 1948) ........................................... 4.50
14. — Rehn (John W. H.) — Classification of the Blattaria as indicated by their Wings (134 pp., 13 pls., 1951) ........................................... 5.00

THE AMERICAN ENTOMOLOGICAL SOCIETY
1900 RACE STREET, PHILADELPHIA 3, PA.
ENTOMOLOGICAL NEWS
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Vol. LXIV No. 4

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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.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act
of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in para-
graphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
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, ADVERTISEMENTS: All communications and remittances to be addressed to 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.

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Henry Torsey Fernald
Henry Torsey Fernald (1866–1952) ¹

The death of Doctor Henry Torsey Leroy Fernald has removed from the lists one of the few remaining members of the 'Old Guard' of entomology in America. Doctor Fernald was born on April 17, 1866, at Litchfield, Maine, the son of two outstanding entomologists. His father, Professor Charles Henry Fernald (1838–1921), was an authority on various groups of Microlepidoptera, while his mother, Maria Elizabeth (Smith) Fernald (1839–1919), was similarly known for her studies on the scale insects, particularly for her 'Catalogue of the Cocidae of the World.' His boyhood and early manhood was spent in Orono, Maine, where his father was on the staff of the Maine State College (now the University of Maine). Many of his summers were spent on Mount Desert Island, at the birthplace of his father on Fernald Point, near Southwest Harbor. The parents were active in collecting the insects of this part of Maine and it was natural that the youth should participate in these activities and gradually become interested in the science to which he later devoted his life. He received the B.S. degree from Maine in 1885, the M.S. in 1888. He then entered Johns Hopkins University, receiving the Ph.D. degree in 1890. On June 9 of this same year he was married to Miss Minna R. Simon, of Baltimore, who survives. Throughout their long wedded life of more than sixty years, Mrs. Fernald was a loyal helpmate whose kindly interest and sympathy with his work undoubtedly has proved his greatest possible inspiration. Three children were born to this union: Helen Elizabeth (Professor at the Royal

¹ The frontispiece, for which the News is indebted to Miss Helen E. Fernald, shows Dr. Fernald at 83 years of age. Ed.
Ontario Museum of Archaeology, Toronto, authority on Chinese art; Charles Henry (who was Professor of Business Administration at the University of Arkansas at the time of his death in 1942); and Ruth Louise (Mrs. Carl B. Stone, of Cincinnati, Ohio).

Doctor Fernald's first position was that of Professor of Zoology at the Pennsylvania State College from 1890 to 1899, where he functioned as State Entomologist, and, during the last year, as State Zoologist. In June 1899 he was called to the Massachusetts Agricultural College (now the University of Massachusetts) as Professor of Entomology in the newly established Department of Entomology. His father never held this title, having been Professor of Zoology. Doctor Fernald held his Professorship and Head of the Department for thirty-one years, retiring in 1930 because of ill health. At this time he moved permanently to Florida, first residing in Orlando, in 1938 moving to Winter Park, where he built a beautiful home at 1128 Oxford Road. Here he spent his remaining days and died on the morning of July 15, 1952, following several increasingly serious attacks of angina. He was buried in Palm Cemetery, Winter Park, beneath the palms and live oaks.

Virtually all honors possible in his chosen field came to him during his lifetime. In the American Association of Economic Entomologists, which he joined as a young man, he became president in 1914, and at the time of his decease was one of only two Honorary Members (the other being Professor Herbert Osborn who still survives). In the Entomological Society of America, he was a charter member, became a Fellow in 1914, and was chosen an Honorary Fellow in 1939. He presented the Annual Address before the 22nd meeting of the Society at Nashville, Tennessee, on December 27, 1927, speaking on the subject “Insects, the People and the State.” He was a member of the Honorary Societies of Phi Beta Kappa and Phi Kappa Phi.

On January 14, 1925, the Fernald Entomological Club was founded at the University of Massachusetts and was named in honor of Doctor Fernald. Following his retirement in 1930 he prepared an account of the work of the Department, under the
general title "The History of Entomology at the Massachusetts Agricultural College 1867-1930," which was issued in mimeographed form in 1938 and serves as a basic account of the founding and early work of the Department. Since 1932 the Fernald Club has sponsored an annual publication, likewise in mimeographed form, entitled the "Fernald Club Yearbook" which continues this record of the work of the department, staff, students, and alumni.

In 1921 the McGraw-Hill Company published the first edition of his "Applied Entomology," followed by later editions in 1926 and 1935. For the fourth edition (1942) Doctor Fernald chose as co-author one of his former students, Doctor Harold H. Shepard, who is now engaged in the preparation of a revised fifth edition. This very important college text in entomology was widely accepted and thousands of copies have been sold in this country and abroad.

Doctor Fernald's fields of investigation and research included life-history studies of various insects, the burning of foliage by arsenicals, and, in the field of insect taxonomy, important studies on the Sphecid wasps, upon which group he published various papers, particularly on the species of the New World. In 1913 he went to Europe where he visited many of the leading museums and studied the various types of Sphecidae described by earlier workers. Near the close of his active career he presented his important collection of these wasps to the United States National Museum. His manuscript notes on the various types in the European museums are in the possession of Doctor V. S. L. Pate.

Doctor Fernald's breadth of knowledge in entomology and zoology and his ability to impart this to his students combined to make him one of the outstanding teachers of entomology in America. He, together with his father, belonged to a school that insisted on breadth of learning in his pupils and from his earliest days at Amherst adhered to the principle of the so-called tripartite thesis for candidates working toward the higher degrees. This included separate studies on insect morphology, taxonomy, and biology, together with additional work on the
methods of control in the case of injurious species. That such a policy was sound seems to be shown by the unusually high calibre of his students, many of whom became prominent in commercial work, in the Federal service, as State entomologists, and as teachers in colleges and universities.

Following his retirement from active duties at the relatively early age of 64, Doctor Fernald continued in correspondence with many of his former friends and students. That there was no decrease in the affection and respect for their beloved teacher and friend was strikingly shown on the occasion of his eightieth birthday, in 1946, when hundreds of letters, cards, and telegrams, expressing their love and appreciation, poured in from former students in this country and abroad.

Mrs. Alexander and I owe a vast debt of gratitude to Doctor and Mrs. Fernald. When we first arrived in Amherst in late August 1922, they insisted that we stay at their home until we could find a house and get settled. We can never forget the hospitality shown us at that time and constantly thereafter. Despite his busy and exacting life, Doctor Fernald insisted upon accompanying us in our work of house hunting, and in every possible way made our introduction to the town and to the department a most happy and auspicious one.

Doctor Fernald's life personified kindliness, patience, and understanding. His own sterling integrity and uprightness made him demand comparable characteristics in others, and he had an uncanny ability to evaluate these qualities. His manner was invariably dignified and courtly. All of these many attributes were briefly summarized at the end by a friend who called him "God's true gentleman." His profound love for his home and for his family, and his deep loyalty to his friends, were endearing qualities. We who were so fortunate as to have known him and to have been associated with him, will always remember Doctor Fernald as a great teacher, a perfect gentleman, and a true friend.

CHARLES P. ALEXANDER
Glow-worms in a Marine Littoral Habitat in Jamaica (Coleoptera; Lampyridae) *

By FRANK A. McDERMOTT, Wilmington, Delaware

In February 1952, during a study of the Lampyridae of Jamaica, the larvae of an unidentified species were found crawling on wet rocks at the edge of the sea at Whitehouse Bay on the south coast. These rocks were coral limestone, much corroded and pitted, affording a very treacherous foothold; they were so situated that at high tide the sea-water splashed over them, while at ebb tide they were merely kept wet by the spray. Three species of snails were abundant on the rocks; these snails were kindly identified for me by Dr. C. Bernard Lewis, Director and Curator of the Museum of the Institute of Jamaica, as Littorina ziczac, Nerita peloronta, and Tectarius tuberculatus. One of the glow-worms was found half-way inside the shell of a snail of the latter species, presumably feeding on the snail. The glow-worms were 9 to 11 mm. long, greyish dorsally and white or yellow ventrally, of the general shape and appearance of the larvae of Photinus, and with the usual ventral luminous organs on the 8th abdominal segment. It was not possible to determine the species. A few adults of Photinus commissus E. Oliv. and of P. synchronus Barber were in flight in the vicinity, and the color and size of the glow-worms suggest that they may be the larvae of the former. Neither of these species is at all confined to coastal areas; both had been taken shortly before at inland localities up to 15 or 20 miles from the sea, and at altitudes up to 2,400 ft. A peculiarity of these glow-worms was the possession of four nearly parallel rows of dorsal tubercles; this suggests the similar arrangement of tubercles on Jamphotus tuberculatus Barber, but it seems very doubtful whether these littoral larvae are juvenile instars of that species, since a full-grown larva of Jamphotus had been found at Portland Gap, St. Thomas Parish, at an altitude of about 5,600 ft. on October 14, 1950.

In spite of the low range of the normal tides, 12 to 15 inches,

* This investigation was supported in part by the American Philosophical Society, Grant No. 1370, Penrose Fund.
it appears that the glow-worms are active only during the ebb tide; first seen at 9:30 P.M. on February 21st, they did not appear until an hour later successively, on the next three nights. At this tide stage the rocks are merely wet by spray, and the snails, which are firmly attached to the rocks when the water is washing over them, then crawl on the wet surface, and the glow-worms pursue them. The presence of the larvae on these particular rocks can hardly be unique, but they were not found on the same dates on similar rocks a few hundred feet east of this location, nor were they found a few nights later at Bloody Bay (west end of the Island), or subsequently at St. Ann's Bay (north coast) or Port Henderson (south coast). At least two, and usually all three of the same species of snails were present at these other locations. The rock formation on which they were found is only about 15 ft. long, and spray-wet for a width of about 10 ft. Only one glow-worm was seen on a dry rock above the reach of the spray. Close search during daylight hours failed to reveal a single glow-worm, but there was abundant opportunity for them to hide in crevices and holes in the rocks. Nor were any larvae or pupae found in any of the great many snail shells examined. Moonlight may also affect the activity of the glow-worms; the time during which they were seen was moonless, while some of the later examinations were in fairly bright moonlight, although the tide stage was favorable. As far as I know, only three persons beside myself have seen the glow-worms on the rocks.

Four specimens of the larvae, including the one found eating the snail, and also this snail, have been given to the Division of Insects of the U. S. National Museum; two larvae and specimens of the snail are in the Museum of the Institute of Jamaica.

Just what function, if any, the luminosity plays in the life of lampyrid larvae is obscure. Aquatic glow-worms, in fresh water, have been described by several authors; the glow-worms found in Jamaica are not strictly aquatic, but no similar habitat appears to have been noted previously.

Since the foregoing was written, information has been received that the glow-worms were still present on the rocks at Whitehouse Bay in early September.
Concerning Rheumatobates rileyi ¹ Bergroth  
(Gerridae)  
By H. B. Hungerford ²

To me, Rheumatobates is the most interesting genus in the Gerridae. The bizarre modifications of the antennae and legs of the males in many species are strange indeed! These little striders are exceedingly lively and nervous creatures and difficult to keep in captivity. In 1920 ³ I reported that the females are provided with an ovipositor for inserting the eggs in plant tissue and figured both the ovipositor and the fully developed ovum. I did not discover the deposited eggs either in field or laboratory. In 1923 at the University of Michigan Biological Station, I found large numbers of Rheumatobates rileyi palosi Blatchley on the slowly moving water of Bessey Creek but did not succeed in transporting many live specimens across Douglas Lake to the station laboratory. In 1927, J. K. Gwynn Silvey, at my suggestion, undertook a study of the life history of this species at the Biological Station and continued his studies during the summer of 1928. He published his results in 1931.⁴ He described the mating behavior, reported a female ovipositing in the tissues at the base of a Potamogeton leaf and figured the eggs, five nymphal instars and adults. His plate is quite satisfactory but the legend incorrect, Figure 3 being the fifth instar not the first; figure 7 the first not the fifth, etc. No precise dates are given in this paper and nothing to indicate that any specimens were reared from egg to adult.

More work should be done on the biology of Rheumatobates. It may be helpful to know that the best way to bring these in-

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¹ Michigan specimens are R. rileyi palosi Blatchley.
² Contribution from University of Michigan Biological Station and Contribution No. 817, Department of Entomology, University of Kansas.
sects from field to laboratory is to place toweling paper in the bottom of a minnow bucket, moisten the paper and let the Rheumatobates drop from the dip net into the pail. Do not permit too much water to drip from the net into the pail and the insects will survive a considerable journey on the moist paper.

In the laboratory, instead of using aquaria containing water I have had better success with finger bowls and large seven inch stender dishes in the bottoms of which had been placed several layers of toweling paper moistened but not too wet. The female Rheumatobates insert their eggs into and often protruding through the top layer of paper. While it is extremely difficult to locate the oviposition punctures from above, by peeling off the top layer of paper and examining its under side the eggs are readily found, either plainly protruding and exposed or but thinly covered by paper fibers, as shown in the text-figure.

Pieces of paper containing eggs may be cut out and placed in small stenders for following the embryological development and hatching of these insects. This same technique has been used with success in rearing Mesovelia which also lays its eggs in the paper and with Microvelia, Hydrometra and other surface forms that simply attach their eggs to the paper. It is suggested, therefore, that losses from drowning that occur in aquaria may be avoided in studies of other semiaquatic Hemiptera and may facilitate the rearing of these insects.
Two New Millipeds Taken in California Caves

By Ralph V. Chamberlin

Among millipeds taken in California and submitted to me for identification by Edward Danehy, who has been active for some years with the Stanford spelological group in the exploration of caves in that area, the two forms here described were found. Neither of these forms shows any obvious adaptive modifications to cave life unless the slightness of pigmentation in the ocelli of the Striaria should be open to such interpretation. The types of the new forms are in the author's collection.

Family Eurydesmidae

Genus SIGMOCHEIR Chamberlin

The finding of a second species referable to this genus is a matter of interest. The present form seems to be sufficiently distinct from the generotype, S. calaveras Chamb. in coloration and the details of the gonopods of the male, although in the latter character they are obviously close. Among related genera Sigmocheir agrees with Montaphe and Orophe in having no spines on the second joint of any of the legs, such a spine being present, although sometimes considerably reduced in the western genera other than these. It differs from Montaphe and even more strongly from Orophe in the smaller keels which are located higher up on the sides, with the intervening dorsum much less convex than in those genera.

Generotype: Sigmocheir calaveras Chamberlin

Sigmocheir dohenyi n. sp.

Head finely reticulate in black above, solid black in the area between antennae, and below this except over the labral region where yellowish. Antennae yellow. Somewhat less than anterior half of collum black, the remaining portion yellow. The immediately following tergites are black between the keels except a large sublunate median area in front of the caudal margin; the black area extends out in a narrow stripe along anterior bor-
der of the keel on each side, the remaining part of which is yellow. Farther back the entire keels are yellow and the median yellow area is enlarged, transversely oblong, to occupy most of the middle part of the metatergites, on the more posterior segments fusing with the yellow area of the keels. The prozonites are greenish white except the caudal portion which is black and a median tongue-like or triangular extension of the black area subdividing the light area, the black also extending forward on each side between bases of keels. Lower part of tergites and the venter yellow. Basal part of anal tergite black, the cauda yellow. Legs yellow.

Antennae slender, the second to sixth articles not much differing in length, the sixth more strongly clavately widening distad than the others.

Collum much wider than the head and than the second tergite; anterior corners widely obliquely rounded off, the posterior corners narrowly rounded; median portion of anterior margin straight, the caudal margin subarcuate, moderately convex over middle portion and nearly straight at sides where oblique.

Keels inserted rather high up on the sides, horizontal, none overlapping though some may be in contact on anterior segments, well separated over most of body. Keels margined narrowly anteriorly and posteriorly, the lateral margining thicker, pores opening laterally through a moderate thickening of the margin. Keels of anterior segments subrectangular; farther back the anterior corners become more and more rounded off; on last several pairs of keels the posterior corners become produced caudad, those of the 17th and 18th most strongly so, those of the 19th reduced. Cauda narrow, nearly straight; much exceeding the valves.

Legs with none of the joints with a distal spine. Likewise no sternal spines.

Width of female holotype, 7 mm.

Family Striariidae

Striaria eldora new species

Light horn brownish or in part somewhat dusky above from adherent fine particles of dirt, the sides and venter yellow, and legs and antennae yellow.

Eyes pale, the ocelli small, compactly arranged in a triangular patch on each side, 12 or 13 in number. Antennae of moderate length, clavately thickened distad; geniculate at end of second article; the second and fourth articles longest.

Collum resembling that of granulosa but relatively shorter, much less than twice as long as the second tergite; the crests unusually low, almost striaform, short, incomplete anteriorly, the surface roughened between them.

The succeeding tergites with the usual twelve crests, these more elevated at their ends; surface between crests finely granular. Anal tergite with the large median lobe caudally rounded, the angle of the indentation separating off the lateral lobe on each side obtuse.

Width, about 1 mm.

Locality: California, Eldorado Co., Crystal Cosumnes Cave. Three females taken in the cave in total darkness by Art Lang and Gill Lange, on Feb. 2, 1952.

Insects of Micronesia

J. Linsley Gressitt has been appointed Entomologist, Bernice P. Bishop Museum, Honolulu. He is in charge of the project “Insects of Micronesia,” now being taken over by Bishop Museum from the Pacific Science Board. A grant of $15,200 has been made to Bishop Museum by the National Science Foundation to help support the project for the next 18 months. One hundred specialists of a dozen countries are now collaborating on the project. J. F. Gates Clarke, N. L. H. Krauss and Dr. Gressitt have been completing the field work in the Caroline Islands during 1952-53 under the Science Board’s contract with the Office of Naval Research.
Concerning a New Genus, Dinocryptops, and the Nomenclatorial Status of Otocryptops and Scolopocryptops (Chilopoda: Scolopendromorpha: Cryptopidae)

By Ralph E. Crabill, Jr., Department of Entomology, Cornell University, and Ithaca College

In 1844 Newport proposed a new genus, *Scolopocryptops,* to which he referred five species: *miersii* sp.n.; *melanostoma* sp.n.; ferruginea (Linne); *sexspinosa* (Say); and *longitarsis* sp.n. He designated no type. In 1895 Pocock stated that the type of this genus was *miersii* Newport, and subsequent authors have accepted his decision.

When Erich Haase proposed *Otocryptops* in 1887, he included a single species, *rubiginosa* (L. Koch), 1878, within it which, of course, established its type by monotypy. But all authors have overlooked the fact the Hippolyte Lucas had already fixed the type of *Scolopocryptops* in 1849 when he stated that its type was *Scolopocryptops melanostoma* Newport, 1844. Therefore, since *rubiginosa*, the type of *Otocryptops*, is congeneric with *melanostoma*, which is the type of *Scolopocryptops*, *Otocryptops* is a subjective synonym of *Scolopocryptops*. There is no available generic name for the species previously referred to *Scolopocryptops*; therefore, I propose the new genus *Dinocryptops*, for their reception.

In summary, those species previously referred to *Otocryptops*, i.e., *sexspinosis* (Say), *melanostomus* (Newport), *rubiginosus* (L. Koch), etc., must be accorded the generic name *Scolopocryptops*, whereas *miersii* (Newport), *broelemani* (Kraepelin), etc. are referred to a new genus, *Dinocryptops*, the type of which is *Scolopocryptops miersii* Newport, 1844 [= *Dinocryptops miersii* (Newport)].

A Check List of the Trichoptera (Caddis Flies) of New Hampshire

By WALLACE J. MORSE and ROBERT L. BLICKLE

(Continued from p. 73)

Banksiola Martynov

calva Banks, Durham (It), June 16–Aug. 9; canadensis (Banks), Durham (It), June 28–30; concatenata (Walker), Claremont, Hampton, Mt. Washington, Squam Lake (LJM), July 22; dossuaria (Say), NH (LJM, CB), Durham (It), June 16; selina Betten, Bow, Durham, Hopkinton (It), Lee (RLB; It), June 18–Aug. 26; smithi (Banks), New Durham (JGC), July 19.

Ptilostomis Kolenati

angustipennis (Hagen), Newfields (PRL), Aug. 22; oceliferata (Walker), Claremont, Franconia, Milford, Squam Lake (LJM), Barrington (WJM, JGC), Durham (It), Exeter, Lee (RLB), June 3–Aug. 13; posita (Walker), NH (LJM), Newfields, Aug. 23; semifasciata (Say), Squam Lake (LJM), Durham (JGC), Lee (It), June 5–July 30.

Phryganea Linneaus

cinerea Walker, Squam Lake (LJM), Lee (It), July 13–15.

Limnephilidae

Radema Hagen

incerta (Banks), Franconia (CB, LJM), Durham (CFF), May 29.

Dicosmoecus McLachlen

quadrinotatus (Banks), White Mountains, Randolph (NB, LJM), Sept. 23.

Platycentropus Ulmer

indistinctus (Walker), White Mountains (NB, LJM), July; radiatus (Say), White Mountains (LJM), Durham (JGC; It), Lee (RLB, It), Newport (It), July 5–Aug. 24.

Glyphotaelius Stephens

hostilis Hagen, New London (HHR), Durham, Lee, Plymouth (It), May 26–Aug. 21.

Astenophylax Ulmer

argus (Harris), Franconia (LJM), Durham, Plymouth (It), June 13–July 3.

2 Scientific Contribution No. 147.
Hesperophylax Banks
designatus (Walker), NH (HHR).

Ironoquia Banks
parvula (Banks), Durham (lt), Lee (RLB). June 18–Oct. 24.

Limnephilus Leach
bimaculatus Walker, Squam Lake, White Mountains (LJM), Durham, Lee (lt), June 30–July 20; consocius Walker, NH (CB, HHR), Durham (JGC, WJM; lt), Hopkinton, Lee, Newington (lt), Apr. 24–Aug. 15; curtis (Banks), White Mountains (alpine) (LJM), Aug. 10; extractus Walker, Claremont (LJM), May 10; hyalinus Hagen, Claremont (NB), Rumney (lt), July 30; indivisus Walker, Claremont, Hampton (LJM), Durham, Hopkinton (lt), Lee (RLB; lt), Plymouth (lt), June 24–Sept. 6; moestus Banks, Concord, Franconia, Mt. Kingsman, Rumney, Squam Lake (LJM), Bow, Durham, Lancaster, Lee, No. Hampton (lt), June 12–Sept. 17; montanus (Banks), Franconia, Mt. Washington (CB, LJM); ornatus Banks, Franconia (CB), Durham, Lee (lt), June 20–July 17; ozburni (Milne), Lee, Plymouth (lt), June 24–July 3; parvulus (Banks), Barrington, Durham, Lee (lt), May 10–July 6; *plaga Walker, NH (LJM, CB); sericeus (Say), Claremont, Dublin, Hampton, White Mountains (LJM), Durham, Plymouth (lt), June 29–Aug. 24; sordidus (Hagen), Durham, Lee (lt), July 20–Aug. 9; submonilifer Walker, Franconia, Milford, Mt. Washington, Squam Lake (LJM, CB), Durham (WJM; lt), Lee (RLB; lt), Plymouth (lt), May 1–Nov. 16; vastus Hagen, White Mountains (LJM).

Pycnopsyche Banks
antica (Walker), White Mountains (NB), Durham, Hopkinton (lt), Lee (RLB; lt), Plymouth (lt), June 24–Sept. 14; circularis (Provancher), NH (CB), Durham (lt), Sept. 28; conspersa Banks, White Mountains (NB); gentilis (McLachlan), Franconia, White Mountains (LJM), Durham (lt), June 10; guttifer (Walker), Franconia, Shelburne (LJM, CB), Durham (lt), Lee (RLB; lt), No. Hampton (lt), Twin Mountains (CFF), June 24–Oct. 5; lepida (Hagen), Durham (lt), Lee (RLB; lt), Aug. 2–Oct. 1; limbata (McLachlan), Hopkinton (lt), Aug. 30; luculenta (Betten), NH (CB); scabripennis (Rambur), White Mountains (LJM), July; subfasciata (Say), White Mountains (LJM), July 26.

* May be a synonym of L. sericeus.
Cabiorius Navas
  lyratus Ross, Durham, Plymouth (It), May 24–Oct. 5; punctatissimus (Walker) Hampton (LJM), Durham, Hopkinton, Lee, Newington (It), Aug. 22–Sept. 28.

Frenesia Betten & Mosely
  diffcilis (Walker), Franconia, Dublin, Mt. Monadnock, Squam Lake (LJM, CB), Durham (WJM, JGC, RLB; It), Lee (RLB), June 24–Dec. 3; missa (Milne), Mt. Monadnock (LJM), Durham (WJM, JGC; It), Lee (RLB), Oct. 24–Nov. 18.

Glyphopsyche Banks
  irrata (Fabricius), NH (CB).

Psychoglypha Ross
  subborealis (Banks), Lee (RLB), Nov. 14–15.

Phanocelia Banks
  canadensis (Banks), Durham (It). Oct. 19.

Drusinus Betten
  sparsus (Banks), White Mountains (LJM); uniformis Betten, Durham, Lee (It), June 16–July 15.

Neophylas McLachlan
  aniqua Ross. White Mountains (DGD), July 2–Sept. 4; concinnus McLachlan, Dublin, Franconia (LJM); fuscus Banks, Franconia (CB, LJM); nacatus Denning, Jefferson (DGD), Sept. 16; oligius Ross, Durham, Lee (It), Aug. 25–Oct. 24; ornatus Banks, White Mts. (CB, LJM); slossonae Banks, Franconia (NB).

Molannidae

Molanna Curtis
  blend a Sibley, Lee (It), July 5; cinerea Hagen. Franconia, Squam Lake (LJM), July 29; musetta Betten, Bow, Durham, Freedom, Lee, N. Conway (It), Northwood (JGC), Plymouth (It), June 9–Aug. 30; tryphena Betten, Durham, Lee (It), June 25–Aug. 25; uniophila Vorhies, Squam Lake (LJM), Aug. 10–11.

Odontoceridae

Psilotreta Banks
  frontalis Banks, Lee (It), June 30; indecisa (Walker), Claremont, Franconia, Gorham (LJM), Colebrook (WJM,
RLB), June 19–July 20; labida Ross, Benton (HHR), Durham, Lee (JGC; It), May 1–June 26.

**Calamoceratidae**

Ganonema McLachlan

*americanum* (Walker), NH (LJM), Lee (WJM), June 22.

**Leptoceridae**

Leptocerus Leach

*americanus* (Banks), Durham (WJM; It), June 18–July 23.

Leptocella Banks

*candida* (Hagen), NH (LJM); *exquisita* (Walker), NH (LJM), Bow, Durham, Lee (It), June 25–July 30; *pavida* (Hagen), Bow, Hopkinton, Lee (It), Northwood (WJM), July 3–27; *uwarowii* (Kolenati), NH (LJM).

Athripsodes Billberg

*alagmus* Ross, Bow, Durham, Lee (It), June 15–July 19; *angustus* (Banks), Bow, Hopkinton, Durham, Lee (It), June 19–Aug. 8; *cancellatus* (Betten), Bow, Durham, Hopkinton, Lee, Plymouth (It), June 30–Aug. 7; *dilutus* (Hagen), Durham, Lee (It), June 19–Aug. 29; *flavus* (Banks), Dublin, Squam Lake (LJM), July; *mentieus* (Walker), Milford, Squam Lake (LJM), June 2; *punctatus* (Banks), Durham, Hopkinton, Lee (It), June 20–Aug. 10; *resurgens* (Walker), Squam Lake (LJM), Bow, Durham, Hopkinton, Lee (It), June 5–Aug. 8; *tarsi-punctatus* (Vorhies), Bow, Durham, Hopkinton, Lee, Plymouth (It), June 24–Aug. 7; *transversus* (Hagen), Squam Lake (LJM), Bow, Lee, Plymouth (It), June 24–Aug. 7.

Oecetis McLachlan

*avara* (Banks), Durham (WJM; It), Hopkinton, Lee, Rumney (It), June 28–Aug. 30; *cinerascens* (Hagen), Bow, Durham, Freedom, Hopkinton, Lee, Newport, Plymouth, Rumney (It), June 9–Sept. 2; *immobilis* (Hagen) Durham, Plymouth (It), June 27–Sept. 2; *inconspicua* (Walker), NH (LJM), Bow, Durham, Freedom, Hopkinton (It), Lee, (RLB, WJM; It), Lee (RLB, WJM; It), Northwood (JGC), Plymouth, Rye (It), June 15–Sept. 8; *osteni* Milne, Durham (HHR), Durham, Freedom, Lee, Rumney (It), June 18–Aug. 30; *persimilis* (Banks), Durham, Hopkinton, Lee (It), July 3–Sept. 10; *scala* Milne, Hopkinton (It), July 18–Aug. 8.
Triaenodes McLachlan

aba Milne, Durham (HHR). Durham, Lee, Plymouth (It), June 9–Sept. 10; baris Ross, Bow, Durham, Lee (It), June 24–Aug. 21; ignita (Walker), Hampton (NB); injusta (Hagen), Durham, Lee (It), June 20–Aug. 27; nox Ross, Durham, Lee, Plymouth (It), June 9–July 30; perna Ross, Durham, Lee (It), July 4–Aug. 27; tarda Milne, Hampton (LJM), Bow, Durham, Freedom, Lee (It), June 18–Aug. 25.

Mystacides Berthold

longicornis (Linnaeus), Bennington. Squam Lake (LJM), Northwood (WJM), July 11–23; sepulchralis (Walker), NH (LJM), Durham (WJM, RLB; It), Lee (It), May 29–Aug. 24.

Setodes Rambur

incerta (Walker), Durham, Hopkinton (It), July 5–Aug. 8.

Goeridae

Goera Curtis

calcarata Banks, Colebrook, Durham, Lee (It), July 10; stylata Ross, Plymouth (It), June 24.

Lepidostomatidae

Lepidostoma Rambur

americanum (Banks). Franconia (LJM, CB); bryanti (Banks), Lee (It), June 22–27; costalis (Banks), White Mts. (LJM, HHR), Lee (It), Aug. 10; frosti (Milne), Gorham, Pinkham, White Mts. (LJM, HHR), July 20–26; griseum (Banks), White Mts. (LJM); latipennis (Banks), Lee (It), Aug. 21–30; lydia Ross, Mt. Washington, Warren, Woodstock (HHR). Bradford (WJM), Lee, Rye (It), June 16–Sept. 6; modestum (Banks), Franconia (LJM); ontario Ross, Benton, Mt. Washington, Randolph, Woodstock (HHR); prominentes (Banks), Mt. Washington (DGD), July 29–Aug. 4; sackeni (Banks), N. Conway (NB), Durham, Hopkinton, Lee, Plymouth (It), Aug. 11–Sept. 19; swannanoa Ross, Benton, Mt. Washington, Woodstock (HHR); togatum (Hagen), Squam Lake, Mt. Washington (LJM), Durham, Lee (It), June 14–Sept. 7; vernalis (Banks), White Mts. (DGD), July 17.

Brachycentridae

Micrasema McLachlan

Brachycentrus Curtis
americanus (Banks), Franconia (LJM, CB); lateralis (Say), Pinkham (LJM).

Sericostomatidae

Sericostoma Berthold
distinctum (Ulmer), Squam Lake, Franconia (LJM), Durham (JGC; It), Hopkinton (It), Lee (RLB; It), May 1–July 30; griseum (Banks), Durham (WJM, JGC; It), Lee (RLB; It), May 1–Aug. 1.

Helicopsychidae

Helicopsyche Hagen
borealis (Hagen), West Milan (HHR), Durham (WJM, RLB; It), Lee (RLB; It), June 7–July 30.

Current Entomological Literature
Compiled by VENIA T. PHILLIPS, Librarian
Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1952 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

Note: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in Entomological News are not listed.

Gaufin, A. R. and C. M. Tarzwell.—Aquatic invertebrates


Kloft, W. — (See General.)


Kloft, W. — (See General.)


Kloft, W. — (See General.)


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.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Koenigsberg, Krs. Wetzlar 16, Germany.


Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.


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.

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THE AMERICAN ENTOMOLOGICAL SOCIETY
1900 RACE STREET, PHILADELPHIA 3, PA.
ENTOMOLOGICAL NEWS
MAY 1953
Vol. LXIV No. 5

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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.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act
of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in para-
graphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.

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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, ADVERTISEMENTS: All communications and remittances to be addressed to 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.

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Studies in Panama Culicoides (Diptera, Heleidae).
III. A New Species Related to phlebotomus
(Williston)  

By Willis W. Wirth ² and Franklin S. Blanton ³

Twelve new species of Culicoides have been described in two previous papers (Jour. Wash. Acad. Sci.; Jour. Parasit., in press) of this series, which is based primarily on material collected by the junior author in Panama. In this paper we wish to clarify the status of an important pest at Caribbean seaside resorts, Culicoides phlebotomus (Williston), and to describe a new species closely allied to it from Panama.

We are greatly indebted to Paul Freeman, of the British Museum, for generously making available paratypes of Culicoides amazonius Macfie and for critical comparisons of our specimens with the type of Ceratopogon phlebotomus Williston; to John Lane and O. P. Forattini, of the University of São Paulo, Brazil, for critical notes and for the gift of Brazilian specimens; to Irving Fox, of the University of Puerto Rico, for Puerto Rican material and for valuable advice and suggestions; and to Paul Woke, of the U. S. Public Health Service, for the gift of specimens. Unless otherwise noted, all material studied is in the collection of the U. S. National Museum, Washington, D. C.

¹ Published under the auspices of the Surgeon General, U. S. Army, who does not necessarily assume responsibility for the professional opinions expressed by the authors.

² Entomologist, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, U. S. Department of Agriculture, Washington, D. C.

³ Lieutenant Colonel, MSC, U. S. Army Caribbean, Fort Clayton, Canal Zone.
Culicoides phlebotomus (Williston) (figures 1, 2)


*Culicoides phlebotomus*, Hoffman, 1925, Amer. Jour. Hyg. 5: 285 (female redescri.; Puerto Rico; figure of wing); Painter, 1926, United Fruit Co. Med. Rept. 15: 258 (Honduras; biology); Fox, 1942, Puerto Rico Jour. Publ. Hlth. & Trop. Med. 17: 419 (pupa; Virgin Islands); Fox, 1946, Ann. Ent. Soc. Amer. 39: 252 (St. Croix);


**NEW SYNONYMY.**

Material examined:

**Puerto Rico:** Fort Buchanan, May, 1951, I. Fox (light trap), 1 female. Guanica, June 22, 1952, F. S. Blanton (light trap), 14 females.

**Mexico:** Salina Cruz, Oaxaca, F. Knab, 1 female.

**Honduras:** Puerto Castilla, Sept. 21, 1943, K. R. Maxwell (horse trap), 12 females.

**Nicaragua:** Corinto, Jan. 17–23, 1943, P. A. Woke (biting man and at light), 8 males, 27 females.


**Venezuela:** Puerto Cabello, Carabobo, Nov. 12, 1951, L. W. Teller (biting man at beach), 1 female.

**Brazil:** Tutoia, Maranhao, 1934, E. M. Lourie, 2 females [British Museum; paratypes of *amazonius*; one deposited in the U. S. National Museum through the courtesy of the British Museum]. Conceicao Beach, Pernambuco, April, 1944, F. Barbosa, 1 male. Caponga, M. Cascavel, Ceará, Nov., 1939, 2 females.
As a result of the descriptions by Hoffman (1925) and Macfie (1935), this species has been well characterized. Indeed, it is puzzling that Macfie, having access to Williston's type of *phlebotomus* at London, and mentioning that species in his description of *amazonius*, but without giving characters for their separation, could have been misled into describing the Brazilian material as new. Probably the fact that he had no male specimens from any known localities for *phlebotomus*, together with the southern distribution of his specimens, prompted him to go ahead. In the recent keys to Neotropical *Culicoides*, these two species are separated only by the cordiform fourth tarsal segment of *amazonius*, which *phlebotomus* is said to lack (Costa Lima, 1937; Barbosa, 1947; Macfie, 1948). Therefore a careful study was made of the material listed above, especially that from Puerto Rico and Venezuela, localities which are adjacent to St. Vincent and at which *phlebotomus* should most likely occur. All specimens were found to have the fourth tarsal segment cordiform, of the same shape as the paratypes of *amazonius* from Brazil (also as in figure 3, of *willistoni* n. sp.). Mr. Paul Freeman informs us that the same is true of Williston's type of *phlebotomus* in the British Museum. The only difference which could be found between the three Brazilian lots and those from farther north were that in the former the wings were not so strongly infuscated, the wing being mostly yellowish proximad of the r-m crossvein, a character obviously not of specific value. The wing of a female from Fort Buchanan, Puerto Rico (fig. 1), shows the more conspicuous extreme of markings. One of the Tutóia paratypes was found to have three, subequal, almost spherical, and rather small, spermathecae, although all the rest of the specimens examined, including the other paratype, possessed the usual two oval, and rather large, spermathecae. No differences could be found in the genitalia, which are shown in figure 2. For these reasons *amazonius* is considered unquestionably a synonym of *phlebotomus*. 
Culicoides willistoni Wirth and Blanton, new species (figures 3–6)

Female. Length 1.2 mm., wing 1.0 mm. by 0.5 mm.
Head black, the vertex grayish pruinose; eyes contiguous, bare. Antennae with flagellar segments in proportion of 15:12:12:12:12:12:12:12:12:18:18:20:20:35; distal sensory tufts present on segments 3–10. Palpal segments in proportion of 10:25:30:10:10; third segment slightly swollen, without pit, the sensoria scattered over mesal side of distal half of segment (fig. 5).
Mesonotum densely bluish-gray pruinose, with prominent pattern of scattered brown dots, each dot surrounding the base of one of the stout, brown, mesonotal hairs; the brown areas often confluent on middle of anterior margin and on sublateral areas between the suture and wing bases. Scutellum bluish-gray pruinose, dark brown in middle; with four long hairs. Post-scutellum and pleura blackish with variable grayish pollinosity. Legs brown; bases of femora pale and well defined, narrow, sub-apical pale rings on femora and sub-basal rings on tibiae; apices of hind tibiae pale; tarsi pale; fourth tarsal segments cordiform (fig. 3).
Wing (fig. 4) with anterior radial cells very narrow, the second short; macrotrichiae confined to a few at wing tip in apices of cells R₅ and M₂. Wing deeply infuscated with brownish, a blackish stigmal spot over second radial cell and distal half of first; large yellowish areas at wing base and over r-m crossvein to slightly behind base of anterior media. Prominent bluish-white spots as follows: in cell R₅, a small, round spot behind second radial cell, a second spot just past apex of costa on anterior margin, a third just past this one in middle of cell R₅ and a fourth, hourglass-shaped spot halfway between the third and wing tip with the anterior portion broadly meeting wing margin. Vein M₁ narrowly bordered on most of its length to apex with light gray; an elongate white spot straddling middle of vein M₂; an elongate white spot on mediocubitus near wing base; an elongate white spot in cell M₂ just behind anterior media before the fork; a smaller oval spot just ahead of mediocubital fork;
**Culicoides phlebotomus.** Fig. 1. Female wing (Fort Buchanan, Puerto Rico). 2. Male genitalia, ventral view, parameres drawn separately in 2a (Arraijan, Panama).

**Culicoides willistoni.** Fig. 3. Distal tarsal segments of female, showing cordate fourth segment. 4. Female wings. 5. Female palpus. 6. Male genitalia, ventral view. 6a. Parameres drawn separately. 6b. Lateral view to show details of aedeagus and parameres.
small, rounded, white spots well back from wing margin in apices of cells M1, M2 and M4; anal cell with an elongate white spot just behind mediocubital fork and a diffuse, narrow streak along wing margin in basal half of cell. Halteres white, the stems brownish.

Abdomen dark brown, narrow apices of tergites with pale gray margins. Spermathecae two, slightly oval to pear-shaped, subequal, the bases of the ducts sclerotized a very short distance; rudimentary third spermatheca and ring present as usual.

Male. Similar to the female but smaller, with the usual sexual differences; antennal plumes yellowish, longer than in *phlebotomus*. Genitalia (fig. 6): Ninth sternite with shallow, rounded mesal excavation; ninth tergite tapered, with very short apicolateral processes. Basistyles with ventral roots strongly constricted at bases, the apices broadly expanded, boathook-shaped; dorsal roots well developed, slender; dististyles strongly bent a third of way to apices, the latter more slender than in *phlebotomus*. Aedeagus with short, broad, transverse basal arms, a short, stout, pointed median process projecting anteriorly from between them; posterior margins of basal arms with short, platelike expansions; the aedeagus bearing posteriorly a straight, spatulate, distally truncated, dorsal blade, with a strong, ventrally curved process arising from the base with its distally pointed apex curving towards the dorsal blade and about two thirds as long. (In *phlebotomus* the ventral process is as long as the dorsal and is more strongly curved, with its apex often passing behind to the dorsal side of the broader, more spatulate, dorsal blade (fig. 2).) Parameres with bases abruptly bent and bearing strong knobs, each with a distinct triangular lobe on inner side at base of stem, then slightly narrowed and bent outward a short distance, then abruptly bent ventrad with slender, simple, pointed apex.


*Paratypes*: 27 ♂♂, 47 ♀♀, same data as type; 6 males, 20 females, Palm Beach near San Carlos, Panama Province, Panama,

This species is very closely related to *phlebotomus*, with very similar habitus, general color and type of wing markings, the same cordate fourth tarsal segments and palpal structure, and almost identical genitalia. In *phlebotomus*, however, the mesonotum is uniformly bluish-gray pruinose, without the punctiform brown dots, but occasionally with suffuse, yellowish brown sublateral bands; the legs are uniformly yellowish brown with the pale bands hardly distinguishable; the whitish wing markings are not so extensive, particularly in cell R₃ where the small round spot behind the second radial cell often disappears entirely and the third (see above) round spot usually lies directly behind the (second) one at the end of the costa, and there are differences as pointed out above in details of the male genitalia. Because of the punctiform mesonotal pattern and the similarity of the wing markings in cell R₃, *ivillistoni* can easily be confused with *jurens* (Poey), which also occurs along Neotropical seacoasts. However, *jurens* can be quickly separated by the yellowish color of the pale wing spots, it lacks the pale spot straddling the middle of vein M₂, the distal pale spot in cell M₁ extends narrowly to the wing margin and there are two pale spots distally in the anal cell. In *jurens* there are also many structural characters different from those of the *phlebotomus* group.

We wish to dedicate this species to the memory of Samuel W. Williston, pioneer American dipterist, whose work on the Central American fauna remains as an American classic.

**Literature Cited**


The Identity of the Milliped Genus Camptomorpha Silvestri (Polydesmida: Chelodesmidae)

By Richard L. Hoffman, Blacksburg, Virginia

In the years between 1895 and 1900, a large number of Neotropical diplopods were described by Signor F. Silvestri, chiefly in a series of short papers appearing in the Bollettino dei Musei di Zoologia ed Anatomia comparata della Reale Universita di Torino (hereinafter cited as Boll. Mus. Torino). Although most of his colleagues and successors largely ignored or discredited Silvestri’s work, it is undeniable that his illustrations were usually very good, and his descriptions succinct, though brief.

The recent acquisition of one of the early Silvestri papers reveals that in certain milliped groups a great deal of confusion exists which may be attributed to faulty treatment of his genera and species by certain prominent workers. The genus Camptomorpha affords one such instance. In the most recent manual of the polydesmoid forms (Das Tierreich, 69, 1938), Attems has associated the name with an entirely different group of millipeds from that to which Silvestri originally gave it, drawing his concept of the genus from the erroneously placed species! In addition, the true Camptomorpha has acquired two synonyms, and its species are widely scattered through the pages of the Attems work cited above.

The purpose of the present paper is to demonstrate the nature of the type species of the genus (as readily observable from the original description); to define the genus on the basis of gonopod characters, and bring together for the first time the species properly referable to it; and to summarize the nomenclatorial history of the group.
Genus *Camptomorpha* Silvestri


**Diagnosis.** Chelodesmoid diplopods characterized particularly by the shape of the male gonopod. The telopodite is composed of three distinct elements: two large laminate prefemoral processes of nearly equal size, and a much smaller, simple, sickle-shaped solenomerite located between them. This arrangement is unique in the family.

Dorsum smooth; lateral carinae small, their margins generally even, the pores in a swelling near the posterior corner; tibial projections present. Medium sized species (30–40 mm in length).

**Distribution.** Eastern Cordilleran region in Ecuador, Peru, and western Brasil. One species also from eastern Brasil (Para).

**Synonymy.** This genus was proposed for the reception of two Ecuadoran species, *dorsalis* and *perproxima*, similar to each other and differing from other forms known to Silvestri in the nature of the male gonopods. These appendages were figured in five drawings, showing them (1) in situ, their coxae attached, and (2) individually, with one of the prefemoral processes removed to show the ordinarily nearly concealed solenomerite. On seeing these drawings, my immediate reaction was that a species of "Phantasmodesmus" was represented. Consultation of the legend showed that the milliped in question was the type species of *Camptomorpha*! I have prepared a copy of Silvestri's figure 29, here reproduced as a line drawing (fig. 1). Comparison of it with the figures illustrating the species listed
below will show beyond doubt they are all species of *Camptomorpha*.

Apparently unaware of Silvestri's paper, Verhoeff proposed the name *Phantasmodesmus* in 1927 for *Leptodesmus pulvillatus* Attens, an upper Amazonian species which Verhoeff correctly felt was not congeneric with the type species of *Leptodesmus*. Until acquiring the Silvestri paper, I had been using Verhoeff's name for this genus.

In 1938, the entire group of "leptodesmoid" millipedes was treated by Attens in a most useful (although somewhat unreliable) compilation. In this work, Attens included a great diversity of unrelated species in the genus *Leptodesmus*, which was divided into four subgenera. This division, based upon the shape of the gonopod coxa, and the presence or absence of coxal spurs, is unquestionably one of the most artificial and indefensible arrangements ever proposed in diplodop systematics. It has already been refuted by Schubart, who has rearranged the members of the group into sections based upon the general appearance of the entire appendage. Attens had placed *pulvillatus* and *papillosus* in the subgenus *Leptodesmus*, and *cordilleranus* in *Pseudoleptodesmus*. His account of *Camptomorpha* on pages 69-74 is incorrect inasmuch as his concept of the genus was based upon species which are not congeneric with *dorsalis*. These five species, not even homogeneous within themselves, will have to be reallocated in the future.

Most recently, Chamberlin has proposed a new generic name—*Eucamptesmus*—for a species from northeastern Peru which is obviously only a form of *Camptomorpha*.

Since only a few of the known species have had the gonopods illustrated from the same aspect, it is difficult to make accurate comparisons or to prepare a key for their discrimination at this time. It may be commented in passing, however, that *cordilleranus* appears only to be a synonym of *dorsalis*, a relationship which can be verified by a re-examination of the type specimen of the latter. Two subgeneric groups may be distinguished by the gonopod structure. In one, including *dorsalis, perproxima, papillosus*, and *cordilleranus*, the prefemoral processes are simply
laminate with uninterrupted margins; in the second, which numbers pulvillatus, orcites, and digitatus, the prefemoral processes are armed with a variable number of slender branches or spurs. It may become useful at some future time to revive the name Phantasmodesmus for this ensemble (the species of which are further distinct in their lowland habitat is contrasted with the strictly Andine heimat of the other four) but for the time being there seems to be no particular need for such action.

Fig. 1. Camptomorpha dorsalis Silvestri. Male gonopods as seen in situ, redrawn from fig. 29 of the paper cited in the text.

Following is a list of the species of Camptomorpha, arranged chronologically in order of the date of their description:

C. papillosus (Attems), 1931, Zoologica (Stuttgart), vol. 30, liei. 3–4, p. 10, figs. 1–4. Ecuador: Sabanilla, on the east slope of the Cordillerhas.
C. cordilleranus (Attems), 1931, Zoologica (Stuttgart), vol.
30, lief. 3–4, p. 28, figs. 40–42. Ecuador: Sabanilla, on the east slope of the Cordilleras.


Finally, a species described as *Pseudoleptodesmus tricuspis* by Attems in 1931 (Zool., vol. 30, p. 27) appears to be closely related to *Camptomormpha*, and might well be referred to this group. In *tricuspis* the prefemoral processes are long and slender, and the inner one bears a short upright spur at its base.

---

**A Note on a Subgeneric Name in the Saturniidae (Lepidoptera)**

By Charles D. Michener, University of Kansas, Lawrence

In two recent papers (Michener, 1949, New genera and subgenera of Saturniidae, *Jour. Kansas Ent. Soc.*, vol. 22, pp. 142–147; and 1952, The Saturniidae (Lepidoptera) of the Western Hemisphere—morphology, phylogeny, and classification. *Bull. Amer. Mus. Nat. Hist.*, vol. 98, pp. 335–502) *lapsus calami* appear in the citation of the type species of *Ceratesa* Michener, 1949, a subgenus of the citheroniine genus *Adelowalkeria* Travassos. A letter was omitted from the spelling of the specific name, and it was credited to the wrong author. In order to correct the matter formally the following revision is presented:

*Ceratesa* Michener

Type species: *Adelocephala hemirhodia* Rothschild.

This subgenus differs from its relatives by the strong apical spine present on each fore and middle tibia as well as by numerous other characters as detailed in the 1949 and 1952 papers cited above.
Samuel Nicholson Rhoads

Samuel Nicholson Rhoads died on Saturday, December 27, 1952, in Camden County Hospital, Lakeland, New Jersey. He had been an invalid for the past twenty-five years and until recently was a patient in a private hospital at Willow Grove, Pennsylvania.

He was born in Philadelphia on April 30, 1862, and became a member of the Academy of Natural Sciences of Philadelphia in 1891, a life member in 1941. His interests were chiefly in birds and mammals on which he published from 1892 to 1902. Perhaps his best known work is "The Mammals of Pennsylvania and New Jersey. A biographic and descriptive account of the furred animals of land and sea, both living and extinct, known to have existed in these States. Privately published, Philadelphia, 1903."

He made collections of other groups of animals. In 1899 he was in Mexico; the Odonata which he obtained there were brought by Mr. F. D. Godman, of London, for the Biologia Centrali-Americana. Among them was a species described in the Neuroptera volume of that series as Argia rhoadsi. The Orthoptera collected by him in Mexico were secured by J. A. G. Rehn, who described from that series Sinaloa brevispinis and Pristocentophilus rhoadsi; this Orthoptera material is now in the collection of the Philadelphia Academy. The Academy has also Odonata from New Jersey, Philadelphia County, Delaware and Ecuador gathered by Rhoads in 1899, 1903 and 1911.

From 1902 on for twenty years or so Rhoads maintained the "Franklin Book Shop," most of that time at 920 Walnut Street, Philadelphia, where he dealt in volumes chiefly of natural history character.

(We are indebted to an obituary in the Philadelphia Inquirer of December 31, 1952, for some personal data on Mr. Rhoads.)

P. P. C., J. A. G. R.
The Type of Forficula Rehni (Dermaptera)

By James A. G. Rehn, Academy of Natural Sciences of Philadelphia

In a recent note 1 Dr. Malcolm Burr described as a new species, which he called Forficula rehni, the insect which had been recorded as Forficula rodziankoi Semenov, from certain localities in Kenya, East Africa, as well as in the lake region of Central Africa. Dr. Burr brought out the fact that true rodziankoi Semenov 2 is a very different thing, and that the material recorded as it by himself in 1911, 3 by Borelli in 1915, 4 and by Rehn in 1925 5 and 1936 6 represents his new rehni, which he regards as nearer the palearctic F. tomis (Kolenati) than it is to rodzainkoi, which was described from Harrar, Abyssinia.

In his description of rehni Burr unfortunately failed to indicate a single type for the species, but his sole figure is a photograph of a male specimen from Kijabe, Kenya, collected by Alluaud and Jeannel, reported as rodziankoi by Borelli, and now in the collection of the Academy of Natural Sciences of Philadelphia, which acquired it in exchange from the Paris Museum. A photograph of this specimen had been supplied to Dr. Burr by the author for comparison with Anatolian specimens of F. tomis, and he used this for comparison with illustrations of topotypic material of rodziankoi, and of tomis from the Ukraine, the Caucasus and Turkey, and of F. sjostedti Burr from Kilimanjaro, East Africa. In consequence, in the absence

of other indication, the figured specimen becomes the holotype of Forficula rehni Burr (Academy of Natural Sciences of Philadelphia, type no. 5772).

Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian
Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1953 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

Note: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.


ARACHNIDA AND MYRIOPODA—Aragão, H. and F. da Fonseca.—Confirmação de Ixodes aragaoi Fonseca,
Norddeutschlands. No. 2 (Acarina, Oribatidae). [Zoolo-
nymic catalogue of British Acari; pt. 1. [19] ser. 12, 6: 
1-26. Wolfenbarger, K. A.—Systematic and biological 
 studies on North American chiggers of the genus Trom-
bicula, subgenus Eutrombicula (Acarina, Trombiculidae). 

—Further distributional data on Utah Siphonaptera. (Ab-
Lima and Costa-Leite.—Pscoptera. (See Diptera.) Goto, 
H. E.—Lepidocyrtus christianseni, sp. n. (Collembola: 
Entomobryidae) from North America. [19] ser. 12, 6: 
30-32, ill. Remy, A.—Palpigrades de l’Ile de la Réunion. 
Valle, K. J.—Die Verbreitungserhältnisse der ostfenno-
skandischen Odonaten (Zur Kenntnis der Odonatenfauna 
Wereck, F. L.—Contribuição ao conhecimento dos Ano-
pluros. III. O género Eulinognathus. [117] 12: 421-31, 
ill., 1952.

ORTHOPTERA—Cochran, D. G. (See Anatomy.) 
Dupont-Raabe, M.—(See Anatomy.) Durand, M.-C. 
—Évolution de la chromatine dans la spermatogenèse de 
Gryllus bimaculatus; étude critique de quelques réactions 
histochemiques des acides nucléiques. [39] 86: 381-403, 
1952. Lawson, F. A.—Structural features of cockroach 
egg capsules. III. The ootheca of Euryotis floridana (Blat-
of Tettigellidae proposed by Melichar. [106] 53: 47-50, 
ill. (*) Smith, K. D. and G. B. Popov.—(See General.) 
Voy, A.—Régénération et croissance des pattes atypiques 
chez le phasme (Carausius morosus Br.). [39] 86: 449-70, 
to humidity. [40] 43: 575-80.

HEMIPTERA—Al-Tikrity, A. B. —The biology of the 
boxelder bug in Cache Valley. (Abstract.) [Utah Acad. 
e histológicos sobre a subfamília Triatominae (Reduviidae). 
China, W. E.—A new subfamily of Microphysidae (West 
C. A. Campos Seabra and C. R. Hathaway.—Aditamento 
ao trabalho sobre o género Apiomerus (Reduviidae). [121]
50: 265–70, ill., 1952 (*). **Drake, C. J. and L. Hoberlandt.**


J. R.—The larvae and pupae of some important Lepidoptera. [40] 43: 691-701, ill.


Reviews


Near the close of World War II officials of the Commonwealth Scientific and Industrial Research Organization, of Australia, requested J. A. G. Rehn, of the Academy of Natural Sciences of Philadelphia, to undertake a monographic study of the grasshoppers of that continent. For some years workers dealing with the ecology, behavior, and control of Australian species had been handicapped by the lack of names for a large number of undescribed species, also by several fundamental shortcomings in the taxonomic work of Yngve Sjostedt, the late Swedish orthopterist who had published more extensively than anyone else on Australian Acridoidea. A very close and helpful cooperative arrangement was made with Mr. Rehn, by which partially sorted series of genera were sent to Philadelphia in several lots, to minimize the risk of loss in shipment and to reduce the routine handling of specimens by Mr. Rehn. At the same time full geographic and other pertinent notes were supplied. For the development of this cooperation and the incentive leading to this highly successful undertaking much credit is due K. H. L. Key, a Senior Research Officer (CSIRO) in Canberra.

The present volume covers the Tetrigidae (grouse or pygmy locusts) and Eumastacidae (monkey grasshoppers, which in the United States are represented by only a few southwestern species). In Australia 37 species and subspecies of the former are
known, and 43 of the latter. Four genera and 19 species and subspecies are described as new in the Tetrigidae, two genera and 24 species and subspecies in the Eumastacidae. Of the 43 new forms the holotypes of 25 are deposited at Canberra, four each at Adelaide and Sydney, nine at Cambridge, Mass., and one at Washington, D. C. Of the total of 80 species and subspecies treated, some 16 tetrigids and 19 eumastacids are now recorded in North American collections. The 37 previously known forms (not including synonyms) were described by Sjöstedt (25), Ignacio Bolivar (6), Walker (3), Erichson (2), and Stal (1).

This book is attractive, but the binding is not especially sturdy. In Mr. Rehn’s habitual style, which has become a tradition for completeness of detail in orthopterological work, careful attention is given to the location of places, the distributional pattern of the major entities both within and outside of Australia, and full descriptions of higher categories, genera and species. Photographs or drawings represent all but two of the 37 tetrigids and all but 13 of the 43 eumastacids. There is an index to the systematic categories treated. A total of 424 footnotes are used to separate certain references and many very interesting and valuable details from the more formal systematic text. Some readers may wonder if the number of footnotes might not have been somewhat reduced without loss of detail. In the case of Moraba improcera, for instance, the original description has four different footnotes pointing out that the holotype has been dried from a wet preservative and that consequently there has been shriveling and an uncertain amount of change in color and shape.

While this work will naturally become a standard wherever Australian grasshoppers are studied, and the concentration of types is mainly in Australia where they will give an added impetus to research by resident students, American orthopterists concerned with the world fauna will have a much improved reference series available as a result of Mr. Rehn’s comprehensive studies. The specimens collected in Australia by P. J. Darling- ton in the early 1930’s, and now located at the Museum of Comparative Zoology in Cambridge, have proved especially helpful. It may interest Americans that one eumastacid, Callilata lesueurii, is named for Charles A. Lesueur, a member of an early French expedition to Australia who eventually came to America, was an active zoologist in Philadelphia, and later joined Thomas Say in the historic colony at New Harmony, Indiana.
But few improvements could be suggested for this admirable work. Identification keys might be used with greater facility if more references to appropriate illustrations were inserted directly in the couplets. The lack of opportunity to consult the historic Sjöstedt material at Stockholm necessarily has been responsible for incomplete information on certain species, but Mr. Rehn has assured me that this handicap was not serious and that most of Sjöstedt’s species are recognizable without reference to the Stockholm types.

A manuscript on the Pyrgomorphinae has been completed for some months and is expected to constitute Volume 2. At present Mr. Rehn is busy with the Cyrtacanthacridinae (spinet-throats) which are the largest single group of grasshoppers in Australia, and which consequently are expected to require two volumes. Treatment of remaining groups will follow, probably in two volumes, and it is hoped that a final volume will bring together much material on distribution and other general aspects, so that about seven volumes are planned. This modern work reflects the author’s 50 years of experience with the world fauna as well as the availability of a collection which in many groups of Orthoptera is the finest in existence. For the majority of users who have struggled with previous Australia revisions it has the added advantage of being in English.

One wonders how many taxonomists endowed with much natural ability and high ideals have had their hopes for major taxonomic accomplishment falter and then collapse in the face of advancing age, administrative responsibilities and seemingly endless interruptions. At slightly past 70 years of age, Mr. Rehn may be congratulated for not having allowed himself to lose sight of his goal. We may hope that there is for him a well deserved satisfaction in seeing a successful project reach the publication stage, and also that nothing will prevent the completion of the entire review of Australian grasshoppers.

Ashley B. Gurney
Division of Insect Detection and Identification
Bureau of Entomology and Plant Quarantine
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.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Koenigsberg, Krs. Wetzelar 16, Germany.


Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.


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.

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THE AMERICAN ENTOMOLOGICAL SOCIETY
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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.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in paragraphs (d/2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
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, ADVERTISEMENTS: All communications and remittances to be addressed to ENTOMOLOGICAL NEWS, 1900 Race Street, Philadelphia 3, Pa.

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The Taxonomic Value of Male Genitalia in the Ithomiidae (Lepidoptera)

By Richard M. Fox, Colorado College, Colorado Springs, Colo.

During the past sixteen years I have studied more than 20,000 Ithomines and have been able to account for nearly all the names published to date for subspecies and species. Hundreds of dissections of male genitalia have been made, with most of the names represented. In view of this rather comprehensive survey of the family, it may be of interest to summarize the worth of the male genitalia as taxonomic criteria in the Ithomiidae. It is understood, of course, that sound taxonomy can be based under no circumstances only on a single criterion. Nor is it thought that the findings presented here will appear new or startling to the experienced systemist; this study has the merit only of being based on comprehensive data within one major taxonomic category.

J. Kremky was the first to use male genitalia for systematizing the Ithomines (1925). This pioneer work suffered from being based on a small collection rather than on fully representative material. In recent years, R. F. d'Almeida has made several attempts (1939–45) to utilize male genitalia as a basis for the classification within this family.

I find that the family Ithomiidae includes some 349 species, many of them strongly polytypic, grouped into 45 genera and into two subfamilies of unequal size. (By way of contrast, Bryk's catalogue (1937) listed 518 species in 38 genera.) The smaller subfamily contains only the genus Tellervo, which in turn com-
prises a single, strongly polytypic species found in the Australian tropics. The other subfamily, the Ithomiinae, is found in the American tropics and is divided into eight tribes.

At the family level, male genitalic structures are in this case not specific. There is no characteristic feature common to all the Ithomiidae but unlike the genitalia of any other family. However, these structures indicate interfamilial relationships, although nothing not also indicated by other structures such as the fore legs, the antennae, the palpi, the wing venation or the pattern anatomy.

Four of the eight tribes in the Ithomiinae have characteristic male genitalia enabling immediate tribal identification from these structures alone. The other four tribes cannot be diagnosed surely by the male genitalia, so that their separation depends on the analysis of other structures.

For identifying the 45 genera in the family, there are 44 recognizable and definable kinds of male genitalia. Here these structures are clearly of great value. However, two of the primitive genera, *Tithorea* (containing two species) and *Elzunia* (containing seven species), are identical in the male genitalia, although nearly every other structure separates the two genera and the included species.

Fifteen of the 45 genera are monotypic; thus 334 of the species belong in 30 genera. In 23 of these polytypic genera, all included species can be distinguished by the male genitalia. In one genus (*Scada*) slight but constant differences enable the recognition of the subspecies. Thus in seven polytypic genera, male genitalia will not differentiate species. Two of these are *Tithorea* and *Elzunia*. In the remaining five polytypic genera, male genitalia neatly diagnose species groups, but do not differentiate the species within the groups.

The traditional way to identify a butterfly is by means of its color and pattern. It is more than a little dangerous to rely on color and pattern to sort the Ithomines into species, however, and this is caused by three curious phenomena: There are a number of cases of remarkable parallel evolution of pattern and color by which "sibling" species occur; there is quite extensive mimicry
within the family; the subspecies of a polytypic species frequently show striking divergence in coloring and in development of the pattern. As a consequence, one must examine very carefully two Ithomines that look alike, for they may be different species; and conversely, when one has an aggregation of different-looking members of a genus, they can easily belong to a single species. Not colors and spots, but structures must be studied. Thus the male genitalia frequently are of the utmost value for untangling the taxonomic snarl.

In the following table, the number of species in each tribe is listed to show how many can be identified with male genitalia to species, how many to species group only, and how many do not separate by male genitalia.

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<td></td>
</tr>
<tr>
<td>Ithomini</td>
<td>68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olereini</td>
<td>71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dircennini</td>
<td>53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total species</td>
<td>245</td>
<td>95</td>
<td>9</td>
</tr>
<tr>
<td>% of species</td>
<td>70.2</td>
<td>27.2</td>
<td>2.5</td>
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References Cited

New Species of Acmaeodera from California
(Coleoptera: Buprestidae)

By JOSEF N. KNOLL, Department of Zoology and Entomology,
The Ohio State University, Columbus, Ohio

Acmaeodera fattigi n. sp.

♀. Rather robust, elongate, cuneate at apex; ground color shining black; each elytron with yellow spots as follows: one in middle at base, two back of base, two at middle, two back of middle and one near apex, an elongate red spot at apex, elytra and sides of pronotum clothed with appressed plumose white scales; head and rest of pronotum densely clothed with white pubescence; ventral surface densely clothed with appressed plumose scales.

Head convex, covered with large shallow punctures; antennae serrate from fifth segment.

Pronotum convex, much wider than long, widest in middle, wider at base than apex; sides broadly rounded, constricted at base and apex; disk with slight median depression at base and one each side; surface densely coarsely punctate, punctures larger and closer on sides, base transversely corrugated.

Elytra at base as wide as base of pronotum; sides expanded back of base, then constricted and again expanded at middle, converging to rounded coarsely serrate apices; disk convex, umbone prominent; surface with closely placed large punctures forming striae, interspaces finely punctate, outer interspaces near apex serrulate.

Anterior margin of prosterum with wide emarginate truncation, margin not reaching lateral prolonged front angles. Abdomen beneath densely, finely punctate, punctures concealed by vestiture; last visible segment not modified.

Length 7.1 mm.; width 2.5 mm.

Holotype ♀ collected at Jacumba, San Diego Co., CALIFORNIA, July 6, 1952. Two paratypes collected at Mountain Springs, same county, June 28 and July 6, 1952. All specimens collected by D. J. and J. N. Knoll and in collection of author.
Acmaeodera fattigi n. sp. (Line equals 1 mm.)

This species should stand next to *A. mimicata* Knull (1938) from which it can be separated by the cuneate elytral apices, yellow mark at base of each elytron and elongate red mark at apex.

The prosternal margin is similar to that of *A. pinalorum* Knull (1950); however the long pubescence on elytra will separate *A. pinalorum* from fattigi.

I take pleasure in naming this species for P. W. Fattig, who has added much to our knowledge of Georgia insects.

References


A Taxonomic Note on the Larvae of Aedes Schizopinax Dyar

By WILLIAM D. SUDIA, Communicable Disease Center, Public Health Service Federal Security Agency, Atlanta, Georgia

*Aedes schizopinax* Dyar is considered by most mosquito authorities to be quite rare. Dyar described the species in 1929, and it has apparently only been recorded since then by G. Allen Mail from Gallatin and Jefferson Counties, Montana, and Mammoth Hot Springs, Wyoming. Matheson (1944) includes *schizopinax* in his key to *Aedes* larvae where he mentions as the chief character the following: “Scale of comb thornlike, the long apical spine without lateral spinules.” Dyar (1929) in his original description states, “Lateral comb of the eighth segment of about 50 scales, each with long thorn-shaped central point and only traces of lateral spinules.”

The author has examined the comb scales of 6 of the 13 paratype larval skins from the U. S. National Museum and noted that under the magnification of a dissecting microscope (54x), no lateral spinules could be seen. However, upon closer examination using a compound microscope (430x), lateral spinules could be seen. Dr. Alan Stone of the National Museum kindly examined the larval skin of the holotype and others of the type series. He confirmed the presence of lateral spinules when observed under high magnification, and stated that they were less readily seen under lower magnifications.

The present trend in identification procedures is to confirm such characters as the shape of comb scales under the highest magnification available. If a taxonomist observed lateral spinules on the comb scales, he would be unable to run specimens of *schizopinax* to this species in Matheson’s larval key. This situation may possibly explain the rarity of this species.

**Explanation of Figures**

Details of the larva of *Aedes schizopinax* Dyar. (Drawing based on specimens collected at Sedan, Montana).

In an attempt to clarify this problem, a detailed drawing of the larva is presented as well as the following key which involves those species included in couplets 45 and 46 on page 135 of Matheson’s “Handbook of the Mosquitoes of North America.”

1. Upper head hairs with five or more branches..........2
   Upper head hairs usually single to four-branched........3
2. Mesothoracic hair No. 1 very long and stout; all hairs in anterior submedian prothoracic group of about the same length and thickness (Western)......pullatus Coquillett
   Mesothoracic hair No. 1 short and delicate; one hair in anterior submedian prothoracic group single and much longer than the other two hairs (Eastern)......canadensis Theobald
3. Individual comb scale rounded at apex, more or less evenly fringed with sub-equal spinules; prothoracic hairs 1–3 single........................pionips Dyar
   Individual comb scale pointed at apex, with a large apical thorn and fringed with extremely fine spinules; prothoracic hairs 1–3 not all single.................schizopinae Dyar

Acknowledgments

The author wishes to thank Chester J. Stojanovich, Communicable Disease Center, Atlanta, Ga., for drawing the illustration accompanying this article. Grateful acknowledgments are also presented to Dr. Alan Stone, U. S. National Museum, and to Dr. H. D. Pratt, Communicable Disease Center for assistance rendered.

Bibliography

Data on Chlorobenzene Compounds

The Solvay Process Division, Allied Chemical and Dye Corporation, has prepared a special bibliography and summaries of tests on the biological activity of various chlorinated benzene compounds, as taken from National Research Council publications. The compilation is for free distribution and as an aid to research workers in organic chemicals. Address: 61 Broadway, New York 6, N. Y.

Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian

Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1953 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

Note: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S). Papers published in Entomological News are not listed.


Reviews


With the remark "arthropods are a group of related invertebrates, arthropodists, for the most part, are a group of unrelated vertebrates," R. E. Snodgrass introduces this text, the latest in his long series of able contributions to our knowledge of the
structure of insects and their relatives. This clearly and interestingly written volume is a descriptive account of mainly the external anatomy of eleven major groups of arthropods. A chapter each is devoted to a discussion of the trilobites; Limulus, the king crabs; the fossil Eurypterids; the peculiar marine Pycnogonids; a scorpion, a tick, and spiders as representatives of the Arachnida; the primitive Tasmanian Anaspides, a crayfish, and the isopod Ligya in the Crustacea; a member each of the four major groups of the centipedes or Chilopoda; examples of the two main divisions of the millipedes or Diplopoda; the Pauropoda; the Symphyla or garden centipedes; and in the insects, various species of Diplura and Thysanura and one pterygota, Periplaneta. Prefacing each chapter is a discussion of the general characteristics, biology, distribution, and probably relationship of the groups treated. Scattered throughout the text are approximately 650 illustrations distributed among 88 "figures" or plates, all executed in the author's well-known and inimitable clear style. The cockroach hind wing, Fig. 84 A, p. 319, is rather schematic and has evidently been drawn from an aberrant specimen, for it is incorrect in several details. No illustration of the fore wing or tegmen is given. However, the excellent figures and photomicrographs in Smart's recent paper (1951, Proc. Zool. Soc. London, vol. 121, pp. 501-509) will remedy this lack. Explanation of the lettering on the text-figures are, for the most part, given at the end of each chapter rather than under each collection of figures. This involves much turning and searching of pages and, when textual matter and figures are widely separated, sometimes by ten or twenty pages, may prove very exasperating to readers.

The author states he has attempted to evaluate the various theories relating to the ancestry of insects and the evolution of the arthropods and has come to the disconcerting conclusion that "the facts of arthropod structure are not consistent with any proposed theory of arthropod relationships." Many of the theories are succinctly demolished and dismissed and, although no substitute is actually proposed, nevertheless it is evident from comments scattered throughout the text that Snodgrass has probably formulated some definite ideas on the proper grouping of arthropods. The Xiphosurida and the fossil Eurypterida, for example, are completely dissociated from the Arachnida as well as from one another; and the centipedes are clearly separated as a class from the millipedes. Of particular interest to entomologists is the author's complete rejection of the conventional division of insects into the two customary groups: Apterygota and Ptery-
Instead, as others have pointed out in recent years, he shows that the endognath Collembola, Protura, and Diplura form one loose association and that the ectognath Thysanura (s. s.) and pterygotes another very compact and closely related group.

This attractively printed and well-bound text will be invaluable to both students and teachers of zoology and entomology. —V. S. L. Pate.


The appearance of this book has been awaited by American ant specialists with interest, not to say anxiety, for several years. About the best one can say for it is that it introduces very few new names into the literature. Four new species are described and figured: Proceratium californicum, Pogonomyrmex nitratatus (also referred to as P. californicus nitratatus), Pogonomyrmex spadix (also referred to as P. barbatus spadix and P. barbatus spadex), and Lasius helvelus (also referred to as L. helvelus). The last three of these appear to be safely considered as synonyms of familiar species long known from California, and the Proceratium, described from a single male, is enigmatic in more ways than one.

The descriptive material in the book is almost entirely composed of direct copies from the original or subsequent descriptions by other authors, and is largely obsolete for modern purposes. In the preface the author mentions W. S. Creighton’s important revision, The Ants of North America, and lauds the advances made in the elimination of numerous synonyms and in other simplifications of the taxonomy of our ants, yet Mr. Cook’s text reveals scarcely any sign that he has incorporated these advances in his thinking. Most of the old synonyms are without justification disinterred and faithfully listed. The book is profusely and often irrelevantly illustrated, a large part of the drawings being very closely approximate line-for-line copies of figures which first appeared in various works by M. R. Smith, W. S. Creighton, W. M. Wheeler, and others. One searches in vain for a direct credit for these figures, instead finding the following curious statement in the Acknowledgments section: “These drawings follow the modern style of modeling insect drawings as exemplified by the work of the artists Sara H. Deborg [Debord] and A. D. Cushman in some of M. R. Smith’s
works; the technique of Shirley Risser in making open-line drawings, as in Dr. William S. Creighton's *Ants of North America*, has been followed in some instances."

This work amounts to an indiscriminate compilation of the literature concerning Californian (and quite a few non-Californian) ants. The locality data are surprisingly scanty in view of the excellent collecting opportunities in California. The correspondence of Cook's records (stated without collector's name in many cases) with old series in the Wheeler Collection at Harvard is remarkably extensive. Many of the records may have been secured during the author's fleeting sojourn at Harvard as a graduate student.

In matters of arrangement, spelling, and captioning, abundant confusion exists in this book. On page 208, for instance, there are given two figures (after Smith) of "*Strumigenys* rostrata" Emery, although, as the previous page testifies, this species does not occur in California and does not belong to the genus *Strumigenys*. On page 330, figures of four species of *Lasius* are given; these are oriented in such a way that in two of them all conventional diagnostic characters are hidden, rendering identification impossible, while in the other two, enough can be seen to disclose that "*Lasius umbratus subumbratus*" (*L. subumbratus*, fide Creighton) is probably *L. umbratus*, and "*L. interjectus californicus*" (*Acanthomyops claviger californicus*, fide Creighton) is probably *L. neoniger*. In general, the figures original to the book show few of the useful key characters, are often grossly out of scale in individual plates, and are certain to be misleading to the novice. A key in the usual sense is lacking.

Cook presents practically nothing of value for the myrmecologist and much that will hopelessly puzzle the layman residing in California who wants to learn about the ants of his State. In handling this outwardly handsome volume, one cannot help but think of the worthwhile and basic manuscripts on ant biology, the publication of which has been delayed or even prevented for lack of funds, artistic assistance, and working time. It is obvious that *The Ants of California* has wasted a great amount of all three. It is the hope of the present reviewers that somewhat less effort will be wasted in trying to use it for the study of California ants. Fortunately, Creighton's above-mentioned book covers the subject with reasonable thoroughness.—W. L. Brown and E. O. Wilson.
List of Titles of Publications Referred to by Numbers in Entomological Literature in Entomological News.

10. American Journal of Tropical Medicine & Hygiene. Baltimore, Md.
34. Bonner Zoologische Beiträge. Bonn, Germany.
43. Canadian Entomologist. Ottawa, Ont.
44. Canadian Journal of Zoology. Ottawa, Canada.
48. Dusenija. Curitiba, Parana, Brazil.
49. Ecological Monographs. Durham, N. C.
52. Entomological Society of America, Annals. Columbus, Ohio.
61. Eos; Revista Española de Entomología. Madrid.
63. Faune de l'Union Française (Formerly Faune de l'Empire Français).
64. Florida Entomologist. Gainesville.
65. Folia Universitaria, Cochabamba, Bolivia.
72. Institut Scientifique de Madagascar, Mémoires, Ser. E. Tananarive.
85. Lepidopterists’ News. New Haven, Conn.
88. Mexico Univ. Instituto de Biología, Anales. Mexico City.
90. Microentomology. Stanford University, California.
91. Mocambique; Documentario Trimestral. Lourenço Marques.
93. Musei Zoologici Polonici, Annales. Warsaw, Poland.
94. Musei Zoologici Polonici. Fragmenta Faunistica. Warsaw, Poland.
95. Naples Univ. Instituto e Museo Zoológico, Annuario.
97. Natural History Miscellanea (Chicago Academy of Sciences).
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111. Pan-Paciifc Entomologist. San Francisco, Cal.
114. Polskie Pismo Entomologiczne. Wroclaw, Poland.
121. Rio de Janeiro. Instituto Oswaldo Cruz, Memorias.
123. Rivista di Parassitologia. Rome, Italy.
125. Royal Entomological Society of London, Proceedings, Ser. B.
126. Royal Entomological Society of London, Transactions.
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139. Société Fouad I d'Entomologie, Bulletin. Cairo, Egypt.
140. Société Linneenne Lyon, Bulletin Mensuel.
146. Systematic Zoology. Washington, D. C.
149. Tijdschrift voor Entomologie. Amsterdam.
150. Tohoku University. Science Reports, Ser. 4. Tohoku, Japan.
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.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Koenigsberg, Krs. Wetzlar 16, Germany.


Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.


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.

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14.—Rehn (John W. H.)—Classification of the Blattaria as indicated by their Wings (134 pp., 13 pls., 1951) ........................................... 5.00

THE AMERICAN ENTOMOLOGICAL SOCIETY

1900 RACE STREET, PHILADELPHIA 3, PA.
ENTOMOLOGICAL NEWS

JULY 1953

Vol. LXIV No. 7

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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.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in paragraphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
stipulations of the original generic diagnosis, then it becomes automatically the type of the genus. Because Sager’s *fulva* does meet these requirements and inasmuch as no other species had been referred to *Strigamia* between the time of its proposal in 1842 and the time of Sagar’s action in 1856, *fulva* is the type of *Strigamia*.

In 1862 H. C. Wood described a number of new species which he correctly referred to the Gray genus. He had evidently examined Sager’s typical specimens at the Academy of Natural Sciences in Philadelphia and consequently was able to diagnose the nature of the genus correctly.

Overlooking Koch’s *Linotaenia*, Bergsöe and Meinert in 1866 proposed still another generic name, *Scolioplanes*, for the reception of *acuminata*, *crassipes*, and *maritima*, the first two of which had already been placed as synonyms in *Linotaenia* by Koch, a fact that Bergsöe and Meinert, curiously enough, were aware of at the time. It is even more puzzling that the European authors have continued to use *Scolioplanes* since the time of its proposal, even though it is obviously a junior synonym of *Linotaenia* Koch. In 1890 Pocock, disregarding the claims of *Strigamia*, decried the continued use of the Bergsöe and Meinert name and at the same time stated that *rosulans* Koch [= *acuminata* Leach] was the type of *Linotaenia* Koch. I am aware of no earlier type designation so that presumably the genotype of *Linotaenia* was fixed at that time.

In a paper published posthumously in 1893 Bollman reviewed the entire problem, and, completely ignoring *Strigamia*, concluded that the only valid name was *Linotaenia*. Subsequently all American workers, except O. F. Cook, adopted *Linotaenia*, whereas almost all Europeans viewed *Scolioplanes* as the valid name. The type of the latter genus was fixed in 1895 by O. F. Cook who cited *maritima* (Leach) as its genotype.

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5 Naturh. Tidsskr., (3) IV, p. 98 (1866).
8 Amer. Natural., XXIX, p. 866 (1895).
In that same year Cook interjected still another source of confusion when he reviewed the whole matter once again and concluded, as had Sseliwanoff in 1881, that the European species, properly referred to *Linotaenia*, really were not congeneric with some of the North American forms. Discounting the validity of *Strigamia* on the basis that: "... there would seem to be an insurmountable obstacle to the use of his [= Gray's] name in the fact that he published no species under it ..." Cook of course found no other generic name that was available, since *Scolioplanes* was a synonym of *Linotaenia* and the American forms could not be referred to either anyway in his estimation, so he proposed another name, *Tomotaenia*, and cited *Strigamia parviceps* Wood, 1862 as its genotype. This name was subsequently consigned to an appropriate Avernus in synonymy by the American proponents of *Linotaenia* and the European mainstays of *Scolioplanes*.

When the first serious attempt at a world monograph of the Geophilomorpha was undertaken in 1903 by the late Carl Graf Attems, he discounted *Strigamia, Linotaenia, and Tomotaenia* and placed the species previously referred to them by American workers in *Scolioplanes*. Subsequently both he and K. W. Verhoeff, and many others as well, continued to use the Bergsöe and Meinert name for all of the forms involved.

In 1935 Verhoeff erected a new subgenus, *Protoplanes*, under *Scolioplanes*. He pointed out that forms referable to his new group possess a divided ultimate pedal pretergite, whereas the nominate subgeneric forms do not. Regarding *Protoplanes* as essentially Asiatic in contrast to the typically European *Scolioplanes*, he referred *maritimus* (Leach), *hirsutipes* Attems, and *herzgowinensis* sp.n. to it; no type, of course, was established. It is evident now that many of the northeastern North American species are members of Verhoeff's Asiatic subgenus. Among these species is the true *fulva*, the type of *Strigamia*. It fol-

10 Amer. Natural., XXIX, p. 866 (1895).
11 Sager's types at Philadelphia, which I have examined, all possess divided ultimate pedal pretergites. The large, brilliant red centipedes, which have been erroneously referred to *fulva*, are not conspecific with the
lows, then, that Verhoeff's *Protoplanes* is a synonym of Gray's nominate subgenus, *Strigamia*, and that *Scolioplanes*, as a subgenus, is still a synonym of *Linotaenia* Koch. Hence, the following scheme obtains: the only valid generic name is *Strigamia* Gray. It includes two subgenera, the typical subgenus, *Strigamia* Gray, and *Linotaenia* Koch.

The complexities of the situation necessitate a conspectus of the involved generic names.

*Linotaenia* C. L. Koch, 1847.

**Type:** *Linotaenia rosulans* C. L. Koch, 1847 [= *Strigamia (Linotaenia) acuminata* (Leach)]. (Subsequent designation of Pocock, Ann. Mus. Civ. Storia Genova, (2) IX, p. 8 (1890).)

*Protoplanes* Bergsöe and Meinert, 1866.

**Type:** *Geophilus maritimus* Leach, 1817 [= *Strigamia (Strigamia) maritima* (Leach)]. (Subsequent designation of Cook, Amer. Natural., XXIX, p. 866, and Proc. U. S. Nat. Mus., XVIII, p. 75 (1895).)

*Protogenia* Verhoeff, 1935.

**Type:** *Scolioplanes hirsutipes* Attems, 1927 [= *Strigamia (Strigamia) hirsutipes* (Attems)]. (Present designation.)

*Tomotaenia* Cook, 1895.

**Type:** *Strigamia parviceps* Wood, 1862 [= *Strigamia parviceps* Wood]. (Original designation.)

---

**Concerning Charmatometra bakeri (Kirkaldy) (Hemiptera: Gerridæ)**

By H. B. Hungerford, Lawrence, Kansas

Kirkaldy ² described the above under the name *Brachymetra bakeri* from a single female specimen that came from Colombia, Sager types. They are, I am convinced, referable to Woods' despised and rejected species *bothriopa* which was described in 1862. In a paper soon to be published these two very common northeastern species will be characterized in detail.

¹ Contribution No. 815, Department of Entomology, University of Kansas.

S. A. The specimen was 13 mm. long, twice the length of *Brachymetra albinervus* (Am. Serv.) with which he compared it. The following year he examined two more specimens (2 ♀♂ Ecuador) from the Royal Museum of Belgium and concluded that a new genus *Charmatometra* should be set up for *B. bakeri* Kirkaldy. Since then Drake and Harris, 1935, recorded an apterous female from Bogota and in 1941 “several specimens from Venezuela” without adding to or correcting Kirkaldy’s original description.

Since the Kirkaldy type is now in the Francis Huntington Snow Collection of the University of Kansas and the original description is inaccurate and incomplete, it is necessary to correct and supplement the description of both genus and species. Besides the imperfect type I have before me the following:

Colombia, S. A., San Barnardo, Jan. 1939. F. W. Urban. 3 ♀♂, 2 ♀;

The two males labeled “winged” have the high shouldered pronotum characteristic of winged forms but only the broken bases of the wings are present.

In describing the genus *Charmatometra* Kirkaldy says: “Length of head twice as great as its width at the base, much wider at the base than between the eyes anteriorly.” Even ignoring the eyes as part of the head width at base, the length of the head is to its width as 3 : 2.3. Of the antennae he says: “First segment subequal to the other three segments together four times as long as the second, third three-fifths longer than the second, a little longer

---

than the fourth; there is a small node between the second and third segments.” Actually the first segment of antenna is plainly shorter than other three together (130: 150 +). The first segment is not four times as long as the second. In the type the first segment is to the second as 170 : 50.

There is nothing in Kirkaldy’s generic description to justify its separation from Brachymetra. However the species C. bakeri is considerably larger than any described Brachymetra; the first tarsal segment of the front leg is plainly longer than the second, while in all Brachymetra it is plainly shorter; the front tibia is conspicuously expanded at its tips, which is broadly excavate on its mesal surface and sulcate on the outer surface while in Brachymetra the tibia is but little expanded; the middle and hind femora are considerably longer than the body whereas in Brachymetra they are but slightly, if any, longer. Therefore I am recognizing Charmatometra Kirkaldy as a genus.

Kirkaldy’s two descriptions of C. bakeri are not quite accurate. The front femora are not “cylindric” but thicker in one diameter than the other. His measurements of antennal and leg segments are also misleading. There are variations to be sure but the description should agree with the type at least.

The description states that the first antennal segment is four times as long as the second and in the generic description above that it is subequal to the other three segments together. Here are the relative lengths of the antennal segments of the type and seven other specimens.

<table>
<thead>
<tr>
<th>Type</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\varphi$</td>
<td>170</td>
<td>50</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>170</td>
<td>55</td>
<td></td>
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<td>150</td>
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<tr>
<td></td>
<td>145</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O+</td>
<td>140</td>
<td>42</td>
<td>64</td>
<td>56</td>
</tr>
<tr>
<td>O+</td>
<td>130</td>
<td>40</td>
<td>60</td>
<td>57</td>
</tr>
<tr>
<td>O+</td>
<td>130</td>
<td>37</td>
<td>58</td>
<td>55</td>
</tr>
<tr>
<td>O+</td>
<td>120</td>
<td>42</td>
<td>60</td>
<td>55</td>
</tr>
</tbody>
</table>

None of the above has the first segment four times as long as the second, and the last four indicate that the last three segments
are not subequal to the first. In his redescription of *B. bakeri* Kirkaldy says: "Intermediate and posterior femora subequal; intermediate femur two-thirds longer than tibia, the latter five times as long as tarsus." Here are the segmental proportions of the middle leg of a male: Femur: tibia: 1st tarsal: 2nd tarsal: : 40: 33: 8: 1.9. In this specimen the tibia is three plus times as long as the tarsus instead of five times. He also says: "Posterior femur about three-fourths longer than the tibia, the latter ten and one quarter times as long as the first segment of tarsus." The tibiae are difficult to measure accurately but here are the proportions of the hind leg of a male: Femur: tibia: 1st tarsal: 2nd tarsal: : 40: 24: 3: 1.6. The tibia is not ten times as long as the first tarsal segment! It is only eight times as long.

Perhaps with these notes it will be possible to recognize *Charmatometra bakeri* Kirkaldy.

---

**Notice to Collectors in National Parks**

A recent action to simplify procedures governing the collection of scientific materials in areas administered by the National Park Service is of interest to entomologists.

Formerly, in order to collect insects and arachnids, it has been necessary for entomologists, other than federal employees, to qualify, through appointment by the Department of the Interior, as collaborators without compensation. This involved considerable paper work and delay, both for the applicant and the Government.

The new procedure, authority for which is set forth in *The Federal Register* of May 15, 1953 (18 FR 2831, 2832), excepts the collection of insects and arachnids from the federal employment requirement. It will now be possible for qualified entomologists to submit a simple application form by mail or in person to the Superintendent of the national park or monument concerned who is empowered to issue permits to make collections for scientific purposes.

The interests of science have been served well by regulations intended to preserve in the national parks and monuments a maximum of as nearly as possible undisturbed natural biological associations. Collection of specimens is limited to legitimate scientific collection of such nature as to have no measurable adverse effect upon the biological values involved.
A Second Case of Lacebug Bite (Hemiptera: Tingidae)

Although numerous species of hemipterons have been reported to inflict bites upon human beings, most of them have been predacious forms, and only recently have the phytophagous lacebugs been added to the list. Sailer (1945, Journ. Kansas Ent. Soc., v. 18) gives a first-hand account of having been bitten repeatedly by Corythucha cydoniae (Fitch) at Washington, D. C.; this seems to be the only instance in the literature relating to a member of the Tingidae.

It is now possible to put on record notice of the bite of a second species of tingid, Corythucha ciliata (Say), the normal host of which is the sycamore tree. On June 17, 1950, while reading on the front porch of my home at Clifton Forge, Virginia, I became conscious of a slight burning sensation on the back of my left hand, not dissimilar in effect to the bite of a mosquito. Investigation revealed the presence of a specimen of ciliata, busily engaged in sinking its beak into my skin. Curious about the outcome, and admiring the ambition of such a tiny creature, I suffered it to proceed, unmolested. After a few minutes it withdrew its beak and, just as did the specimen of cydoniae in the account cited above, cast about for another likely spot to probe. Lacking Dr. Sailer's forbearance, however, I interrupted the activities and blew the lacebug away. In my case, there was no particular itching sensation—rather a burning one—and the bite was commemorated by a red spot which persisted for more than a week.

Comparatively speaking, the lacebug bite was somewhat less painful than those inflicted by the common anthocorid Orius insidiosus, a much smaller species. Being an entomophagous form, however, Orius is probably endowed with a much more potent salivary secretion.

There remains unanswered the question of what manner of spiritual or material satisfaction rewards the lacebugs from their ventures into anthropophagism.

Richard L. Hoffman
Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian

Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1953 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

Note: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:) References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol ($) .

Papers published in Entomological News are not listed.


**BIOGRAPHIES, OBITUARIES**


**ANATOMY, PHYSIOLOGY, MEDICAL**

Eassa, Y. E. E.—The development of imaginal buds in the head of Pieris brassicae Linn. [126] 103: 39–50, ill.
Hsu, W. S.—The origin of proteid yolk. (See Diptera.)
Kennington, G. S.—The effects of reduced atmospheric pressure on populations of Tribolium castaneum and Tribolium confusum. [113] 26: 179-203.
Levenbook, L.—The variation in phosphorus compounds during metamorphosis of the blowfly, Calliphora erythrocephala Meig. [75] 41: 313-34.
Tanada, Y.—Viruses, microsporidea, and bacilli. (See Lepidoptera.)

Chaubaud and Choquet.—Ixodidae. (See General.)
Gering, R. L.—Structure and function of the genitalia in some American agelenid spiders. [131] 121: no. 4, 84 pp., ill.
Goodnight, C. J. and M. L.—The opilionid fauna of Chiapas, Mexico, and adjacent areas.


expressibility in the genotype abnormal abdomen of Droso-
omie und Metamorphose der Chironomidengattungen Pro-
gall fly (Procecidiochares utilus Stone) of Pamakani, Eupa-
torium glandulosum. [69] 15: 41-44. Dodge, H. R.—Two
erscopagid flies new to Hawaii. [69] 15: 131-34, ill. Dupuis, C.—Contributions à l’étude des Phasiinae cimico-
phages (Larvaevoridae). XV. Données sur les Leucosto-
hertigii Fairchild and description of the female (Psycido-
phology and chaetotaxy of the Culex subgenera Melano-
conion and Mochlostrayx. [56] 55: 89-100. Frick, K. E.
—Further studies on Hawaiian Agromyzidae, with descrip-
tions of four new species. [69] 15: 207-15 (k). Frohne,
A factor influencing male mosquito and midge swarms.
[92] 13: 27. Gilbert, Couch and McDuffie.—(See Anat-
some crane-fly species (Tipulidae) from different types of
localities. [Videnskab. Medd., Dansk Naturhist. Foren.]


Reviews


Entomologists will be pleased to learn of the publication of volume five, by the Thomas Say Foundation. This volume of four hundred fifty-two pages is by Miriam A. Palmer, who was for many years associated with C. P. Gillette, and is titled “Aphids of the Rocky Mountain Region.” This work, the largest thus far published on aphids in America, brings together descriptions, illustrations, and biological notes on about 460 aphid species known to occur in Colorado, Utah, southern Wyoming, southeastern Idaho, and northern New Mexico. Many of the species are keyed for the first time, and many have never been figured before. The work is especially noteworthy because it brings together the many species described from Utah by G. F. Knowlton. Several new species are described and one or two new names are proposed. The plan of classification followed is largely that of A. C. Baker, and is conservative as to genera and species. Following a brief introduction, the family is characterized and divided into subfamilies. The subfamilies
are characterized, keyed to tribes and subtribes, these are in turn characterized and keyed. Genera are characterized, and keyed to species. Individual species are treated after a rather fixed pattern; all known forms are described and essential characteristics illustrated by excellent line drawings which are grouped to make four hundred fifty-four figures, distribution is indicated within the area, and essentials of life history recorded. The section on taxonomy of species is followed by eight colored plates. Following the colored plates there comes a section which should appeal to many entomologists; it is a key to species infesting economic plants grouped under their respective hosts. These keys are brief because they involve few species and for the most part employ common, well known, easily recognized characters. Here one finds keys to such species that live on apple, aster, birch, blue spruce, currants, plum, rose and many other garden and field crops. There is a host plant index, list of literature, gazetteer, and an index to scientific names.

Probably in deference to American economic entomologists a few well known, well established names for species are retained which are known to be synonyms. In one or two cases perhaps this is well because taxonomists in Europe do not agree as to which specific name should be used. It might, however, have been well to indicate such cases. In a work as extensive as this, it is natural that taxonomists would find points here and there to quibble over, or on which they hold honest differences of opinion concerning generic concepts, the interpretation of rules of nomenclature, and the use of specific names. These differences of opinion will vary from person to person, and need not concern the general user of this book.

The work is not a revision. It is to be regretted that it does not cover the entire United States, or that it does not include the species described from the Pacific Coast unless they occur within the region. However, it is by no means as limited in its scope as its title indicates. It includes most economic species found in the United States. The addition of approximately a hundred species from the United States and Canada would make it practically complete.

The book is excellently printed by the off-set process and well and strongly bound.

For this reviewer, who more than thirty years ago received instruction and infectious enthusiasm for the study of aphids from Professor Palmer, it is a pleasure to recommend this book.

F. C. Hottes,
Grand Junction, Colorado

This elegantly printed volume has had an interesting history and one pertinent to an understanding of its scope. Work on it was begun by the authors in 1933, but the first edition was not published until 1940, in Copenhagen, at a time when Denmark was under blockade and when it was necessary that a country in such a situation be agriculturally self-supporting. The book was so helpful that a second Danish edition was issued in 1944. The present English language edition, based on this second edition, was translated by Evelyn Ramsden and edited and abridged by Dr. Dennis of the Royal Botanic Gardens, Kew.

Intended primarily as a general work for the cultivator, and seemingly popular in parts of Europe, it contains considerable technical information and more than a scattering of scientific terms. Although written in quite lucid English, a professional worker does not feel he is reading a text that has been watered-down for the amateur. Reader interest is often added by a brief history of the development of our knowledge of a disease as well as its early methods of control. Textual references are freely made to authors and a reasonable bibliography is appended.

As one would suppose by the title the contents deals with the diseases of orchard, nursery and garden crops, those of the grain crops being omitted. However, the general scope is wider than the title would seem to indicate. The first section deals with "The nature of plant disease" and includes such things as environmental factors (even damage by lightning), an excellent treatment of mineral deficiencies, poisoning by chemical substances such as coal gas, damage by sprays, as well as a general discussion of various of the aspects of fungus, bacterial and virus disease conditions.

The next three sections, "Diseases of Tree and Bush Fruit," "Diseases of Vegetables and Herbaceous Fruit," and "Diseases of Ornamental Plants and Trees" form the bulk of the text. Here the plants are listed alphabetically under their English common names, with the diseases also listed alphabetically under each, again under their English common names. The name of the causal organism (or initiating condition) is given and the disease discussed, often at considerable length under the subheadings of Symptoms, Cause and Control. Secondary invasions also are considered.
For use in America general effectiveness of the present work will be lessened by several factors. As one would expect, it stresses diseases and conditions prevalent in Denmark. This has been further modified by the last editing which pointed the text toward conditions in England. This does not mean that diseases not present in northwestern Europe but serious elsewhere are not included; however, the lack of emphasis of these is certain to be noted. Yet it is to be admitted that only a few serious plant diseases of temperate regions are today confined to any one area; therefore in general the present text has wide application in America. Perhaps the greatest factor hindering the effectiveness of the book is the presence of varietal names mostly unknown to us, especially in the otherwise excellent tables of susceptibility to diseases and spray injury. In some instances the names of widespread varieties have suffered a "sea change" upon introduction into this country; in the majority of cases, especially among the fruits, we just do not grow the sorts commonly planted in England and Denmark. This same situation holds for the names of the proprietary therapeutic products on occasion noted as being effective in the control of some particular disease; although we may be using the same basic compounds, we do not know them under the same trade names. The four pages on British quarantine regulations and advisory services in the present edition are, of course, only of academic interest to the American reader. Furthermore, the recent expansion of plant disease control measures in America is only touched upon in the text, probably the result of the necessary time lag in production of the present edition. In fact today no book published on this side of the Atlantic can be said to be really up-to-date, so rapid is our production of new therapeutic compounds.

On the whole, however, the entomologist desiring to have at hand a readable treatise on the diseases of a wide range of useful plants will find this work of considerable help. One of the major points of interest will be the "keys" to symptoms under each of the major crop plants. For example, the one on potatoes covers nearly five pages. With an ailing plant at hand one without technical training usually can rather easily run down through the key and determine the cause by the appearance of the specimen, this applying to single element deficiencies (or excesses) and cultural troubles, as well as pathological conditions caused by disease-producing organisms. Fortunately the authors have "keyed-out" the same condition in several places according to its variant symptoms as exhibited under different
cultural situations, at different times in the plant's development, as well as in different parts of the plant. These keys also list the page where the condition is discussed at length, either under a particular plant or under some general topic. The illustrations, although not always of the best quality, serve to amplify the discussion and description of symptoms and causal organisms. Altogether, this is a useful and helpful work which should be on the shelves of those economic entomologists who, from time to time, need to ascertain the cause of some pathological condition not directly attributable to insect damage.

Wendell H. Camp
Department of Experimental Botany and Horticulture
The Academy of Natural Sciences of Philadelphia


This is the first American book on the physiology of insects. True, Snodgrass, in his "Principles of Insect Morphology" (1935), included a good deal of information on the functioning of the various organs that was up-to-date for its time, but the emphasis was morphological. For many years entomologists were concerned mainly with taxonomic, distributional, morphological, life-history, and ecological studies, and with economic entomology. Thus, in spite of the many entomologists in universities and other institutions, physiology was neglected, and it is only in fairly recent years that we have been hearing more and more of "insect physiologists."

It was the appearance of Wigglesworth's "Principles of Insect Physiology" in 1939 that brought to general notice the fact that a science of insect physiology had surely if quietly been coming into existence, and ever since then that book has accelerated the growth of the science by attracting and guiding new workers in the field. This new book, edited by Roeder, will be valuable in the same way. Compared with Wigglesworth's (1950 edition), the present volume, with 1100 pages, is slightly more than half again as large; Wigglesworth has only 544 pages but has
60% more words per page. The British book provides a better general introduction to the field, with a more complete and uniform coverage of the subject. Roeder contains much detailed information not found in Wigglesworth, especially in the chapters on metabolism, on insect behavior, and in other places.

The authors, each responsible for one or more chapters, are American workers except for the three Australians, M. F. Day, D. Gilmour, and D. F. Waterhouse. The editor acknowledges also the assistance of C. L. Prosser, F. J. Yeager, and C. M. Williams, and names 16 others that helped with individual chapters. Such multiple authorship has its disadvantages as well as advantages. There are some gaps as well as some overlapping in the chapters (and it is important to use the index in order to locate all information on certain subjects), and there are differences in point of view, in the treatment, and in style depending upon the personality of the authors. On the other hand, each subject is presented by a scientist active in the particular field and the information is authoritative and often detailed, especially as regards the most recent developments.

In the text, ideas and facts are credited to the original authors, with the date, so that one may refer to the bibliography at the end of the book; and following each title in the bibliography there are page numbers that refer to the text. This book will be extremely useful to every serious student of entomology, to every teacher, and to the research worker who must have access to information and literature giving the present state of knowledge in the many branches of insect physiology.

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.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Koenigsberg, Krs. Wetzlar 16, Germany.


Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.


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.

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14.—Rehn (John W. H.)—Classification of the Blattaria as indicated by their Wings (134 pp., 13 pls., 1951) .................................................. 5.00

THE AMERICAN ENTOMOLOGICAL SOCIETY
1900 RACE STREET, PHILADELPHIA 3, PA.
ENTOMOLOGICAL NEWS
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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.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act
of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in para-
graphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
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.

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The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. If not accepted, authors will be so advised and postage requested for return of manuscripts. Articles longer than six printed pages may be published in two or more installments, unless the author is willing to pay for the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

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A New Gall Midge Infesting Holly (Diptera: Itonididae)

By Richard H. Foote

The species described here as new is recorded from three eastern states, Maryland, Virginia, and West Virginia, and infests berries of Ilex opaca Ait. (American holly) and Ilex sp., preventing their ripening.

Asphondylia ilicicola n. sp.

*Female*: Antenna brown, frons brownish yellow; eyes black. Mesonotum gray pollinose, with a slightly darker narrow median line on anterior two-thirds; posterior third of mesonotum light gray pollinose; each lateral area with a dark gray spot of variable size in the pollinosity just anterior to the wing; a narrow area midway between center line and lateral margin of mesonotum, and a patch antero-laterally, with long, golden hairs. Scutellum and post-scuteellum light brown, shiny, with a patch of long golden hairs apico-laterally. Prothorax, propleura and pteropleura light yellowish brown, all other pleural sclerites shining grayish brown becoming darker gray ventrally. Coxae and trochanters grayish brown; front femora light yellowish brown on postero-dorsal surface, becoming slightly darker apically, all remaining surfaces with narrow dark brown scales; mid and hind femora light on posterior surfaces and with slightly darker scales on remainder; tibiae unicolorous or nearly so, somewhat lighter at extreme bases, about as dark as dark portion of femora,

1 Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, U.S. Department of Agriculture, Washington 25, D.C.
clothed with narrow dark scales; tarsal segments with dark scales which appear to be very slightly darker toward the tip of each segment, the fifth tarsal segment golden brown. Wing very light gray, heavily clothed with dark hairs, the basal three-fourths of costa especially so, fringe at posterior angle of wing long. Halter with narrow light scales on stem and apex of knob and darker scales at base of knob. Abdomen light brown, terminalia light brown, both covered with long, golden hairs. Eyes broadly contiguous over head, frons narrow; antenna of 14 segments, the scape roughly triangular, three times as wide at distal end as long; pedicel subglobular, only slightly wider in diameter than the following flagellar segments; last three flagellar segments markedly shortened, the 12th segment 0.4 times as long as basal, 13th 0.25 times as long and the 14th subglobular; circumfilae of second flagellar segment of two loops joined on distal third of segment (fig. 7), circumfilae of 12th and 13th on distal halves of the segments, none present on terminal segment. Three palpal segments, the proportions 1:0: 4.7: 6.0, the basal segment sometimes very indistinct, terminal segment bluntly pointed distally (fig. 3). Wing (fig. 4) 2.1 times as long as wide; costa extending slightly beyond tip where it meets R s, the latter bending down slightly from apical five-sevenths of wing to meet it; M 3:4 1.2 times as long as M. Proportions of hind tarsal segments 1.6: 7.0: 4.0; 2.8: 2.2; tibia slightly longer than femur; length of pulvillus nearly equal to that of claw, the latter single on all three pairs of legs (fig. 10). Ovipositor 0.5 times as long as abdomen; aciculate, very slender, the tip as shown (fig. 2); dorsal pouch blackened, thickly spined and setose, with a median distal invagination, the two lateral halves parallel-sided; membrane of ovipositor with rows of minute, evenly-spaced setae.

Explanation of Figures

Asphondylia ilicicola n. sp. Fig. 1. Female antenna. Fig. 2. Female ovipositor, with posterior tip enlarged. Fig. 3. Female palp. Fig. 4. Wing of male. Fig. 5. Fourth abdominal tergite of pupa. Fig. 6. Pupal "horns." Fig. 7. Second antennal segment of female. Fig. 8. Male terminalia; a, aedeagus; ds, dististyle; bs, basistyle; p, paramere; st, 10th sternite; tg, 10th tergite; ra, root of aedeagus; rbs, root of basistyle. Fig. 9. Pupal respiratory organ. Fig. 10. Apex of fifth tarsal segment of male. Fig. 11. Second antennal segment of male.
Male: Color similar to female. Terminal flagellar segments not distinctly shortened; circumfila on each segment consisting of a tortuous maze closely adherent to the sides of the segment (fig. 11). Terminal palpal segment tending to be very slightly shorter than that of the female. Proportions of hind tarsal segments 1.5: 10.0: 6.0: 4.0: 2.5. Basistyle short, stout, incomplete on inner side, its root running the full length of root of aedeagus; dististyle extremely short and stout with a bidentate tooth apically, the anterior projection rather blunt, abruptly tapering, the posterior projection slightly flattened on the inner side; tenth sternite broadly triangular with a small distal notch, setae dense and long; tenth tergite with two well-separated setose lobes; aedeagus with two long roots extending well basad of base of basistyle, the side of each root slightly flared laterally, opening at tip of aedeagus 4.0 times as long as wide; parameres darkened, irregular masses attached laterally to either side of aedeagus near terminal opening.

Pupa: Anterior horns touching each other along basal two thirds, and separated only slightly on apical third; second tooth single; third transverse with only a slight anterior projection (fig. 6). Respiratory organ (fig. 9) consisting of two closely appressed parts, one about one-third the length of the other, the longer with eight to ten slightly raised spiracular openings. Tergites of abdominal segments with a more or less even row of blunt spines near the posterior margin in addition to a patch of irregularly spaced spines which nearly reaches the anterior margin of the tergite, the anterior-most spines in the patch very small and increasing in length posteriorly (fig. 5).

Holotype: Male, Williamsburg, Virginia, Apr. 20, 1949 (J. B. Brouwers), reared from unripened berries of Ilex sp., U.S.N.M. Type No. 61640.


In addition to the type series, this species is represented in the National Collection by specimens from Mt. Lookout, West Vir-
Virginia, (no date), and Halethorpe, Maryland (reared March 21, 1952).

**Taxonomic discussion:** Size and color characters are used by Felt in his key to the species of *Asphondylia*. For this reason it is difficult for one to be certain that he has run specimens correctly in it, since our knowledge of variation in these particular respects is virtually non-existent. In this key, *ilicicola* runs to *johnsoni* Felt, from which it differs by the shape of the 10th sternite and by the differently-shaped palpal segment. *Asphondylia ilicoides* Felt forms an oval bud gall on mountain holly (*Ilex montana* T. & G.) but differs principally in the color of the legs and the shape of the tenth sternite.

An interesting account of an infestation has been furnished by W. C. Legg, Twintiliana Sanctuary, Mt. Lookout, W. Va., who states in a personal communication that the pupal case is left protruding from the hole in the berry and that the berries are usually green throughout the winter and until they drop off in the spring.

A chalcid parasite, *Rileyia cecidomyiae* Ashmead, has been reared from *A. ilicicola* on two occasions. These have been identified by A. B. Gahan and B. D. Burks of the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture.

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**Brief Notes on the Mallophaga. I**

By **Ronald A. Ward**, Department of Zoology, University of Chicago, Chicago 37, Illinois

1. **The Identity of Saemundssonia peristicta** (Kellogg & Kuwana) (*Philopteridae*)

In the course of a revision of the *Saemundssonia* species occurring on Terns, it has been possible to examine the types of *Saemundssonia peristicta* (Kellogg and Kuwana), through the courtesy of Dr. G. F. Ferris of Stanford University.

As in most of Kellogg’s Galapagos Islands material, this species was recorded from a number of hosts, none of which is the true host. *Sterna fuliginosa* (= *S. fuscata crissalis* (Lawrence)) may be eliminated as the type host (listed by Hopkins and Clay, 1952:334), since this is not the actual species of *Saemundssonia* found on the above host. The species of *Saemundssonia* found on this host is closely related to *S. meridiana* Timmermann and *S. snyderi* (Kellogg and Paine) and will be described in a subsequent paper. *Dendroica aureata* and *Nesomimus carringtoni* may also be eliminated, as *Saemundssonia* species are never found on Passerine hosts. Careful study of the type series shows that *S. peristicta* belongs to the group of *Saemundssonia* found on the Waders.

In the lot of material from Dr. Ferris, there were a male and a female of this species labelled “Docophorus peristictus K. & K., from *Rhyacophilus solitarius*, Guadeppe Is., Galapagos Is., S.I.K. '99” which were not mentioned in the original description (Kellogg & Kuwana, 1902:462). There can be no doubt that from the labelling and appearance of the slide, that it was examined by the authors; but for some reason, was not recorded in their paper. However, *Rhyacophilus solitarius* (= *Tringa solitaria* Wilson) cannot be considered as the true host, as Dr. Snodgrass did not collect this host species as shown by an examination of the paper by Snodgrass and Heller (1905) on the birds collected by the Hopkins-Stanford Galapagos Expedition. It might be argued that Snodgrass and Heller actually did collect this host but did not record it in their paper. The fact that Hellmayr and Conover (1948:121) questioned the validity of the occurrence of *Tringa solitaria* in the Galapagos would tend to deny this contention.

The species of Waders which were actually collected on the Hopkins-Stanford Expedition were as follows: *Squatarola squatarola* (Linné), *Charadrius hiaticula semipalmatus* Bonaparte, *Actitis macularia* (Linné) and *Arenaria interpres morinella* (Linné). The first mentioned species may be eliminated as the host, as *peristicta* bears no resemblance to the *Saemundssonia* found on this host. A comparison of Timmermann’s redescrip-
tion (1951:393) of *S. platygaster* (Denny) with *peristicta* shows that almost with certainty, *peristicta* (Kellogg and Kuwana) may be considered as a synonym of *S. platygaster* (Denny) and was probably found on *Charadrius hiaticula*. Timmermann also records it from the above *Arenaria* species which might be the true host. Similarly, a comparison of the females with a single female specimen from *Actitis macularia* shows no differences which seem to be significant. Measurements of the type series (in mm.) of *S. peristicta* (Kellogg and Kuwana) are as follows:

<table>
<thead>
<tr>
<th></th>
<th>Length of head</th>
<th>Width of head</th>
<th>Cephalic Index</th>
<th>Length of parameres</th>
<th>Total length</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 males</td>
<td>0.56</td>
<td>0.65-0.68</td>
<td>1.16-1.22</td>
<td>0.27-0.28</td>
<td>1.70-1.73</td>
</tr>
<tr>
<td>4 females</td>
<td>0.61-0.63</td>
<td>0.77-0.84</td>
<td>1.25-1.34</td>
<td></td>
<td>2.00-2.23</td>
</tr>
</tbody>
</table>

2. The Host of *Lymecon gastrodes* (Cummings) (Trichodectidae)

Conclusive evidence for the presence of *Lymecon gastroides* (Cummings) on the two-toed sloth (*Chloepus didactylus* (Linné)) is now available. Through the courtesy of Dr. Alfred E. Emerson of the University of Chicago, the author received five specimens of the above species (including one male) which Dr. Emerson personally collected from a two-toed sloth at Kartabo, British Guiana, in 1924. He stated that the Mallophaga were so firmly attached to the hair that he had to clip off the hairs in order to preserve the specimens. Three specimens have been kept as such in alcohol and two have been mounted. During the mounting process, a considerable amount of sloth hair was removed from the abdomens of the two lice. The material is identical with Werneck's description (1950: 196, figs. 301-05), and nothing can be added to his able diagnosis.

Since the occurrence of *Lymecon* on the sloth is now confirmed, it would be worthwhile to repeat Hopkins' (1949: 543) statement, "The uncomfortably close resemblance between *Lymecon* and *Procavicola* is possibly accounted for by the stock which gave rise to the Edentata and that which was ancestral to the Pro-
caviidae having originated from the proto-Insectivora close together."

BIBLIOGRAPHY


A Migratory Flight of Dragonflies

On September 20, 1952, Mr. and Mrs. Allan D. Cruickshank observed an unusual flight of dragonflies at Todd's Point, on Long Island Sound near Old Greenwich, Connecticut. The flight was in progress when they arrived at the point at noon, and continued for the next two hours. Thousands of dragonflies passed the point during this period, all moving in a south-westerly direction; they passed in groups, and over a hundred were in sight at a time. Several species were present, but about 90 per cent of the flight consisted of two species. Specimens of these two were collected and sent to the writer for determination; they were Anax junius (Drury) and Trapezostigma lacerata (Hagen).

Large-scale migratory flights of dragonflies are probably fairly regular in various parts of the United States, but references in the literature to such flights are relatively scarce. Shannon ¹ and Osburn ² have reported flights similar to that observed by the Cruickshanks, and Shannon has mapped some

of these fights; Walker,3 Wright,4 and others have reported swarms that may possibly represent migrating groups.

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New Taxonomic Entities in Neotropical Aeshnas (Odonata: Aeshnidae) II *

By PHILIP P. CALVERT, University of Pennsylvania and Academy of Natural Sciences of Philadelphia

On making a recheck of the available material of *Aeschna punctata* Martin, a male, identified by Dr. Erich Schmidt and by myself as *punctata*, and whose genitalia of the second abdominal segment were found coated with a hardened substance, was cleaned and the anterior lamina found to lack spines, which are present in *punctata*. This absence justifies the recognition of this male as of a separate species and furnishes the second instance of a species of the subgenus *Hesperaeschna* lacking these spines, the first case being *manni* E. B. and J. H. Williamson 1930; in *psilus* Calvert 1947 these spines are rudimentary. This new species is here and now published for the same reasons that influenced the appearance of No. 1.

*Aeshna (Hesperaeschna) decessus* n. sp.

The specific name, not hitherto used in the Odonata, Latin decessus, departure, is in allusion to the absence of spines from the anterior lamina.

*Holotype* male and unique specimen: BRAZIL, Süd(h)äng) Itatiaya-Gebirg., 700 m., Rio de Janeiro, X 31, Zikan, No. P.P.C. 29, coll. of Dr. Erich Schmidt, Bonn am Rhein, Germany.

* Number I was published in the *News* for December, 1952, Vol. LXIII, No. 10, pp. 253-264.
Face chrome orange, upper margin of anterior surface of frons black. A black line on the fronto-clypeal suture. Width of frons 5.40 mm., maximum width of head 11.44 mm.

Dorsal surface of frons with a transverse basal black stripe embracing the vertex, ocelli and bases of the antennae and continued as a black line along the eye-margin of the frons, and a black T-spot whose stem is of subuniform width (1.39 mm.), bordered on each side by a chrome orange stripe .47 mm. wide, this in turn by a purplish area extending laterad beyond the level of the pointed end of the top of the T of the same side.

Labrum chrome orange, a black line on the clypeo-labral suture, distal margin hardly edged with brown. Vertex chrome orange, margined with black laterally and posteriorly.

Pronotum chrome orange, a pair of black dots on its middle division; whitish and pale brownish hairs 2.04 mm. long on the hind margin.

Pterothorax burnt sienna; a greenish antehumeral stripe 2.86 mm. long, not reaching the antealar sinus by 1.00 mm. and barely diverging from its fellow of the opposite side. Tibiae reddish both superiorly and inferiorly.

Maximum width of abdominal segment 2 6.22 mm., narrowest width of segment 3 1.64 mm., width of hind end of segment 4 3.52 mm., of segment 9 3.27 mm. Ground color reddish brown, dorsum of 10 chiefly chrome orange, the following pale markings pale green or pale blue, designated according to the notation of Prof. E. M. Walker 1912: AD present as a middorsal stripe on segment 2, very indistinct or faded on 4–8, present on 9; MD a small transverse spot on 4–9, separated from its fellow of the opposite side, fused with PMD * on 4–7; PD a pair of large spots on 3–9, separated by middorsal brown or black, the separation wider on 8 and 9 than on preceding segments; AL present on 1–8, fused with ML and PL on 1; ML present on 3–9; PL present on 4–9, fused with ML on 4–8.

* PMD, postmid-dorsal, not included in Prof. Walker’s scheme, is a pale spot found in a number of neotropical Aeshnas on each side of the dorsum between MD and PD.
Spines completely absent from the anterior lamina. Genital lobe projecting 1.00 mm. beyond the lateral margin of abd. seg. 2, length at base, measured along the prolonged ventral margin of 2, 2.45 mm.

Superior appendages very similar to those of punctata, the arch of the superior carina and the depth of the appendage below the lateral margin, as seen in lateral edge view, the same as in a male of the latter species from Nova Teutonia, Brazil.

Venation in the anterior half of each wing with a reddish yellow tinge. Pterostigma brown ochre above, clay yellow below. Membranule pale clay yellow in its proximal .36, brown grey in the distal .64. Cells in the discoidal triangle of the front wings 7 right, 6 left, of the hind wings 7 right, 6 left, 2 cells on the proximal side in all four. Internal triangle 2-celled in all four wings. Distal thicker antenodal fifth on the front wings, sixth on the hind. Supratriangulars 4 on the front, 3 on the hind. Antenodals 20 on the front, 14 on the hind; postnodals 19 and 18 on the front, 23 on the hind.

Dimensions: Total length 78 mm. Abdomen (excl. apps.) 59, sup. apps. 5.73, hind wing 51, max. width 16, pterostigma, front wing, costal margin 2.95 mm.

Decessus is almost unique among neotropical Aeshnas by the chrome orange color on the head. In this respect it is most closely approached by biliosa Kennedy in which the head of the male is colored with bright chrome lemon. The pale colors of the head of most species of Hesperaeschna are blues or greens. The combination of chrome orange on the head and the absence of spines from the anterior lamina distinguishes decessus from all its allies.

The diagnostic characters of the subgenus Hesperaeschna are stated on page 254, Ent. News, LXIII, 1952.
Some Syrphid Fly Synonomy
By C. L. Fluке, University of Wisconsin

There are several cases of synomony, principally my own, which I wish to clear up at this time.

Mesograpta versus Mesogramma


It is interesting to note that Loew changed from Mesogramma to Mesograpta because of preoccupation in Botany. Aldrich in his catalogue went back to Mesogramma indicating that the change was not valid.

Early last spring W. W. Wirth of the U. S. National Museum called my attention to the use of Mesogramma by Stephens in 1850 in Lepidoptera. Even though Mesogramma Stephens stands as an objective synonym of another name in Geometridae, the name is not available for these common American Syrphidae. It is therefore necessary to go back again to Mesograpta Loew.

We are indebted to Miss Ina Hawes who called our attention to the above preoccupation.

Lunomyia brooksi (Curran)


Rhysops neotropicum (Curran)

Volucella beatricia Hull


I have not seen Hull’s type which was a female from Ecuador but believe there is no question about the synonomy.

**Allograpta micrura** (Osten Sacken)


This species, which has been shoved around in different genera, is a true *Allograpta* based on a study of the genitalia.

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**Current Entomological Literature**

Compiled by **VENIA T. PHILLIPS**, Librarian

**Academy of Natural Sciences of Philadelphia**

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1953 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

**Note:** The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in *Entomological News* are not listed.

**GENERAL**—Birch, L. C.—Experimental background to the study of the distribution and abundance of insects. III. The relation between innate capacity for increase and


HYMENOPTERA—Bartlett, B. R.—(See Anatomy.) Brown, W. L., Jr.—The neotropical species of the ant
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.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Koenigsberg, Krs. Wetzlar 16, Germany.


Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.


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.

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3. — Munz (Philip A.) — A Venational Study of the Suborder Zygoptera (Odonata), with Keys for the Identification of Genera (78 pp., 20 pls., 1919) ....................................................... 2.00
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12. — Phillips (Venia Tarris) — The Biology and Identification of Tryptetid Larvae (161 pp., 16 pls., 1946) .................... 5.00
14. — Rehn (John W. H.) — Classification of the Blattaria as indicated by their Wings (134 pp., 13 pls., 1951) .................. 5.00

THE AMERICAN ENTOMOLOGICAL SOCIETY
1900 RACE STREET, PHILADELPHIA 3, PA.
Entomological News
November 1953

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Published monthly, except August and September, by
The American Entomological Society

1900 Race Street, Philadelphia 3, Pa.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada.
Entered as second-class matter April 19, 1943, at the Post Office at Lancaster, Pa., under the Act
of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in para-
graphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.


Smithsonian
Nov 10 1953
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.

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Collecting and Culturing of Native Wood Roaches in Ohio, with some Additional Notes on their Parasites

By LAFE R. EDMUNDS, Department of Zoology and Entomology, The Ohio State University, Columbus, Ohio

In a previous paper (Edmunds, 1952a), the results of studies made during 1950–51 on the parasites and habits of wood roaches were described. These studies were continued through 1952, and numerous additional parasites of wood roach egg capsules were obtained. A method was also developed for the collecting and culturing of wood roaches. Information on this method together with data on the parasites is summarized as follows.

COLLECTING AND CULTURING WOOD ROACHES

Collecting. Parcoblatta pensylvanica (De Geer) and Parcoblatta virginica (Brunner) can be found in the wooded areas of Ohio at almost any season of the year. Cultures of wood roaches can be started from adults or nymphs collected in their natural habitats which include old buildings, wood piles, stacks of lumber, and the loose bark of dead trees.

Wood roaches will usually run rapidly when the cover under which they are resting is removed by the collector. The small roach nymphs can be picked up with an aspirator, but the larger

1 Ass't Sanitarian, Communicable Disease Center, Public Health Service, Federal Security Agency, Mitchell, Nebraska. This work was done while the author was a Graduate Assistant, Department of Zoology and Entomology, The Ohio State University.
nymphs and adults must be caught with a pair of tweezers or the fingers. During the winter and early spring the overwintering nymphs cannot run very rapidly due to the cold, and this is a good time to collect them.

Rearing Procedure. When wood roaches have been collected they can be reared in large glass battery jars (Fig. 1). The bottom of each jar is covered with about an inch of wood shavings to absorb waste and moisture. To keep the roaches from escaping from these jars, the sides are greased with vaseline, and the top is covered with cheese cloth held in place by a strong rubber band. Strips of bark 2 inches wide and 4 inches long can be cut from a dead tree, and several pieces placed one above the other in the jar. The bark provides excellent cover and a natural resting place for the roaches.

Wood roaches were found to feed readily on commercial dog biscuits which come prepared in the form of pellets. A small dish of these pellets can be kept in the culture jar and replenished every 2 weeks. Commercially prepared rabbit foods were not suitable.

Water was supplied by using a small plastic dish with a tight fitting lid. A hole was drilled through the lid and a roll of dental cotton inserted through the hole so that 2 inches projected into the dish, and one-half inch projected out through the hole. When the dish was filled with water the dental cotton acted as a wick, and provided a constant supply of water.

The wood roaches thrive at temperatures between 70° and 80° F, and humidity of about 75%. The humidity was maintained near this level by placing the culture jars in a closed cabinet containing a pan of saturated salt water.2 A pan 2 inches deep and 6 inches square filled with saturated salt solution maintained a humidity between 70–75% in the closed cabinet.

The female wood roaches drop the oothecae without attaching them. These capsules are scattered in the debris on the floor of the jar. At 1-week intervals these unhatched egg capsules can be collected by sifting through the debris, and they can be placed in other culture jars to start new colonies.

2 Sodium chloride.
Parasites of Adult or Nymphs. A red mite, Pimeliophilus podapolipophagus Tragardh, will sometimes attack and destroy a culture of wood roaches. This parasite was also reported by Piquett and Fales (1952), as one which attacks cultures of American roaches, Periplaneta americana (Linn.). Fisk (1952) controlled mites in a culture of American roaches by dusting the interior of the culture jar with 5% Ovotran dust, and spraying the exterior with a 5% Ovotran spray. There was no apparent harm to the hosts.

Parasites of Egg Capsules. To gather additional information on the parasites of wood roach egg capsules, collections were made in Franklin, Delaware, and Allen Counties, Ohio, during 1951-52. The capsules were sorted readily into two sizes. The larger capsules, some 296 in number, are believed
to be those of *Parcoblatta pensylvanica* and the smaller capsules, 24 of them, are probably those of *Parcoblatta virginica*.

Almost 13% of the egg capsules collected under natural conditions showed evidence of previous parasite emergence. The normal roach capsules from which the roach nymphs have emerged can be separated in the following way from the capsules which have had parasites emerged from them.

Roach nymphs emerge from the egg capsule by crawling out between the loosened edges of the seam which runs along one side of the capsule. The empty egg pockets are left as a dry lattice inside the capsule. Lawson (1949) states that the pressure of the expanding nymphs in the hatching capsule ruptures the seam at first in the central portion but later along its entire length. The two halves of the seam are lifted back, the egg shells are broken dorsally at the same time, and the heads of the nymphs extend into the space thus opened.

The parasites emerge from the capsule by chewing a hole through the wall. The edges of the seam remain together. The parasite exit holes vary in size from some as small as a pin prick for *Syntomosphyrum blattae* Burks to others as large as 2.0 mm. in diameter for *Hyptia thoracica* (Blanchard). The species of *Hyptia* make a single exit hole. *Systellogaster ovivora* Gahan and *Syntomosphyrum blattae* Burks sometimes make two or three openings at different places on the same capsule. After the parasites have emerged the capsule is empty except for a small amount of loose debris.

The collected oothecae were incubated in glass tumblers covered with white organdy held in place by a rubber band. As the parasites emerged from the egg capsules they were collected and preserved in vials of alcohol.

For identification, these parasites were sent to C. F. W. Muesebeck of the Division of Insect Identification, Bureau of Entomology and Plant Quarantine. The determinations of the Evaniidae were made by Luella M. Walkley and the other Hymenoptera by B. D. Burks.

A total of 906 parasitic Hymenoptera was obtained. Evaniidae emerged from nine egg capsules, one individual from
each capsule. These evaniids were identified as five *Hyptia harpyoides* Bradley which emerged from the small capsules, and four *Hyptia thoracica* (Blanchard) from the large egg capsules. The remaining parasites emerged in large numbers from other parasitized oothecae; 200 specimens from 2 egg capsules were identified as *Tetrastichus hagenowii* (Ratz.), and 328 specimens from 12 capsules as *Systellogaster ovivora* Gahan. An additional 369 specimens of *Syntomosphyrum blattae* Burks emerged from 5 capsules.

**Table I.** Parasitism of Wood Roach Egg Capsules collected in Franklin, Delaware, and Allen Counties, Ohio, during 1951 and 1952

<table>
<thead>
<tr>
<th>Date Collected</th>
<th>Egg Capsules Collected</th>
<th>Capsules Parasitized by Evaniidae</th>
<th>Capsules Parasitized by Other Parasites</th>
<th>Capsules Showing Previous Emergence</th>
</tr>
</thead>
<tbody>
<tr>
<td>8–8–51</td>
<td>16</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>10–28–51</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>12–1–51</td>
<td>11</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>1–15–52</td>
<td>26</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>3–20–52</td>
<td>148</td>
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<td>22</td>
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<td>3–30–52</td>
<td>48</td>
<td>0</td>
<td>5</td>
<td>4</td>
</tr>
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<td>4–27–52</td>
<td>48</td>
<td>0</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5–16–52</td>
<td>18</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>320</td>
<td>9</td>
<td>19</td>
<td>43</td>
</tr>
</tbody>
</table>

A study of the accumulated data on parasite emergence (Table I) for all capsules of all sizes shows that 8.7% of the capsules collected during 1951–52 were parasitized. The evaniids alone parasitized 2.8% of the wood roach oothecae.

Acknowledgments are made to Dr. Carl Venard, Dr. Alvah Peterson, and Dr. Donald J. Borror of the Department of Zoology and Entomology, of The Ohio State University for their assistance in this study; also to Leslie D. Beadle, Sanitarian, U. S. Public Health Service, for his aid.

**Summary**

Wood roaches collected from their natural habitats can be cultured in large glass battery jars provisioned with pellet-type dog biscuits, a constant water supply, and a resting place made of
bark. The roaches thrive best at temperatures of from 70° to 80° F., and relative humidity of approximately 75%.

Parasites emerged from 28 of 320 wood roach egg capsules collected in the field during 1951–52. The parasites were identified as *Hyptia harpyoides*, *Hyptia thoracica*, *Systellogaster ovivora*, and *Syntomosphyrum blattae*. *Tetrastichus hagenowii* known previously only from domestic roaches was reared from wood roach capsules. A mite, *Pimeliaphilus podapolipophagus* was found attacking adult and nymphal roaches.

**Selected References**


**The Occurrence of Anax longipes Hagen in Mississippi (Odonata: Aeshnidae).**

By George H. Bick, Tulane University, New Orleans, Louisiana

Davis (1914) recorded a number of examples of *longipes* from Pass Christian, Mississippi, collected by Mr. and Mrs. F. F. Hunt in the month of March. Wright (1939) stated that
he "has collected in the vicinity of Pass Christian and other localities of like nature in the Central Gulf Coast, but has neither seen nor heard of any other collection of this species." In my (1950) *Dragonflies of Mississippi* I repeated the information given by Davis and by Wright and stated that all material seen from the Pass Christian area was *Anax junius*. *Longipes* was not included in Westfall's (1952) *Additions*.

I was therefore impressed when a single adult male of *longipes* from Mississippi was found in the Tulane University Collection. The specimen was collected at Lucedale (George County) on June 9, 1949, by Dr. George H. Penn and Mr. E. N. Lambremont. Lucedale is 60 miles northeast of Pass Christian and 35 miles due north of the Gulf.

The addition of *longipes* to the Mississippi list brings the total Anisoptera recorded from the State to 74.

I have always thought that *longipes* was rare in the United States. Indeed, Hine (1913) stated, "It does not appear that more than a score of specimens are in the collections of the world." I, therefore, became interested in checking its U. S. distribution and was surprised to learn that there are in the literature several records of its occurrence in each of the following states: Massachusetts, New York, New Jersey, Pennsylvania, Maryland, North Carolina, South Carolina, Georgia, Florida, Ohio.¹ It appears that *longipes* is fairly widespread in eastern U. S. Its presence along the Atlantic Coast from Massachusetts to Florida seems quite certain, and the Ohio and the Mississippi records indicate that it is probably present throughout the Eastern United States.

I was even more surprised to learn that several workers have considered it locally abundant. Gray (1937) found it surprisingly common in the Woods Hole Region of Massachusetts and Davis (1914) stated that it was not uncommon at least during some years on Long Island, New York. Beatty (1945, 1946) found it abundant on some days, and sometimes far exceeding *junius* in point of numbers at Upton, New Jersey,

¹ I do not think it practical to list the 32 citations which were accumulated to support these state records.
Davis and Fluno (1938) recorded it as fairly common at Winter Park, Florida.

However, records of the nymphs are still quite scanty. Calvert (1934) recorded two male exuviae from Primos, Pennsylvania, and seven female exuviae from Enterprise, Florida. Byers (1934) recorded nine nymphs "probably longipes" from Alachua County, Florida. Gray (1937) stated that one nymph from Woods Hole, Massachusetts, transformed in the laboratory but that an association of the adult with a specific exuvium was impossible.

Because records of the adults indicate a widespread distribution and because longipes is apparently common in some areas, aquatic biologists in Eastern U. S. should be cautioned not to assume that all Anax nymphs are junius and to utilize the key given by Calvert (1934) before reaching a decision.

**Literature Cited**


Collection Records of Some Arizona Mosquitoes
(Diptera: Culicidae)

By Daniel R. Murphy, Arizona Desert Trailside Museum, Tucson, Arizona

Mosquitoes are constantly becoming more important to public health because of the increasing number of diseases known to be transmitted by them. When attacking this problem in a given region one must first ascertain which species occur in the area. Although huge sections of Arizona have been entirely neglected, collection records are available for a few superficially investigated localities. The present paper records the distributional data of the mosquitoes in the principal insect collections in the state. This list is offered as a base upon which to build and should stimulate further work on the mosquitoes of Arizona.

Thanks are due Major Carl R. Bruck, Sixth Army Area Medical Laboratory, Fort Baker, California and Mr. Edward L. Breazeale, Assistant Agricultural Chemist, University of Arizona, Tucson, Arizona for first interesting the author in this project. The late Dr. L. P. Wehrle of the University of Arizona gathered together, over a period of twenty years, most of the mosquito specimens in the collection of the University. His keen interest in the insects of Arizona and recognition of the great importance of this group accounts for approximately 78% of the specimens recorded in the present list. Dr. Alan Stone, United States National Museum, is acknowledged for his determinations on most of the material. The author is grateful to Mr. O. L. Barnes, Miss K. Bartlett, Dr. L. A. Carruth, Mr. F. C. Deaver, and Dr. D. C. Lowrie for permission to examine the various collections.

Scheme of the present list:

The mosquito tribes and genera are arranged according to the system used by Matheson; 1 the species are placed alphabetically within their respective genera. The collections for each species are arranged alphabetically by localities. Collections for each

1 Matheson, Robert—"Handbook of Mosquitoes of North America"—1940.
locality are listed by dates of collection beginning with those collected in January and working on through December; no arrangement by years has been attempted because the material is too scanty. Following the date of collection is the number and stage of development of the specimens at hand; this is followed by the collector, the person responsible for the determination, and lastly the collection in which the specimen is housed.

A list of abbreviations used will be found below.

Abbreviations:

Collectors

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Collector</th>
<th>Stage</th>
<th>Determiner</th>
</tr>
</thead>
<tbody>
<tr>
<td>aan</td>
<td>A. A. Nichols</td>
<td>ls</td>
<td>Louis Schellbach</td>
</tr>
<tr>
<td>cc</td>
<td>C. Calhoun</td>
<td>ob</td>
<td>O. Bryant</td>
</tr>
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<td>ctv</td>
<td>C. T. Vorhies</td>
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<tr>
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<td>E. G. Davis</td>
<td>rbs</td>
<td>R. B. Streets</td>
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<td>ewg</td>
<td>E. W. Gurnett</td>
<td>rh</td>
<td>R. Hobbs</td>
</tr>
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<td>fcj</td>
<td>F. C. Jones</td>
<td>rsb</td>
<td>R. S. Beal</td>
</tr>
<tr>
<td>fww</td>
<td>F. W. Williams</td>
<td>slg</td>
<td>S. L. Green</td>
</tr>
<tr>
<td>gwm</td>
<td>G. W. Marx</td>
<td>tb</td>
<td>J. R. de la Torre-Bueno</td>
</tr>
<tr>
<td>hbh</td>
<td>H. B. Harding</td>
<td>tkr</td>
<td>T. K. Ryan</td>
</tr>
<tr>
<td>lpw</td>
<td>L. P. Wehrle</td>
<td>wn</td>
<td>W. Noon</td>
</tr>
</tbody>
</table>

Determinations

(THGA) T. H. G. Aitken (LPW) L. P. Wehrle

Collections

(B) Barnes, U. S. D. A., Tempe, Arizona
(DM) Daniel R. Murphy, Tucson, Arizona
(FSC) Arizona State College, Flagstaff, Arizona
(GC) Grand Canyon National Park, Arizona
(MNA) Museum of Northern Arizona, Flagstaff, Arizona

The specimens in the collection of the University of Arizona make up the bulk of the list and to avoid unnecessary repetition are not marked.

2 Most of the determinations were made or checked by Dr. Alan Stone of the United States National Museum; to avoid unnecessary repetition indication of the determiner will be found only on those specimens not determined by Dr. Stone.

3 Since most of the specimens in the present paper are in the collection of the University of Arizona only those specimens housed in other collections have the collection indicated.
Miscellaneous

A  adult(s)  
L  larva(e)  
LR  collected as larva and reared  
P  pupa(e)  
PR  collected as pupa and reared  
R  reared specimens, collection stage unknown  
spm  specimen(s)

Dates of Collection

Roman numerals indicate months; arabic numerals indicate days of the month and years.

Genus Anopheles Meigen


ARIVACA VI-17-34, 1 spm, lpw; NOGALES VI-8-39, 3 spm, wn; RUBY VII-10-38, 3 LR spm, gwm; SANTA CATALINA MOUNTAINS (Bear Canyon) X-25-38, 7 LR spm. lpw; XI-8-34, 9 R spm, lpw; XI-10-36, 2 R spm, lpw; XI-25-34, 7 LR spm, lpw; TUCSON III-35, 1 L spm, tb; IV-22-33, 1 spm. lpw; VI-7-21, 2 spm, aam; VI-7-32, 1 spm, Ipw.

Anopheles pseudopunctipennis Theobald, Mon. Culic. 2: 305. 1901.

NOGALES VI-8-39, 5 spm, wn; TEMPE I-30-34, 1 spm, egd (B); XII-20-33, 1 spm, egd (B); XII-22-34, 1 spm, egd (B); XII-26-33, 1 spm, egd (B).


ARIVACA VI-17-34, 4 R spm, lpw; VI-26-33, 1 spm, egd (B); VII-4-33, 1 spm, egd (B).

Genus Aedes Meigen


TUCSON I-8-42, 10 R spm, ctv; I-12-42, 5 LR spm, ctv; I-17-42, 3 LR spm, ctv; II-4-42, 3 LR spm, ctv; II-27-38, 1 spm, hbh; III-2-38, 1 spm, lpw; III-4-38, 2 spm, hbh; III-26-36, 1 spm, lpw; VIII-17-35, 1 spm, lpw; IX-3-36, 1 spm,

These specimens were collected as larvae and pupae in a bowl of water containing sweet potato plants in the house.

Aedes purpureipes Aitken, Pan-Pacific Ent. 17: 82. 1941.

Tucson VII–27–32, 1 spm, Ipw.

Aedes varipalpus (Coquillett), Can. Ent. 34: 292. 1902.

Chiricahua Mountains VI–17–37, 1 spm, rsb; Mount Graham VII–4–40, 1 spm, slg; Santa Rita Mountains X–20–40, 1 spm, raf.


Aedes sp.

Yuma VI–5–41, 1 spm, Ipw.

Genus Culex Linnaeus


Santa Catalina Mountains III–27–30, 1 spm, Ipw; (Sabino Canyon) III–14–33, 1 spm, egd (B); IV–14–33, 1 spm, egd (B); Tucson IV–14–33, 1 spm, egd (B).


Santa Catalina Mountains XI–8–34, 1 R spm, Ipw.


Arivaca VI–17–34, 1 R spm, Ipw; Santa Catalina Mountains III–27–30, 1 R spm, Ipw.


Arivaca VI–17–34, 1 R spm, Ipw; Tempe I–30–34, 1 spm, egd (B); I–31–34, 1 spm, egd (B); II–6–34, 1 spm, egd (B); II–12–34, 1 spm, egd (B); IV–14–33, 1 spm, egd (B); XII–
18–33, 1spm, egd (B); TUCSON II-9-41, 1spm, raf; II-13-41, 1spm, raf; V-2-42, 1spm, lpw; V-15-40, 1 Rspm, aan; V-30-31, 1spm, lpw; VI-8-31, 9 Rspm, lpw; VI-9-31, 9 Rspm, lpw; VI-10-31, 19 Rspm, lpw; VI-11-31, 8 Rspm, lpw; VI-12-31, 18 Rspm, lpw; VI-17–42, 1 Rspm, Ipw; VI-18-41, 2 Rspm, Ipw; VI-21-44, 1 Rspm, fcj; VII-1-20, 4 Rspm; VIII-8-51, 5 Rspm, rh (DM); VIII-16-35, 1 Rspm, Ipw; VIII-19-35, 2 Rspm, Ipw; VIII-35, 2 Rspm, Ipw; IX-35, 2 Rspm, Ipw; X-4-44, 2 Rspm, ewg; X-17–31, 1 Rspm, Ipw; X-18–31, 2 Rspm, Ipw; X-22–33, 1 Rspm, Ipw.


NOGALES VII-15-40, 3 Rspm, (THGA) Ipw; TUCSON II-9-41, 1 Rspm, raf; VII-1-20, 2 Rspm, Ipw; X-2-34, 1 Rspm, cc.


ARIVACA III-21-33, 1 Rspm, Ipw; VI-17-34, 1 Rspm, lpw; BENSON IV-15-41, 1 Rspm, raf; FLAGSTAFF VIII-23-43, 1 Rspm, rsb (FSC); TEMPE I-31-34, 1 Rspm, egd (B); II-6-33, 1 Rspm, egd (B); II-12-33, 1 Rspm, egd (B); IV-19-33, 1 Rspm, egd (B); XI-14-33, 1 Rspm, egd (B); TUCSON I-24-31, 1 Rspm, lpw; III-22-43, 1 Rspm, Ipw; IV-16-42, 1 Pspm, lpw; VI-17–33, 1 Rspm, Ipw; VII-1-20, 1 Rspm.

_Culex spp._

NOGALES VI-8-39, 2 Rspm, (LPW) wn; TEMPE II-9-34, 2 Rspm, egd (B); TUCSON III-35, 6 Lspm & 2 Pspm, tb; V-24-32, 6 Lspm & 65 Aspm, ctv. 6

**Genus Culiseta Felt**

*Culiseta impatiens_ (Walker), List Dipt. British Mus. 1: 5. 1848.

FLAGSTAFF VII-6-49, 4 Rspm, (MNA).

*Culiseta incidens_ (Thomson), Kongl. Sven. Eug. Resa, 6 Dipt.: 433. 1868.

FLAGSTAFF VII-5-49, 2 Aspm & 17 Lspm, (MNA); VII-6-49, 4 Rspm, (MNA); GRAND CANYON (North Rim) VII-10–38, 1 Rspm, ls (GC); VII-11–38, 1 Rspm, ls (GC); (Grand

5 These specimens were all reared by Dr. L. P. Wehrle and probably represent one collection with dates of emergence.

6 Dr. Alan Stone states that these are probably _Culex tarsalis_ Coquillett; the larvae are very small and the adults are badly rubbed.

Arivaca III-21-33, 7 R spm, lpw; III-24-33, 1 spm, lpw; SANTA CATALINA MOUNTAINS (Bear Canyon) III-18-39, 1 spm, tb; Tempe XII-13-33, 8 spm, egd (B); Tucson VII-1-20, 1 spm; XII-21-40, 1 spm, lpw.

Culiseta melanura (Coquillett), Jour. N. Y. Ent. Soc. 10: 193. 1902.

Tempe II-9-34, 8 spm, egd (B).

Culiseta sp.

Tucson III-35, 2 P spm, tb.

Genus Psorophora Robineau-Desvoidy

Psorophora confinis (Lynch Arribalzaga), Rev. Mus. de la Plata 2: 149. 1891.

Tucson VIII-10-36, 1 spm, lpw; IX-34, 1 spm, lpw.


Tucson VIII-6-36, 1 spm, lpw; IX-11-38, 1 spm. lpw.

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.

A Monograph of the Orthoptera of North America

The National Science Foundation has made a grant to James A. G. Rehn, Curator of Insects of the Academy of Natural
Sciences of Philadelphia, as the Principal Investigator, in support of the preparation of a monograph of the Orthoptera of North America. The grant covers a period of two years. This project has for a number of years been the chief long-range objective of the Department of Insects of the Academy, and toward it were directed the many seasons of field work of the recipient and his long-time colleague, the late Morgan Hebard. One half of Mr. Rehn's official time is to be allotted to the North American monograph, while the other half is assigned to his study of similar type on the Acridoidea of Australia, being prepared for and published by the Commonwealth Scientific and Industrial Research Organization of Australia, two volumes of which have already appeared. Direct preparatory work on the North American study will occupy approximately the first half year, which will be followed by the critical study of the acridoids. It is estimated completion of the work as outlined will require between eight and ten years.

The Nabours Collection of Genetic Material of the Tettigidae (Orthoptera)

The Academy of Natural Sciences of Philadelphia has received as a gift the very extensive and important genetic material which resulted from the long-continued breeding experiments with grouse-locusts (Tettigidae), carried on through a number of decades by Dr. Robert K. Nabours, Emeritus Professor of Zoology at Kansas State College at Manhattan, Kansas. This material formed the concrete evidence on which were based numerous outstanding contributions by Dr. Nabours and his associates on the inheritance of color pattern in these interesting grasshoppers, and constitutes the greatest set of controlled genetic breedings ever carried out with Orthoptera, and from these experiments entomology, broad biology and genetics per se have drawn important evidence and conclusions.

The Nabours series is preserved in sealed vials of alcohol, all data fully noted both in the vial and in accompanying records.
The number of individual vials, each containing a specific and recorded mating progeny, is in excess of 40,000, and that of individual specimens in the same between 460,000 and 500,000.

—James A. G. Rehn.

Current Entomological Literature

Compiled by Venia T. Phillips, Librarian

Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1953 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

Note: The figures within brackets ( ) refer to the journal in which the paper appeared, as numbered in the List of Periodicals and Serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in Entomological News are not listed.


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DIPTERA—Alexander, C. P.—Notes on the Tipulidae of Ecuador, Pt. 2. [Revista Ecuatoriana Ent. Parasit.] 1: no. 2, pp. 6-14, ill. (*)
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COLEOPTERA—Benick, G.—Synonymische bemerkun-
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Entomological News [Nov., 1953]


Reviews


This concludes the Pseudococcids. The first four volumes dealt with the Daspididae; there still remain the smaller families that, it is planned, will be covered in two future volumes to complete the series. This work is too well known to require further comment.
In the introduction, the author states his reasons for omitting bibliographic references: "This work is intended to facilitate identification. The original descriptions of the vast majority of the species . . . are practically worthless for purposes of identification and have a historical value only in establishing authorship and priority. That being so, they are of interest and use only to the special student and the special student will have or should have ways of determining these facts. Why increase the expense of publishing this work by reciting them?"—R. G. S.

**How to Know the Spiders.** Pictured-keys for determining the more common spiders, with suggestions for collecting and studying them. By B. J. Kaston and Elizabeth Kaston. Pp. vi + 220, 552 figures. Wm. C. Brown Co., Dubuque, Iowa. Spiral binding, $2.25; cloth, $3.00.

Presents carefully prepared keys and excellent illustrations of our common spiders (40 families with 190 genera and 271 species) together with illustrations of their webs and snares. Each species is briefly characterized and is illustrated; its geographical distribution stated and something of its natural history revealed. —R. G. S.


The author is intent on sharing his delight in the study of insects and in their photography. The pictures are large and have sharp detail; nearly all are of living, active insects, obtained with the use of Exakta VX and a Hasselblad cameras, and a Heiland Strobonar IA flash. Twelve orders of insects are represented including such rarities as an embiid within its silken tunnel, and a live male stylops mating with the female on a bee's abdomen. The last 20 pages, "Insects for Pleasure," give instruction on collecting and preserving, and on photographic methods and equipment.—R. G. S.
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.

**American Sarcophagidae**—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

**German lepidopterist** wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel. Koenigsberg, Krs. Wetzlar 16, Germany.


John W. Morris, 2704 Genesee St., Syracuse 9, N. Y.

**Cynipid and Itonidid galls**—American species wanted; purchase or exchange for British species. Fresh or dried. D. Leatherdale, F.R.E.S., Old Woodstock, Oxford, England.

**Wanted**—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.

**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.


**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.

**Wanted**—Data on exact location of colonies of *Epibembex* (olim *Bembix*) (Hymenoptera), any species, any part of country, for biological studies. Howard E. Evans, Dept. Entomology, Cornell Univ., Ithaca, N. Y.

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**ENTOMOLOGICAL NEWS**

**DECEMBER 1953**

**Vol. LXIV**

**No. 10**

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**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. Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in paragraphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
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.

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Notes on the Zygaenid Genus Harrisina Packard, with Special Reference to Harrisina metallica Stretch

By Robert L. Langston and Owen J. Smith, University of California Citrus Experiment Station, Riverside

Forty-five species are listed for the genus Harrisina Packard, by Bryk (1936). The type localities of all of these are in the Western Hemisphere, the total number being about equally divided north and south of Panama. The reports of Armitage (1946) and of Ebeling (1950) that Harrisina brillians B. & McD. occurs in Italy and was probably introduced into eastern United States from Europe appear to be in error. European literature fails to list the genus Harrisina from that continent, and Grandi * does not know of the occurrence of H. brillians in Italy. Observations on this species throughout its known range indicate that it is indigenous to the mountains of the Sonoran and Chihuahuan deserts, and that it has not spread far therefrom.

The species of the genus Harrisina listed for the United States (McDunnough 1939) may be divided into two groups: the eastern group, H. americana (Guér.) and its two forms texana Stretch and australis Stretch, occurring from Texas to Florida and New York; and the southwestern group, H. metallica Stretch, H. coracina (Clem.), H. brillians B. & McD., H. lustrans (Beut.) H. cyanea B. & McD., and H. aversus Hy. Edw., occurring from Texas westward and, in part, southward into Mexico.

*Correspondence, in 1952, with Professor Guido Grandi, Istituto di Entomologia della Università degli studi di Bologna, Bologna, Italy.
Harrisina brillians is much the most common of the southwestern group, its distribution apparently covering the range of all the other species and contacting the eastern group in Texas. With the exception of H. cyanea, which seems to have significant neurational differences, all the southwestern species are separated from brillians on more or less superficial characters of color and size. One of the apparently most distinct of this group is H. metallica, which has an orangish-red collar on the pronotum, as contrasted with the dark metallic blue of brillians.

The validity of specific status for H. metallica was first questioned by Cockerell (1897). He succeeded in obtaining eggs from a cross of a male of this “species” with a female of H. coracina and considered metallica to be a possible dimorphic form of coracina. It occurred to the authors that metallica might be a “red-collared” form of brillians. Data obtained from limited breeding experiments seem to confirm this opinion.

Results of Breeding Experiments

Among thousands of H. brillians moths that have emerged from larvae collected in California and Arizona, occasional H. metallica moths have appeared. Virgin moths of the two “species” were isolated, one pair to a cage. They were found to mate readily, producing viable eggs, and the offspring of each pair were reared separately.

Three different wild H. brillians females were crossed with H. metallica males and produced a combined total of 280 moths in the F₁ generation, all of which were brillians. A second generation was not obtained from this combination.

Two pairs of wild H. brillians males and H. metallica females were crossed and gave in the F₁ generation a total of 144 moths, again all brillians. A pair of these heterozygous brillians when mated produced 170 moths in an F₂ generation, of which 130 were brillians and 40 metallica, a ratio of 13:4 (approximately 3:1). The typical coloration of the two “species” was distinct with no evidence of integration. The sex ratios were not in significant variance from the normal 1:1 of H. brillians.
It thus appeared that the red collar (metallica) was a simple recessive Mendelian character. Unexpected results were obtained, however, from the progeny of a pair of wild H. metallica. Out of a total of 117 moths of an F₁ generation, 77 metallica and 40 brillians were obtained, a ratio of approximately 2:1. This indicates that either a multiple allele for red collar occurs, one dominant and one recessive to brillians, or that this experiment was accidentally contaminated with H. brillians larvae.

The genetics of the two "species" was not pursued beyond this point. Their extreme closeness, however, is obvious. Furthermore, no difference was observed between the larvae of H. brillians and H. metallica.

Population breeding of wild stock of H. brillians failed to produce a single H. metallica in 3,233 offspring. This indicates that a near-pure strain of brillians exists, at least in some areas. Moths emerging from field-collected larvae also showed metallica to be rare in most areas, in a ratio about 1:1500. In certain restricted locations the proportion was as high as 1:25, however, and field observations at Phoenix, Arizona, indicated that H. metallica might be predominant.

The wide range in size and color observed in Harrisina brillians moths is, in our opinion, sufficient to cover the characters used to separate most of the other species of Harrisina of the southwestern group. A comprehensive genetic study would undoubtedly clarify the confused taxonomy of the genus Harrisina.

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Cockerell, T. D. A. 1897. Note on Harrisina coracina. Psyche 8 (257): p. 120.


Arctic Alaskan Hymenoptera and Coleoptera

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

The following records of Hymenoptera and Coleoptera are in addition to those reported previously (Weber, 1950). They were taken mostly in 1950 during field work supported by the Office of Naval Research and the Arctic Institute of North America. All are from the Arctic slope of the Brooks Range north to the Arctic Ocean. 1 The Tenthredinidae were identified by Dr. R. B. Benson, the Ichneumonidae by Dr. J. F. Perkins, the Apidae by Dr. O. W. Richards, the Carabidae and several Staphylinidae by Dr. E. B. Britton and the Dytiscidae by Dr. J. Balfour-Browne, all through the courtesy of the British Museum (Natural History); other Coleoptera identifications are credited by name.

ORDER HYMENOPTERA

Tenthredinidae

Nematus (Pteronidea) reticulatus Holmgren: Pt. Barrow, July 12–14, 1950. Females taken on undisturbed tundra southeast of village in clear, breezy, 50° F. weather and at inlet seven miles south of village near Eskimo tents in overcast, windy, 40° F. weather. This species occurs on mountain tops in Scotland.

Nematus (Pteronidea) sp.: Ikakevik Lake.


Amauronematus sp.: Noluk Lake.

1 The data for Noluk Lake are latitude 68° 47' N., longitude 160° 0' W., July 6–7, 1950, elevation 2200–2800 feet above sea level; data for Ikakevik Lake are: latitude 68° 30' N., longitude 157° 08' W., July 6, 1950, elevation 2000 feet; data for Oumalik: latitude 69° 59' N., longitude 156° 0' W., July 15, 1949.
Ichneumonidae


Mesoleius sp. B: Noluk Lake.

Mesoleius (Spudaeus Thoms) sp. A: Noluk Lake.

Mesoleius (Spudaeus Thoms) sp. B: Noluk Lake.

Syndipnus sp.: Noluk Lake.


According to Dr. Perkins the Mesoleius and Syndipnus species were probably parasitic on Tenthredinidae larvae as was the Aptesis of Weber, 1950.

Formicidae

Formica fusca L.—Under the name of Formica rubra what is probably this ant was recorded by Parry, 1826, in the account of his third voyage to Arctic America as follows: “Abundant at the Whale-fish Islands; it was also found, on the preceding voyage, on several parts of the Melville Peninsula.” As stated in Weber, 1950, it will probably be found in Arctic Alaska and has already been taken at the mouth of the Mackenzie River in Canada. The record of Myrmica rubra (?) (loc. cit.) should be deleted.

Vespidae

Vespula (Dolichovespula) norwegica albida (Sladen). Identified under this name in Weber, 1949, p. 128, the species was inadvertently referred to under the generic name Vespa in 1950. It has since been identified by Dr. Richards as Dolichovespula norwegica marginata, the latter a preoccupied name, from specimens from Umiat, July 25, 1950. Also on this day here, four species of Bombus were collected. The reference to this wasp (Weber, 1950, p. 189) having a nest with several cells containing honey erroneously implied that the wasps produced honey. Only Bombus in this area could have produced the honey, if honey it was. The nest was brought to me in a partially crushed condition by Eskimos and, while a typical wasp nest
of paper cells, it did have several cells containing a liquid. Unfortunately it was not retained and the honey diagnosis had best be discarded.

Apidae

**Bombus alboanalis** Franklin: Umiat, July 24, 1950. Taken on the crest of the Colville valley several hundred feet above the river at a temperature of 70° F.

**Bombus bifarius** Cress. var. *vancouverensis* Cress.: Umiat, July 25, 1950. Bumblebees of four species (including also *sylvicola, moderatus* and *kirbyellus*) were numerous in the lush vegetation about the ponds on the Colville valley floor.

**Bombus kirbyellus** (Curtis)—Alaska: Umiat, July 25–27, 1950. Ikakevik Lake; Noluk Lake. Considered by Dr. Richards a subspecies of *balteatus* Dahlb. See *vancouverensis*. This large *Bombus*, which appeared to be a variety with black tail and tergites 3–6 black haired (Richards), was captured as it was entering a *Citellus parryi* burrow at 2,500 feet elevation. At Ikakevik Lake the species occurred on a meadow near the lake covered with flowers at this time (dandelions, lupines, Stellaria, etc.).

**Bombus moderatus** Cress.: Umiat, July 25, 1950. See *vancouverensis*.

**Bombus strenuus** Cress.: Umiat, July 27, 1950.

**Bombus sylvicola** Kirby: Umiat, July 24–25, 1951. See *vancouverensis*. Taken also at Umiat on the crest of the valley several hundred feet above the valley floor at a temperature of 70° F.

**Order Coleoptera**

**Carabidae**

**Nebria nivalis** Paykull: Ikakevik Lake. This carabid was taken at noon of a sunny day at the shore of this small, hitherto unnamed lake near Ikakevik Mountain.

The species is known from the high mountains of Scotland and from Sweden, Finland and North Russia. Lindroth in his monograph of Fennoscandian Carabidae (1949) has much to say about this unusually interesting species. “Die einzige ausschliesslich in der Regio Alpina heimische Art ist *Nebria nivalis*” (p. 448) and in experiments (p. 465) it is shown to have the greatest cold tolerance of any carabid tested. He doubts, however, that my specimen is this species.
Pterostichus pinquedineum Esch. Noluk Lake. From summit of 2,800 foot mountain (600 feet above lake) among low tundra vegetation of dryish type.

Dytiscidae

Colymbetes dolabratus Payk.: Umiat, July 5, 1950, in pond on Colville valley floor.
Illybius sp. not in Brit. Mus.: Umiat, July 6, 1950, in pond on Colville valley floor.
Tlybius angustior of Weber, 1950 should be Illybius angustior.

Silphidae

Thanatophilus lapponica Hbst. (det. Arnett). Larvae were taken as late as August 30 at Anaktuvuk at a temperature of 30° F., snow having fallen in the night and morning. A large black larva was here taken, with many whitish mites attached to the venter, which did not seem to be hibernating although soft and pliable. Rather it appeared to be moribund since by the next day it was clearly dead. The habitat of this species and trituberculata appears to be similar. Also, Noluk Lake, from carcass of young female caribou dying several days earlier.

Staphylinidae

Arpedium n. sp.?: Ikakevik Lake, near shore.
Atanygnathus sp. (det. Blackwelder): Oumalik, from debris at base of Salix glauca var. acutifolia (Hook.) (det. Ball).
Tachinus n. sp.?: Noluk Lake.

Aleocharinae


Chrysomelidae

Chrysolina n. sp. (det. H. S. Barber): Anaktuvuk Pass, August 28, 1948. Unfortunately Mr. Barber died before this was described.
Chrysomela subsulcata Mann (det. Bryan): Noluk Lake. Several specimens of variable size. The Pt. Barrow specimens of Weber, 1950, were also variable in size and iridescence. They were only found by patient searching July 3 and 4 while a cold wind blew from the polar ice. The insects moved sluggishly or remained immobile amongst the low, dryish tundra vegetation consisting mostly of lichens, short sedges and grasses. Their bronze elytra reflected sunlight or they would have been particularly hard to see in the vari-colored carpet of vegetation.

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WEBER, N. A. 1949. Late summer invertebrates, mostly insect, of the Arctic Alaskan slope. Ent. News 50: 118-128.

A Change of Names in the Cerambycidae, with other Notes

By LAWRENCE S. DILLON and ELIZABETH S. DILLON
Biology Department, A. & M College, College Station, Texas

As Lamia spinosa Say (1827) is a primary homonym of Lamia spinosa Drury (1773), it is essential that a new name be found for this common species of the genus Dectes. Since both D. brevis Casey and D. texanus LeConte are valid species, no synonyms are available for use. Hence the authors propose that the form in question be known as Dectes sayi Dillon and Dillon, nom. nov.

While the authors were studying over some Indo-Australian longhorns, it became apparent that the two specimens on which the description of Mengelotes ambiguus D. and D. had been based were mislabelled as coming from Mexico. Mengelotes D. and D. is a synonym of Diocharcs, and ambiguus is identical to D. ambigenus Chevrolat from the Philippine Islands.

Saperda vestita Say (1827), now placed in the genus Eupogonius, is a primary homonym of Saperda vestita Say (1824), and must be renamed, as LeConte suggested more than one hundred years ago (see Journ. Acad. Nat. Sci. Philadelphia...
(2) II, 1852, p. 159). For the present the species may be called *Eupogonius pauper* LeConte, which name is currently listed as a synonym of the form under discussion. However, there appears to be considerable evidence supporting *E. pauper* as valid in its own right, in which case a new name will have to be applied here. Other names, according to Knull (Ohio Biol. Surv. Bull. xxxix, 1946, p. 264), that might be available here are *E. fulvovestitus* Schaeft. and *E. fraxini* Knull, the ultimate solution depending on a revisional study of the genus.

Dr. Carl Börner (1880–1953)

Because he was a figure of world-wide importance, it is fitting that a brief notice be published in an American entomological journal of the death of Dr. Carl Börner, it being assumed that a definitive account of his life and work will be published in Germany.

Dr. Börner was born in Bremen, May 28, 1880, and died June 14, 1953, in Naumburg/Saale (Russian Zone), Germany. During most of his life he was director of the Imperial Biological Institution's stations for research on the grape Phylloxera, first at Villers l'Orme-Metz, and later at the new center that he established at Naumburg. He came to recognize a number of "biotypes" or races of Phylloxera, grew and hybridized many varieties of grapes, studied the intricate problems of host-parasite relationship and the inheritance of resistance and of immunity. Using the American species, *Vitis cinerea*, he finally developed varieties immune to all nine biological races of Phylloxera.

Older entomologists will recall Dr. Börner's monumental work on the Chermes, published in 1908, and his subsequent papers on this group, now known as Adelgidae; they will recall also his many contributions on the grape Phylloxera (Die Reblaus), a species that he studied and published on over a period of forty years. Aphid workers will, of course, remember him for his many fine contributions in their particular field, that is, if they happen to have access to his papers, some of which were privately published and appear to have had a limited circulation. They will perhaps long remember him, and cause him unrest,
for the paper in which he described seventy-five new species on four pages of text. It is likely that Dr. Börner will be best remembered for his contribution of a new system of generic classification in the Aphidae, for the numerous genera that he described in this group, and for over 200 new species that he described. All will be pleased that he lived to see his "Europae centralis Aphides" (Die Blattläuse Mitteleuropas), a work of 484 pages, in print.

Few Americans will be aware of the fact that Dr. Börner also published in the field of botany. In 1912, there appeared his "Volksflora Deutschlands," much in demand at the time; in 1923 he published his "Tokontologie," in which he attempted to establish a theoretical basis for a natural system, particularly of the plant kingdom, based on the types of alternation of generations and reproductive phenomena rather than on morphology.

Nor was Dr. Börner’s interest limited to the fields just enumerated. He published on insect anatomy and morphology, insect phylogeny, on the Collembola and Lepidoptera. Few, if any, will be aware of the fact that he also wrote poetry; only his family and intimate friends will know of his interest in music.

The writer never met Dr. Börner, and much to his regret only started to correspond with him in 1948, although attempts were made to do so earlier. He found him very generous and helpful.

F. C. Hottes,  
Grand Junction, Colorado

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.

More about Bees' Dances for Directing the Swarm

In 1951, Martin Lindauer¹ showed for the first time that bees use their remarkable "language"² not only for giving the

¹ See Ent. News 63: 100-02, April, 1952.
location of nectar but also for directing a swarm to a new nesting site or future home. This year, after another season's work, using more controlled conditions (artificially made up swarms placed at convenient eye-level, and a locale where there were no natural nesting sites available), Lindauer has been able to demonstrate that bees can discriminate between more and less desirable prospective homes and that even when several sites are discovered they are able to select the best of these. He has learned how the bees attain agreement as regards the best site, how the cluster is finally broken up, and how the flight to the new home is directed and completed. Some of this work will be described here.

In the first experiment, two empty possible nesting sites were set up: "A," a light box hive 10 meters distant under a tree and covered with some brush, and "B," a ruggedly constructed hive 75 m. distant and exposed on a tree stump. Both were soon discovered by scouts from the swarm. Within 4 hours, 37 such scouts were dancing on the swarm to promote the more sheltered site "A," and making repeated return visits to the site; for "B" there were only 3 dancers. Hive "B" was now placed on the ground beside the stump and dry brush was heaped about it to thoroughly ensconce it. The following day the number of bees frequenting "B" and dancing for it rapidly increased to 101, while site "A" gained only a few new adherents. On the third day there were again more new dancers for "B" while the dancers for "A" gradually gave up dancing entirely and made only infrequent visits back to their site. Four of the "A" dancers even became converted and danced for site "B." At 10:55 on this day, the decision having fallen to "B," the cluster broke up and flew to take possession of the new home.

When given the choice between two straw skeps, one of which was perfumed with a few drops of melissa oil (thought by beekeepers to be attractive), a swarm showed preference for the odorless one. Exchanging the locations of the two skeps, the bees changed their dance to the new location of the odorless one.

As between this skep and a wooden hive the bees preferred the hive.

In one experiment with two empty hives, scout bees from a swarm were giving about equal attention to both (14 and 16 dancers respectively) when suddenly a single bee was seen to dance very vigorously for still a third location. Soon others were dancing in this very lively and excited fashion. Searching in the direction and at the distance indicated by the dance, Lindauer soon found a small hole in the ground, 3 mm. across, with about 50 bees excitedly going in and out. Within another hour there were many more dancers and the swarm reached its decision, broke up and flew to take possession of what proved to be a dry cavity, ½ m. underground, 20 cm. high, 30 cm. wide, 50 cm. deep, in a quiet sheltered corner of the woods, an ideal home indeed.

In the above case, it was the liveliness and vigor of the dance that encouraged more and more new bees to visit the underground site and that at the same time discouraged the dancers for the other site. Apparently the bees do not compare the several sites but are able to judge a site absolutely. A 1st Class site will evoke very brisk dances, a 2nd Class site a less vigorous response, and so on. Dancers for a lower grade site when meeting these lively dancers of a 1st Class site at first pay little heed but after several such encounters on the surface of the swarm they gradually give up their own dancing and their visits to their site also become less frequent. In one instance, after a fourth encounter, one bee was seen later to have adopted the new style of dance, i.e., to have become converted. When only low grade sites are available a decision is reached slowly and so there is more time for the discovery of a better site.

A decision and a departure of the swarm were found to be immanent when about 100 bees were frequenting a prospective home. By setting up two like empty hives at equal distances (and by making various changes during the course of the experiment so that the two sites remained in fact equally desirable to the bees) it was possible to have two groups of dancers in about equal strength. When each group had been built up to a hun-
dred, each group, under the impression that a decision in favor of its site had been arrived at, set about to break up the cluster and to lead it off. Once in the air, however, the swarm got nowhere, and had to re-form a cluster.

The liveliness of the dances depends upon the qualities of the site discovered, but it depends also upon a peculiar behavior of the bees visiting there. At the site, a bee may suddenly burst into a group of bees standing about, or even circle about a single bee, and running with extremely hurried, nervous, zig-zag strides will ram its head into one or another bee, nudging it sharply, while carrying out vibratory shaking movements in the vertical. Most striking of all is the loud buzzing of the wings at intervals during these "Schwirrläufe," as Lindauer calls these performances.

Increased dancing in the swarm brings about more of this buzzing-running at the site, the buzzings at the site increase the vigor of the dances, and so on in an accelerating cycle that quickly reaches an optimum pitch of excitement and that leads to the departure of the swarm. The actual breaking up of the cluster is brought about by such buzzings performed on the swarm by the bees from the site. At such a time the bees at the site have practically all returned to the cluster and begin their excited buzzings, spreading over the surface of the swarm and boring into the cluster which begins to loosen up. As the excitement grows, 5 or ten bees fly off the cluster, then a few dozen more, then hundreds, and then within a few seconds the entire swarm is in the air and producing the familiar low, loud humming tone.

R. G. Schmieder
Brachymyrmex depilis subsp. flavescens Grundmann a Synonym of Brachymyrmex depilis Emery (Hymenoptera: Formicidae) ¹

By A. C. Cole, The University of Tennessee, Knoxville

Grundmann (1952)² described Brachymyrmex depilis flavescens from a series of 22 workers collected in Big Cottonwood Canyon near Salt Lake City, Utah. Dr. Grundmann has generously supplied me with a series of his cotypes. I have examined these specimens carefully and have compared them with series of the typical species from both the eastern and the western United States including a series which I had collected in 1932 near Twin Falls, Idaho in a similar habitat. From these studies I have reached the conclusion that flavescens is not significantly different from the typical depilis and that its structural characteristics fall well within what can be expected as normal variation of populations of depilis. Furthermore there is apparently nothing significant about the station of flavescens to segregate flavescens as a subspecies.

It seems very likely to me that Dr. Grundmann collected a series of callow workers which might even represent an incipient colony. If this should be true, Dr. Grundmann is not the only myrmecologist who has made such an error. The workers are smaller than those of depilis and their color is paler. Furthermore the integument is shriveled considerably.

I propose therefore that B. depilis flavescens Grundmann be relegated to the synonymy of B. depilis Emery.

¹ Contribution No. 78, Department of Zoology and Entomology, The University of Tennessee.
Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian

Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1953 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.


For records of papers on medical entomology see Review of Applied Entomology, Series B.

**NOTE:** The figures within brackets ([ ]) refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S). Papers published in **Entomological News** are not listed.


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Flanders, S. E.—Predatism by the adult hymenopterous parasite and its role in biological control. [76] 46: 541-44.
Lindauer, M.—(See Anatomy.)
Michener, C. D.—Comparative morphological and systematic studies of bee larvae with a key to the families of hymenopterous larvae. [83] 35: 987-1102, ill.
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1900 RACE STREET, PHILADELPHIA 3, PA.
The numbers of Entomological News for 1954 were mailed at the Post Office at Lancaster, Pa., as follows:

No. 1—January .................. January 15, 1954
No. 2—February .................. January 29, 1954
No. 3—March .................... March 8, 1954
No. 4—April ..................... April 7, 1954
No. 5—May ....................... May 3, 1954
No. 6—June ...................... June 18, 1954
No. 7—July ....................... July 9, 1954
No. 8—October ................... September 27, 1954
No. 9—November ................. November 4, 1954

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THE AMERICAN ENTOMOLOGICAL SOCIETY
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AND
1900 RACE STREET, PHILADELPHIA 3, PA.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada. Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in paragraphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.

DIV. INS.
U.S. NATL. MUS.
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.

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Nesting Notes on the European Hornet in North Carolina

By David L. Wray, Raleigh, N. C.

The European Hornet (Vespa crabro var. germana Christ) was first recorded in North Carolina when a single male was taken near the railroad tracks on the State College campus in Raleigh, October 5, 1940 ("Supplement to Insects of North Carolina," 1942, C. S. Brimley). Our next record of this species was Sept. 22, 1944, when J. A. Harris collected 1 male and 3 females at Guilford College (Guilford Co.) and saw 6 others feeding heavily on Ligustrum shrubs and apparently doing some damage to a nursery there. M. W. Wing (Ent News, vol. LX, January 1949) gives four other records of this species within the State: Greensboro, Reidsville, Carthage, and Mocksville. The Greensboro record is of 1 female and a portion of a nest, in early October 1946. The following records and notes from our Insect Survey will show its present distribution and would indicate that it is firmly established from a nesting standpoint.

The general distribution of this species as of this date (December 1952) in North Carolina would lie in the central or Piedmont area of the State, bounded on the east by a line drawn in a southwesterly direction through Raleigh (Wake Co.) and Aberdeen (Moore Co.), and on the west in a southwesterly direction along the lower edges of the Mountain region proper from Wilkes County on the North through Rutherford County on the southwest. So far we have no records for the large eastern or Coastal Plain section, nor for the Mountain region.
proper. Many of the records and specimens for this central region resulted from my article on this species in the *Agricultural Review* (1950).

Probably the first record of this species nesting in North Carolina was made by O. E. Brown, an apiarist and a keen observer of nature, near Asheboro in the summer of 1945. This is in the center of the State and some 25 miles south of Greensboro.

**NESTING AND DISTRIBUTION RECORDS**

This species has been found nesting from Raleigh on the east to as far west as Rutherford County, with many places in between. It has been recorded as occurring in nineteen counties in this central section.

The following locality records and notes about its habits will give its status in North Carolina.

Raleigh (Wake Co.) : A nest was found in the barn of F. G. James hanging from the apex of the roof and inside a loft. It was about 2 feet long and about 10 inches in diameter. I collected this nest in October 1950 when it was empty. In August 1950 J. B. Lyon brought in some large lilac limbs from his place 12 miles north of town which had been girdled by the hornets gnawing small pieces of the bark off (about 1 inch wide and 2 inches long). On August 15, 1950 I observed a large nest built in a large oak tree with a hollow about 3 feet up from the ground, located 5 miles north of town. The hornets were working in and out like a large swarm of bees, some feeding on the sap exuding from a bruised place on the tree nearby.

Cary (Wake Co.) : Adults observed feeding on sap from an oak tree.

Neuse (Wake Co.) : Two nests were found here in trees, and one in a house by J. J. Taylor.

Leesville (Wake Co.) : Nesting in tree in yard of O. J. Smith.

Durham (Durham Co.) : Reported stinging a farmer near here and causing hospitalization.

Chapel Hill (Orange Co.) : On August 19, 1950 I observed a nest on the farm of T. W. Brown. It was built in a large hollow of a white oak tree about 3 feet up from the ground, and on the banks of a creek. He states that they nested here in
1949. Oxford (Granville Co.) : Two adult specimens were collected by Mr. Stahl of the Experiment Station. Burlington (Alamance Co.) : 3 specimens were sent in by Geo. E. Curtis, who states that they are nesting here. Aberdeen (Moore Co.) : One specimen from here and they were reported as catching and eating honey bees. Asheboro (Randolph Co.) : O. E. Brown found them first nesting here in 1945 and 1946, and each year since. On August 9, 1950 a nest was found between the roof and ceiling of a grain storage building, and I observed a portion of this nest. Near here, another farmer reported a nest in a tree and complained that the hornets were feeding on his apples. I went with Mr. Brown to his orchard and observed the hornets come to the ripening apples. They would sit on an apple and begin to gnaw a small hole through the skin by moving around in a circle, then enlarge the hole to about a half to three-fourths inches in diameter, all the time gnawing out the inside. After that they would concentrate on eating the “meat” out. Several apples were found, under the trees, that consisted only of the outside skin or peeling and the central core part. Star (Montgomery Co.) : In August 1950 Mr. Brown took me to a large nest in the northern part of this county. It was built in a
hollow maple tree, near a barn, with an opening about 10 feet from the ground. On a nearby large oak tree we observed hornets feeding on exuding sap. Around this place were found many bits of insect bodies, mostly wasps, beetles, etc., upon which the hornets had fed. We watched them catch other wasps. Indian Trail (Union Co.): On August 23, 1950, T. E. Cartner submitted specimens and stated that large numbers were attacking trees and damaging bark. Mathews (Mecklenburg Co.): In the summer of 1950, a nest was found in an old hollow tree near a house by V. L. Stilwell. The hornets were working “in and out of the tree like bees.” Salisbury (Rowan Co.): Specimens were taken here September 28, 1951 by W. J. Walton. Mocksville (Davie Co.): A large nest was taken here on August 25, 1950 by A. E. Hendrix. This nest was the largest found within the State so far. It was built inside a tobacco barn up in a corner near the roof. It was 36 inches long and 20 inches in diameter, and fastened at the top and two sides. Cana (Davie Co.): Adults taken here were girdling lilac bushes. Mrs. C. F. Sofley stated that “they cut a strip of bark off about one inch wide all around the stems.” Winston-Salem (Forsyth Co.): A colony, in the basement of a house, that had built a nest about the size of a gallon bucket was destroyed by spraying. They were attacking lilac bushes also. Sherman Shore reported them feeding on sap from a large oak tree, and also observed them around lights at night where they appeared to feed on insects attracted by the lights. Kernersville (Forsyth Co.): Feeding on apples. W. G. Entrekin states that “they eat all the apple leaving only the skin and core. People pick up apples with a dinner fork to avoid stings.” Leaksville (Rockingham Co.): A nest that was found here in a barn by L. J. Griffin was 18 inches long and 12 inches in diameter. Madison (Rockingham Co.): Hornets were observed feeding on honey bees, and also on watermelon rinds and on sap exuding from a willow tree. East Bend (Yadkin Co.): One specimen. Elkin (Surry Co.): A nest was found here by Lin Hendren built inside the weatherboarding of a frame house. Many specimens
and a portion of the nest were sent to me for examination. Benham (Wilkes Co.): A large nest was found here by Raymond Harris, built inside of an old log house. The nest was hanging down from the rafters and was almost as large as a half bushel basket. Maiden (Catawba Co.): Specimens were taken here September 15, 1951. Union Mills (Rutherford Co.): Specimens were taken here and there was a nest in a large tree. This is the farthest locality to the southwest and is in the upper foothills at the base of the mountain region proper.

The Nest

The nest of the European Hornet is generally large in size and is composed of many layers of combs, about 24 in the largest nest found at Mocksville. These combs are constructed with intercomb supports of matrix. Those nests examined that were hanging in barns are completely covered with a tan to light brownish paper material, somewhat laminated in appearance. All along the sides were entrance tubes which opened several inches from the horizontal entrance and extended upward to the floor entrance; thus by turning the nest upward one could see many openings protected by these tubular structures. The paper of the nest is very brittle and the nests are damaged by handling, no matter how carefully done. Upon rubbing some of the material in one's hand it appears like a coarse sawdust that has been worked together into paper and that crumbles easily.

Notice to Homopterists

Professor Z. P. Metcalf, of the University of North Carolina, has received a grant-in-aid from the National Science Foundation for continuing the publication of the Catalogue of the Homoptera. He is now asking the cooperation of all homopterists for help in securing reprints and other data relating to the Auchenorhyncha (Fulgorids, Jassids, Cicadas, and Membracids). For detailed information please write to Professor Metcalf, Box 5215, State College Station, Raleigh, N. C.
Biological Notes on Psammeaeicius tricolor (Cresson) (Hymenoptera: Sphecidae: Gorytini)

By H. E. Evans, C. S. Lin, and C. M. Yoshimoto, Cornell University, Ithaca, N. Y.

On August 18, 1952, numerous specimens of Psammeaeicius tricolor (Cresson) were found nesting by the writers at Ulysses, Grant Co., in southwestern Kansas. Our observations cover but a single day and are by no means complete, but considering the scarcity of information on the biology of wasps of this group, they seemed worth reporting at this time. We are indebted to Karl V. Krombein for identifying P. tricolor and its parasite Nysson bellus Cresson for us, and to David A. Young for identifying the leafhopper prey of tricolor. These studies were made as part of a project on the comparative behavior of solitary wasps, supported by the National Science Foundation on grant number G-248.

The Gorytini are predominantly soil-nesters which utilize Homoptera Auchenorhyncha as prey. The species of Psammeaeicius which have been previously studied prey upon Membracidae. P. costalis (Cresson) preys upon several genera of adult Membracidae (Reinhard, 1925a) while P. nebulosus (Packard) uses nymphs of several genera (Pate, 1946; Krombein, 1953; unpublished observations of writers); there is one record of P. spilopterus (Handlirsch) taken with an adult membracid (Pate, 1946). The nesting behavior of costalis is best known, having been described in some detail by Reinhard (1925a and later in "The Witchery of Wasps," 1929). Krombein (1953) has recently published observations on the nesting of nebulosus. Psammeaeicius tricolor differs from all these species in that it preys upon Cicadellidae; several features of its nesting behavior have not been noted for the other species.

Ecology. This aggregation of P. tricolor consisted of 40-50 nesting females, of which 12 were observed in some detail. No males were encountered. The site was a small flat sandy area
at the lower edge of a sloping fallow field, apparently formed by erosion from the field. The top three or four inches were light sand, below this a sandy loam. Numerous low spreading plants were scattered over the sand, the most abundant a species of Euphorbia. Below the edge of the field the land sloped away and was covered with a dense growth of various herbs, finally dropping off to a grassy area along a small stream which flowed into the North Fork of the Cimarron River about half a mile away. A species of Sphex and a Plenoculus were also nesting here.

The first specimens were seen at 11 A.M., and observations were made from then until 7 P.M., when most activity had ceased. All the nests were located near the bases of plants, and none of them in the more open stretches of sand. None of the nests were less than 4 inches apart and most of them were separated by a foot or more. All of our observations were made at the nesting sites, as we were unable to trace the wasps to the source of their prey, and hence did not observe the capture of the prey.

Provisioning the nest. Psammeccius tricolor was using only one species of leafhopper as prey in this locality: Parabolocratus brunneus Ball. The nineteen cells which were eventually examined contained 194 of these green leafhoppers, of which 191 were adult females and the other three last instar nymphs. The prey is carried to the nesting site in flight, held tightly beneath the body. The flight of this species is rather slow, and the wasp characteristically lands several inches away from the nest entrance (sometimes on a plant) rather than flying directly to it. On landing, the wasp stands on its front and hind legs and holds the leafhopper with the middle legs, venter-up, tightly against the under side of its thorax and abdomen. After landing and before entering the burrow the wasp invariably moves its abdomen up and down rather slowly in a broad arc, while holding the wings motionless at a slight angle from the horizontal. These movements of the abdomen are highly characteristic, and we have not observed similar movements in other gorytine wasps which we have studied.
After landing the wasp pauses a moment, then walks or takes one or more short flights to the burrow. In cases where we had in any way disturbed the immediate vicinity of the burrow, the wasp had difficulty in locating it, and would occasionally dig in two or three different spots before finding it. On arrival at the burrow, the entrance is opened with a few strokes of the front legs while still holding the leafhopper with the middle legs and standing on the hind legs. The wasp then enters the burrow directly, leaving it open while inside. Usually less than half a minute is spent inside the burrow; on leaving, the nest is closed with some care from the outside, and the wasp flies off. The amount of time required to obtain another leafhopper varies considerably; the minimum time recorded was 3 minutes, the average somewhere between 5 and 10. One very active specimen was observed to bring in 10 leafhoppers in 50 minutes; another brought in 8 in 30 minutes. Without exception the burrow is closed when the wasp leaves to fly after prey, and left open while it is inside. However, on a number of occasions it was noted that the wasp stayed in the burrow an unusual length of time (about 15 minutes) and at these times threw up a certain amount of earth from the inside. We concluded that these intervals were used to dig a new cell.

Eleven nests were eventually dug out. The length of the burrow to the deepest cell averaged 10.5 cm. (ranging from 7 to 14 cm.); the depth of the deepest cell beneath the surface was 6 (4-8) cm.; the angle formed with the horizontal averaged 35°. The diameter of the burrow was about 3 mm., that of the cell about 7 mm. Most of the burrows were straight or nearly so. Four of these nests had been completed and had received the final closure; of these one had two cells, two had three cells, and one had four. In the nest with four cells, the two deepest cells contained larvae and the other two contained eggs; in another case all contained eggs but the egg from the deepest cell hatched first. From this we concluded that the deepest cell is the first prepared and provisioned, and the others prepared a short distance off from the main tunnel progressively back toward the entrance. However, the cells were invariably very close together.
and sometimes separated by only a very few millimeters of sand. We consider it probable that the wasp provisions a single nest over a period of more than one day (at least in some cases) since larvae and eggs were sometimes found in different cells of the same nest.

The number of leafhoppers in the twelve completed cells examined averaged 11 per cell (7-19); all were one species and nearly all adult females, as previously noted. All had the ventral side up; all seemed thoroughly paralyzed. A small percentage of the leafhoppers were parasitized by Dryinidae, as evidenced by dark sacs protruding from between the abdominal segments. The egg of the wasp was invariably found upon the uppermost leafhopper. The egg is whitish, about 2 mm. long, and is laid longitudinally along the ventral side of the thorax laterad of the leg-bases, extending back about as far as the second abdominal segment. Several eggs and two small larvae were kept for rearing. One of the eggs hatched the following day, but the others failed to hatch, and the two larvae failed to develop. Since we were on a prolonged field trip, it was not possible to care for these delicate insects properly. None of the leafhoppers showed any signs of recovery.

Filling and digging. As noted above, burrows were closed temporarily by a small amount of sand while the wasp was away hunting. The final closure of the burrow, after all the cells had been completed, was very different from this, taking upwards of 30 minutes. In the beginning stages, sand is probably scraped from the sides of the burrow, since by the time the wasp is seen outside, the burrow is almost filled. In later stages the wasp rakes sand from around the entrance into the burrow, then backs in and pounds it down with the tip of the abdomen, which is moved up and down vigorously, the tip describing more or less of a circle. These actions are very reminiscent of Poeci-lopompilus interruptus (Say), a pompilid wasp somewhat similar in color and mannerisms to Psammaccius tricolor. When the burrow is full of carefully packed sand, the wasp kicks sand over the entrance from a distance of up to 7 cm., producing a small mound which is then flattened out by kicking in various directions.
Apparently these wasps usually complete their nests in late afternoon and then dig a new nest which they spend the night in and begin provisioning the next morning. All the final fillings and all the new diggings we observed were between 5 and 7 P.M. In digging, the wasp backs out of the burrow in a straight line as much as 10 cm. dragging sand with the front legs, then works forward toward the burrow scuffing sand with the front legs. The result is a small trough extending out a few centimeters from the entrance. About 45 minutes are required to complete the nest, and the sand at the entrance is then leveled off before the wasp enters, closing from the inside. One such nest dug out at 6:50 P.M. contained the adult wasp in the empty cell, where she presumably would have spent the night; there was an outer closure of about 15 mm. of sand, and an inner closure of about the same size just before the cell.

Habits of *Nysson bellus*. Several of these tiny, brightly colored wasps were observed in the nesting area of *Psammaccius tricolor*. Since wasps of this genus are known to be cleptoparasites of Gorytini, we suspected them to be parasitizing *tricolor*. On only one occasion, however, was a *Nysson* seen to enter a nest. This specimen has been digging here and there near a *Psammaccius* nest without success. When the *Psammaccius* landed nearby, the *Nysson* remained motionless. After a moment's pause, the *Psammaccius* entered the nest with a leafhopper; the *Nysson* followed her in but came out almost immediately. The *Psammaccius* remained in the nest about 15 minutes, which was unusual behavior since she was not building a new cell. During this interval the *Nysson* entered the nest three times and came out twice. Finally the *Psammaccius* emerged while the *Nysson* was still inside, closed from the outside, and flew away. The *Nysson* emerged a few minutes later and was captured. The nest was then dug out and found to contain two cells, the innermost apparently completed. However, no eggs of either wasp were located in either cell, probably having been dislodged during the digging.

One cell in another nest was found to contain two larvae, one slightly larger than the other. Since none of our rearings
were successful, we were unable to be certain that one of these represented the larva of *Nysson*, and the evidence against *Nysson bellus* remains purely circumstantial. Reinhard (1925b) found that *Nysson hoplisivora* Rohwer enters the cell of *Psammacius costalis* (Cresson) before it is fully provisioned and lays its egg under the wings of a prey. The *Psammacius* later lays her egg on the top prey, but the *Nysson* egg hatches first and the larva destroys the *Psammacius* egg, then feeds upon the contents of the cell.

**Discussion.** The Gorytini are usually regarded as a somewhat generalized tribe of the Nyssoninae, perhaps close to the stock which gave rise to the Stizini and finally the Bembicini. In this light certain aspects of the behavior of *Psammacius tricolor* may be worth reviewing: (1) the species appears to be distinctly gregarious in its nesting; (2) the prey is carried by the middle legs, venter-up, beneath the body (as in the Bembicini); (3) the manner of digging strongly suggests the Bembicini; (4) the tip of the abdomen is used for packing the soil in the burrow. The last named habit is well developed in the Bembicini (and in certain other Sphecidae as well) and it is of considerable interest to find it well developed in *Psammacius*. It will be many years before the phylogeny of behavior in the Sphecidae is thoroughly understood, and in the meantime we can do little more than speculate on some of the possibilities and await the accumulation of data on many more species.

**References Cited**


Two New Species of Perdita from North Carolina
(Hymenoptera: Apoidea)

By P. H. Timberlake, University of California Citrus Experiment Station, Riverside, California

Both of the following species of Perdita were discovered at Holly Shelter, North Carolina, by Professor T. B. Mitchell on October 5, 1951. Attempts to obtain additional specimens of P. discreta in 1952 failed, but P. polygonellae was collected again at the middle of September.

Perdita polygonellae n. sp.

A member of the octomaculata group, with a ferruginous abdomen. This is the only species of the group so far described that has this character, and it is also the only known eastern species of Perdita with an entirely red abdomen.

Female: Head and thorax dark olive green. Basal half of mandibles, sides of labrum, clypeus, lateral and supraclypeal marks, pale yellow. Mandibles shading into testaceous at middle and into rufous at apex. Middle of labrum more or less piceous. The usual pair of clypeal dots minute. Lateral marks large, higher than wide, narrowed above and ending obtusely at level of antennae. Supraclypeal mark generally a little notched above, and sometimes divided into two spots (rarely absent). Anterior border and large cuneate marks on each side of hind margin of pronotum, and the tubercles, yellow. Abdomen uniformly ferruginous, with only the lateral foveae of tergite 2 black, but occasionally (paratypes) with a faint brownish subapical band on the first segment, mostly in the form of sublateral oval spots, and a more distinct blackish spot on disk of tergite 5. Legs black, the under margin of posterior side and the apex of front femora, apex of middle femora, anterior side of front and middle tibiae and basitarsi, apex of hind femora, and apex of middle and hind coxae and their trochanters, yellow. Antennae blackish, the under side of scape

1 Paper No. 767, University of California Citrus Experiment Station, Riverside, California.
pale yellow, the under side of flagellum dull yellowish. Tegulae testaceous, with a yellow basal mark. Wings somewhat dusky, the nervures and margins of stigma brown.

Head somewhat broader than long, with face below antennae gently convex. Clypeus only slightly produced and with the lateral extensions broad and nearly fully visible in frontal aspect. Middle of labrum produced, forming a small obtusely pointed lobe that is medially ridged beneath. Facial foveae twice as wide as interval between them and eye margin, and three-fourths as long as space between sockets and anterior ocellus. Pygidial plate with arcuate sides and a rather narrow, rounded apex. Tarsal claws with a minute inner tooth.

Length, 4.5–6 mm.; anterior wing, 3–3.5 mm.

**Male:** Similar to female, but mandibles, except rufous tips, labrum, and face almost or quite entirely below level of antennae, white. Subantennal plates sometimes green at lower end, varying from more than half green to entirely white. Posterior orbits yellowish white, sometimes nearly to middle of eyes, or the white reduced to a small spot near base of mandibles. Thorax and abdomen as in female, except that the abdomen is marked with fuscous on basal half of tergite 1 and usually with an apical dusky band on tergites 1 to 4 (or 5), this band frequently reduced to a transverse oval spot on each side, where the duskiness is accentuated, and rarely with an extension basad in median line as a spot or short stripe. Legs with the dark area on femora more reduced than in female. Scape of antennae yellow, except at apex above, the pedicel and flagellum blackish above and brownish yellow beneath. Tegulae as in female. Wings a little more dusky than in female, the nervures and margins of stigma blackish.

Head slightly broader than long, the cheeks no wider than the eyes. Lateral extension of clypeus broad and gradually reflexed. Facial foveae about twice as long as broad. Mandibles rather short, curved, and simple. Tarsal claws strongly
bifid, the teeth nearly equal. Labrum nearly normal. Apical
tergite with a rather narrow, apically rounded pygidial process.
Sculpture and pubescence very nearly as in the female. Length,
4.5 mm.; anterior wing, 3.2 mm.

Holotype female and allotype, Holly Shelter, NORTH CARO-
LINA, on Polygonella polygama, Oct. 5, 1951 (T. B. Mitchell).
Paratypes from the same locality and flower: 33 females, 3

Types to be deposited in the U. S. National Museum; para-
types in the collection of the author and of T. B. Mitchell.

**Perdita discreta** n. sp.

Similar to *P. octomaculata* (Say), but smaller with the mark-
ings white, those of abdomen reduced to small, transverse spots.

Female: Head and thorax dark green, the labrum and clypeus
black. A narrow median stripe on clypeus, and small lateral
marks, yellowish white. The latter slender and acute above at
level of antennae and globosely widened opposite the clypeus
(in paratype reduced to a narrow curved mark, not quite reach-
ing level of antennae). Mandibles testaceous, becoming reddish
at apex and with a white spot at base. Thorax entirely dark,
the propodeum a little more bluish green than the mesonotum.
Abdomen black, the customary bands represented by trans-
versely linear white marks, one on each side of tergites 1 to 4:
those on tergite 1 at base of disk and narrowly separated; those
on following segments basal and widely separated, becoming a
little oblique on tergites 2 and 3; and those on 4 sometimes
evanescent (paratypes). Pygidial plate ferruginous. Anten-
nae black, the flagellum slightly brownish beneath toward apex.
Legs black, the tip of front and middle femora, extreme apex
of hind femora above, anterior side of front tibiae and basitarsi,
and a line on middle tibiae, pale yellow. Tegulae pale testae-
ceous. Wings dusky (grayish), the margins of stigma and
nervures fuscous.

Head about as wide as long, the facial foveae narrow and
elongate. Stigma of anterior wings rather narrow; marginal
cell with the parts beneath and beyond stigma equal. Pygidial
plate broad, slightly ridged medially and rounded or obscurely emarginato-truncate at apex. Tarsal claws with a small inner tooth near apex. Head and thorax dullish, densely tessellately shagreened, and impunctate except on anterior part of face. Abdomen microscopically lineolate. Pubescence moderately developed, erect, whitish, becoming pale ochreous on mesonotum. Length about 5 mm.; anterior wing, 3.1 mm.

Two females (holotype and paratype), Holly Shelter, North Carolina, Oct. 5, 1951 (T. B. Mitchell). There is no flower record for these specimens but they carry a fine-grained yellow pollen, presumably from some Composite.

Holotype returned to T. B. Mitchell for ultimate deposit in the U. S. National Museum.

P. discreta and the four similar eastern forms of the octomaculata group may be distinguished as follows:

1. Markings yellow, including marks on pronotum and tubercles ................................................................. 2

   Face with three small yellowish-white marks, the thorax entirely dark and the abdomen with transversely linear white marks on each side of tergites 1 to 3 or 4; length, 5 mm.................................discreta n. sp.

2. Lateral face marks much higher than wide, generally terminated bluntly at anterior end of facial foveae; superclypeal mark sometimes developed............................................. 3

   Lateral face marks triangular, usually hardly higher than wide and acute above; superclypeal mark absent; abdominal marks usually widely separated, those on tergites 2 to 4 oblique; length, 7 mm.........octomaculata (Say)

3. Supraclypeal mark large ........................................... 4

   Supraclypeal mark absent or represented by two dots or a line: yellow band on tergites 1 and 4 (usually also on 5 and rarely on 3) narrowly interrupted, that on tergite 2, and usually on 3, widely interrupted, with the remnants oblique; length, about 8 mm..consobrina consobrina Timb.

4. Scape narrowly yellowish beneath; abdominal bands broad, those on tergites 2 and 3 moderately well, and the others narrowly interrupted; wings a little dusky..............

   Scape yellow except above on apical half; abdomen with bands on first five segments moderately wide and narrowly interrupted medially; wings clear, the nervures yellowish; length, about 6–7 mm..................consobrina lepida Timb.

Scape yellow except above on apical half; abdomen with bands on first five segments moderately wide and narrowly interrupted medially; wings clear, the nervures yellowish; length, about 6–7 mm..................svenki Cwd.
Aphids on Rudbeckia

Aphids have been observed to be very numerous upon *Rudbeckia occidentalis* in various shaded canyon areas of Utah and southern Idaho. Most of the aphid material, recently examined by Professor M. A. Palmer, proved to be *Macrosiphum cockerelli* Hottes. On September 6, 1945, this species was abundant on leaves and stems of these plants near the summit of Ephraim Canyon, Utah. Here a careful examination showed some syrphid larvae, adult and larval ladybird beetles, including adult *Hippodamia quinquesignata* Kirby and *H. lecontei* Muls., damsel bugs which were largely *Nabis alternatus* Parshley, and *Anthocoris* sp. preying on this aphid. This was the greatest concentration of predators the writer has observed associated with this species. Other collections of *M. cockerelli* in Utah include: American Fork Canyon and Mt. Timpanogos, July 26, 1942, Mt. Nebo, July 25, 1942, Santaquin Canyon, Settlement Canyon, Monte Cristo and Indian Canyon. Also very abundant on the same host at Mink Creek Canyon and Emigration Canyon, in southern Idaho, August 14, 1942, when C. F. Smith and I examined this host at several stops.

*Macrosiphum rudbeckiarum* (Cockerell) was collected at Mt. Nebo, Utah, August 14, 1943. It is less numerous than *M. cockerelli* on *Rudbeckia*. *M. rudbeckiarum* also was collected in Mink Creek Canyon, Idaho, August 14, 1942, by C. F. Smith and the writer.—G. F. Knowlton, Logan, Utah.

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**Current Entomological Literature**

Compiled by VENIA T. PHILLIPS, Librarian

Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.
This list gives references of the year 1953 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

Note: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol ($) .

Papers published in ENTOLOGICAL NEWS are not listed.


ENTOMOLOGICAL NEWS


provisional check-list of the butterflies of the Ethiopian
Schneiderman and Wilson.—(See Anatomy.) Uchida and
Masaki.—(See Anatomy.) Vago, C.—Septicémie a spiro-
chètes chez les "Vers Courts" de Bombyx mori et son role
Papilios de Mexico, con descripciones de algunas formas
nuevas: una especie nueva para Mexico y localidades nuevas
de algunos otros. 111. [88] 24: 171-75, ill. Wigglesworth,
V. B.—(See Anatomy.)

DIPTERA—Alexander, C. P.—Undescribed species of
nematocerous Diptera. Pt. 111. [36] 48: 97-103. d’Assis-
Fonseca, E. C. M.—(See General.) Berg, P. W.—(See
Anatomy.) Blakeslee, T. E. & G. S. Payne.—Aedes (O)
sollicitans (Walker) and Culiseta (C) morsitans (Theo-
bald) in Kentucky. (Culicidae.) [92] 13: 210. Chaudon-
eret, J.—Reflexions sur les premandibules des larves de
De Biagi, A. M. de B.—Observaciones ecologicas sobre mos-
Dethier, V. G.—(See Anatomy.) Dobzhansky, T.—(See
Anatomy.) Grenier, P.—Simuliidae de France et d’Afrique
du Nord (Systématique, biologique, importance médicale).
uber die schlangelbewegungen der larven von Chironomus
plumosus und thummi. [159] 151: 52-59. Hubert, A. A.
—Observations on the continuous rearing of Culiseta inci-
C.—A new species of the anthomyiid genus Hylemya Rob.-
Desv. from Oregon, reared from fir cones (Muscidae).
Aedes mosquitoes of the Philippine Islands. III. Subgenera
Aedimorphus, Banksiells, Aedes and Cancraedes. [110] 7:
453-81, ill. Lal, R.—(See Anatomy.) Ramakrishnan, N. R.
& G. K. Rathnaswamy.—Some notes on sand-flies: a tech-
nique for mounting specimens for examination: honey-water
as sand-fly feed in cages. (Psychodidae.) [Indian J. Ent.]
from Mexico. [36] 48: 89-96. Stone, A.—The halteres of
Anopheles walkeri Theobald. (Culicidae.) [92] 13: 209-
10. Stuckenberg, B.—An ephyrid preying on Psychoda
alternata Say. [60] 89: 230. Travis, B. V.—Laboratory
studies on the hatching of marsh-mosquito eggs. [92] 13:

**COLEOPTERA** — **Barattini, L. P. & A. C. Saenz.** — Nuevos aportes para el conocimiento del desarrollo del Phanaeus milon (Blanch.) (Scarab.). [133] 16: 25–30, ill.


List of Titles of Publications Referred to by Numbers in Entomological Literature in Entomological News.

10. American Journal of Tropical Medicine & Hygiene. Baltimore, Md.
34. Bonner Zoologische Beiträge. Bonn, Germany.
43. Canadian Entomologist. Ottawa, Ont.
44. Canadian Journal of Zoology. Ottawa, Canada.
48. Dusenia. Curitiba, Parana, Brazil.
49. Ecological Monographs. Durham, N. C.
52. Entomological Society of America, Annals. Columbus, Ohio.
61. Eos; Revista Española de Entomología. Madrid.
63. Faune de l'Union Française (Formerly Faune de l'Empire Français).
64. Florida Entomologist. Gainesville.
85. Lepidopterists' News. New Haven, Conn.
88. Mexico Univ. Instituto de Biología, Anales. Mexico City.
90. Microentomology. Stanford University, California.
91. Mocambique; Documentario Trimestral. Lourenço Marques.
93. Musei Zoologici Polonici, Annales. Warsaw, Poland.
94. Musei Zoologici Polonici. Fragmenta Faunistica. Warsaw, Poland.
95. Naples Univ. Instituto e Museo Zoologico, Annuario.
97. Natural History Miscellanea (Chicago Academy of Sciences).
103. Notulæ Entomologicae. Helsingfors, Finland.
111. Pan-Pacific Entomologist. San Francisco, Cal.
114. Polskie Pismo Entomologiczne. Wroclaw, Poland.
121. Rio de Janeiro. Instituto Oswaldo Cruz, Memorias.
123. Rivisti di Parassitologia. Rome, Italy.
125. Royal Entomological Society of London, Proceedings, Ser. B.
129. Sao Paulo, Brazil. Instituto Biologico, Arquivos.
131. Smithsonian Miscellaneous Collections. Washington, D. C.
134. Sociedad Mexicana de Historia Natural, Revista. Mexico City.
139. Société Fouad I d'Entomologie, Bulletin. Cairo, Egypt.
140. Société Linneenne Lyon, Bulletin Mensuel.
143. Society for British Entomology, Transactions, Bournemouth, Eng.
146. Systematic Zoology. Washington, D. C.
149. Tijdschrift voor Entomologie. Amsterdam.
150. Tohoku University. Science Reports, Ser. 4. Tohoku, Japan.

NOTICE. The December 1953 issue of Entomological News was mailed at the Post Office at Lancaster, Pa., on December 8, 1953.
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.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Koenigsberg, Krs. Wetzlar 16, Germany.


Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.


Bembicina 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.

Wanted—Data on exact location of colonies of Epibembex (olim Bembix) (Hymenoptera), any species, any part of country, for biological studies. Howard E. Evans, Dept. Entomology, Cornell Univ., Ithaca, N. Y.

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12.—Phillips (Venia Tarris)—The Biology and Identification of Tryptetid Larvae (161 pp., 16 pls., 1946) .................. 5.00

13.—Braun (Annette F.)—Elachistidae of North America (Microlepidoptera) (110 pp., 26 pls., 1948) .................. 4.50

14.—Rehn (John W. H.)—Classification of the Blattaria as indicated by their Wings (134 pp., 13 pls., 1951) .................. 5.00

THE AMERICAN ENTOMOLOGICAL SOCIETY
1900 RACE STREET, PHILADELPHIA 3, PA.
ENTOMOLOGICAL NEWS
FEBRUARY 1954

Vol. LXV No. 2

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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.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in paragraphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
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.

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Remarks on the Larval Chaetotaxy of the Subgenus Melanoconion (Diptera: Culicidae)

By John N. Belkin, University of California at Los Angeles

The study of the chaetotaxy of culicine mosquito larvae has not attracted many workers in the past, despite the fact that numerous investigators have utilized from time to time some of the elements of the chaetotaxy other than that of the head and distal abdominal segments for the diagnosis of species. The recent contribution (Foote, 1952) on the complete chaetotaxy of the subgenus Melanoconion of Culex is a welcome addition to the information now being gathered in this field. It is unfortunate that Foote disregarded the earlier work (Belkin, 1951) in which an attempt was made to review the chaetotaxy of mosquito larvae, both anophelines and culicines, and to provide criteria for establishing homologies, and where the complete chaetotaxy of a culicine mosquito was figured. As a result a number of misinterpretations were made in the case of those hairs which do not always occur in a regular numerical sequence, although some changes in nomenclature introduced in Foote's paper were identical with those proposed by Belkin. Further work on the larval chaetotaxy and its homology with the chaetotaxy of the pupa (Belkin, 1952, 1953) has shown that the criteria for homologies and the interpretations proposed by me are generally consistent. Therefore, I wish to point out at this time some of the discrepancies in the interpretations of the chaetotaxy as well as some errors in observations made by Foote. My observations were made largely on Culex (Melanoconion) erraticus (Dyar and Knab), 1905 from Wilson Dam, Alabama.
It is stated by Foote that hair 2 is absent on the head capsule of the subgenus Melanoconion. My material shows a small tubercle with a minute bristle at the level and caudad of hair 1, in a position somewhat mesad of the homologous but better developed hair 2 in Culex quinquefasciatus Say, 1823, in which hair 3 is also present.

The thoracic chaetotaxy has not been studied comparatively in the culicines and all the present interpretations show glaring discrepancies between segments and with the abdomen, so that no comment can be made at present. On the abdomen, several discrepancies must be pointed out. Despite a statement to the contrary, hair 0 is present in the subgenus on segments II through VIII, as it is apparently in the larvae as well as pupae of all mosquitoes. In the species examined by me it is about one-fifth the length of the pilosity and is located in the usual position. It is figured and labelled by Foote as hair 1 on Segment VIII; on this segment it is considerably larger and more conspicuous. Hair 14 was also missed on segments III to VII and was labelled 13 (cephalic) on segment VIII, on which it is also more conspicuous. It is slightly smaller than hair 0 on the corresponding segments and is found in the normal anterior intersegmental position. On the venter of the abdomen, I question the interpretation of hair 13 on segments III through V. It is much more likely that the hair labelled 13 is actually 11, hair 12 is hair 13 and hair 11 is hair 12. The few pupal hairs of this group that I have seen in situ in the fourth instar larva support my interpretation; furthermore hair 13 is almost always well developed. It appears unlikely that Foote's interpretation of hairs 11 and 12 on segment I is correct for in many culicines, perhaps all, hair 11 on this segment is absent in the older instars although it is usually present in the first instar, and hair 13 is always present. One would expect therefore the two hairs to be 12 and 13 on this segment. On segments VII and VIII the interpretations are confused. It appears that some of my interpretations were followed, despite a statement to the contrary, on segment VII as well as elsewhere, while on segment VIII reliance was placed directly on
the interpretations of Root (1924), Martini (1929) and Hurlbut (1938). On segment VII, except for failure to identify hairs 0 and 14, the interpretation appears to be correct. On my figures of this segment (Belkin, 1951, fig. 6 and 7) hairs 11 and 12 are labelled incorrectly and the terminology should be reversed. On segment VIII none of Foote's interpretations are in agreement with the preceding segment and all appear incorrect. The first pentad (7) in many sabethines has the same position, as well as degree of development, as hair I of abdomen VII and it can be interpreted as the same hair in anophelines, particularly if the first instar larva is examined (Belkin, 1953). The second pentad (6) is probably hair 5, for it is retained in the pupa and in that stage Knight and Chamberlain (1948) have homologized it with the corresponding hair on the other segments. The third pentad (9) is almost without doubt hair 7; the evidence from the pupal chaetotaxy is quite clear and again in the first instar anopheline larva its position is quite similar to that of the corresponding hair on segment VII. The fourth pentad (11) is in all probability hair 10 as shown by the first instar larva. Finally, the fifth pentad (caudal 13) cannot be hair 13 since it is present in the first instar larva and hair 13 is missing in this stage; it is most probably hair 12 (Belkin, 1953). Since all these homologies are not completely clear, it would be preferable to use the arbitrary terminology, such as proposed by me, particularly since it appears that the first and second pentads are reversed in the culicines as compared to the anophelines. The remaining two hairs on this segment are 0 (1) and 14 (cephalic 13).

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—. 1952. The homology of the chaetotaxy of immature mosquitoes and a revised nomenclature for the chaetotaxy of the pupa (Diptera, Culicidae). Ent. Soc. Wash., Proc. 54: 115-130.
Some Observations on Stability and Uniformity in the Nomenclature of Larval Hairs (Diptera: Culicidae)

By Richard H. Foote, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture

One of the most serious problems confronting taxonomists today is the attainment of stability and uniformity in nomenclature. This ideal is slowly and gradually on its way toward realization, but only through a severe process of evolution involving the mutation of ideas and their selection and survival in the population of biologists concerned with the naming of animals. The attainment of the ideal of stability and uniformity in the nomenclature of the various parts of animals is just as desirable, but this must experience a similar process in which the same difficulties are inherent—those of the union of mind and of opinion.

This evolutionary trend has been carried a long way by those biologists who have studied, for instance, the serial homologies of the appendages of a crayfish. Though still not attaining universal acceptance of a single idea, they have agreed upon a more or less universal way of teaching and speaking about their
subject. On the other hand, those of us who have been studying the so-called "homologies" of mosquito larval and pupal hairs stand at the threshold of a long and, to some, very discouraging weeding process before general acceptance will ever be attained.

It is not the purpose of this contribution to discuss hair by hair the relative merits of the system of chaetotactic nomenclature proposed by Belkin (1950, 1952, 1953),\(^1\) nor is it necessarily a defense of a somewhat similar system devised by Foote (1952) for the *Culex* subgenus *Melanoconion*. Rather, I should like to discuss several possible pitfalls, the awareness of which should help to guide us more soundly in our choice of any such system for what we commonly term "permanent" use.

We should be particularly careful in our use of the word "homology," in my opinion rather unfortunately employed in the various papers by Belkin and other authors, as well as in one by myself (1952). One of the most commonly employed criteria in the determination of the true homology of two or more structures is the similarity in their embryological and post-embryological development. Our progress in this direction in the study of the larval and pupal hairs of mosquitoes has not yet attained a level where the accumulated volume of observations allows us to employ any such criterion fairly. For instance, the study of first larval instars of a majority of supraspecific groups must certainly be a prerequisite for such a program. Furthermore, attempts to homologize larval with pupal hairs, as exemplified by the work of Baisas and Pagayon (1949),\(^2\) Belkin (1952) and others, although consisting of carefully considered observations, really lack basic research in revealing the true physical and morphogenetic relationships involved. These authors have compared the relative positions and degree of development of larval and pupal hairs simply by

\(^{1}\) For most references see paper by J. N. Belkin in this issue of *Ent. News*.

observing the latter through the more or less transparent cuticle of the well-developed fourth larval instar. Even though this method of attack represents a distinct step forward, it is at best only suggestive, and the number of interpretations of the data thus gathered can be, and often is, as great as the number of observers. In my study of pupal chaetotaxy in two subgenera of *Culex* (Foote, 1953), the past and current lack of uniformity in the nomenclature of hairs is reflected in a table in which 13 different systems are compared. All of these systems have been proposed since 1920.

I have shown (unpublished data) that it is possible to immobilize mosquito larvae and alter the character of the pupal hairs developing under the larval integument by cauterizing the hair-forming areas of the larval cuticle. By using pupal hairs as markers in this way, workers may well evolve data that lie beyond the bounds of dispute. Experiments such as this will place our discussions on a basis that is more than pure speculation, and only then will we begin to resolve the more serious differences of opinion among us.

Those who have used the appendages of the crab and crayfish for their studies of serial homology point to the previous existence of a common ancestor which possessed a long series of very similar biramous appendages. It is believed that these appendages have changed in structure through mutation and selection until relatively large differences in structure from segment to segment have resulted. Again we see that our choice of the word "homology" may not be an apt one, since I believe we have not gone far enough back along the line of descent. In the end we may find an answer to this problem of hair nomenclature in an organism distantly removed from the group rather than in a member of the group itself.

Without doubt, Dr. Belkin has been aware of these and many other pitfalls. His work shows evidence of a careful appraisal of the available information, and doubtlessly he is correct in numbering many of the hairs. The volume of information that

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he has brought to bear on this problem is much greater than I was able to assemble during the short period of my study of *Melanoconion*. That study was a victim of bad timing in a way, since thesis deadlines were inflexible, and by the time Dr. Belkin’s nomenclature was available for use the system that I had devised had already been applied to most of the larval descriptions involved in the taxonomic work. It was designed primarily for use as an urgently needed tool which could be used for these descriptions. I sincerely regret the implications of universality which I may have written into this paper; yet as a tool it served a very useful purpose—to name the hairs of a restricted group of insects. However, it is my sincere hope that, as this nomenclature evolves, workers will devote more time to basic research and experimentation such as has been briefly indicated above. Facts, rather than intuition, should become the basis for our speculation.

A Modification of Hopkins’ Technique for Collecting Ectoparasites from Mammalian Skins

By Edwin F. Cook

In the course of a study on the populations of Anoplura on wild mice Hopkins’ (1949) technique of dissolving the hair of the mammalian host skins in caustic potash has been employed. By this means one can readily recover the total louse population of an individual skin. Other procedures that have been employed in the past—brushing, searching and the use of detergents—were considered but discarded; the first two procedures because too many parasites are overlooked and the latter because it is too time-consuming in addition to being unlikely to yield the total population of parasites. A comparison of the searching and brushing technique with the caustic potash

1 Paper No. 2981, Scientific Journal Series, Minnesota Agricultural Experiment Station, St. Paul 1, Minn.

method was made by first removing those parasites that could be seen upon a careful examination and then carefully brushing the specimen to remove any additional parasites. Following both of these treatments the skins were dissolved in caustic potash, and in all instances many additional parasites were recovered.

Hopkins' procedure involves initially soaking the skin of the mammalian host in cold 5% KOH for 15 minutes, after which the hair is scraped from the skin and the skin discarded. This particular step is rather tedious and some parasite specimens are likely to be lost by adhering to the skin. With over 400 dried skins to examine in the investigation noted above, the amount of time spent in scraping the hair from the skin became excessive. The following modification was then adopted with excellent results. Further, this procedure eliminates one of the possible sources of error in sampling the population of the ectoparasites. It should be noted, of course, that these results were obtained with the dried skins of small rodents: Clethrionomys, Microtus and Peromyscus. Whether or not it would be effective with larger animals is uncertain.

Dried skins are cut into small pieces (1 to 2 inches square) and placed in a 125 ml. Erlenmeyer flask with 50 ml. of 3% trypsin (4 × U. S. P. pancreatin) buffered to a pH 8.3 ± with .2 molar Na₂HPO₄. This is placed in an oven at 37° C. for 36 to 48 hrs. Following this initial digesting period, 10 gm. KOH and 50 ml. H₂O are added, and the resulting mixture is boiled for several minutes or until all of the hair and the skin have dissolved. This liquid is then strained through an 80 mesh bronze screen (folded to a conical form). The small amount of debris remaining on the sieve is washed gently with tap water and the screen inverted into a petri dish. The specimens are washed off the screen into the dish by a small stream of water from a washing bottle or the tap. Any parasite specimens still adhering to the screen are found by examination of the screen under a dissecting microscope. The specimens, now in the dish with very little debris, can be readily discerned at 15 × with a dissecting microscope. First instar nymphs of
the Anoplura as well as all larger instars are retained completely by the screen. Mites are also recovered by this process; even the Listrophoridae although these are so small that some do pass through the 80 mesh screen. With this modification 20 or 30 skins can be brought through their initial digesting with much less time and effort than that involved in skin scraping, and no lice are lost in the process.

The parasite specimens are largely cleared by this process, and aside from some manipulation to remove the dissolved body contents, they are ready for staining and mounting in appropriate media. Lice and mites prepared in this fashion are undamaged and make excellent mounts. The latter is not the case where prolonged boiling of the skins in caustic potash has been attempted nor where heat and pressure have been used to digest the skins.

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A Frigartus from California and an Erythroneura from South Dakota (Homoptera: Cicadellidae)

By Dorothy J. Knull, Department of Zoology and Entomology, The Ohio State University, Columbus, Ohio

Frigartus obesus n. sp. Figures 2, 3, 5, 6.

Resembling Frigartus frigidus (Ball)* but longer, less robust, and with smaller median spots on vertex and dark basal angles of scutellum.

Robust, cream-colored, marked with black and brown. Head broadly rounded to front, margins almost parallel, a large round spot between ocellus and eye on anterior margin, another comma-shaped, smaller spot either side on apex, small irregular spots and lines along base, eyes dark. Pronotum pale anteriorly, with sparse transverse lines on posterior two-thirds; scutellum pale with a black triangle in each basal angle, and

small triangular spot either side below median transverse impressed line. Elytral veins broadly pale, cells embrowned, apical cells darker. Below, face pale with seven short arcs either side, sutures and spot above antenna dark.

♂.—Valve short, blunted; plates broader than valve at base, long, narrowing gradually on sides to sharp appressed tips, covering pygofer, twice as long as valve. Inner genitalia as illustrated.

♀.—Last ventral segment longer than preceding, margin straight, slightly excavated on median two-thirds between produced sides.

Length: ♂ 4.1 mm.; ♀ 4.5 mm.

Described from specimens collected in California by D. J. & J. N. Knell. ♂ holotype and 3 ♂ paratypes, allotype and 1 ♀ paratype, Chester, July 1, 1951; and 1 ♀ paratype, Clear Lake, June 18, 1941. Types to be deposited in the Collection of The Ohio State University.

Erythroneura (Erythridula) pura n. sp. Figures 1, 4.

In form of inner ♂ genitalia near E. (E.) nitida Beamer,† but style with a longer, narrower posterior point.

Small, ground color cream on vertex, pronotum and body, of elytra white; color markings scarlet. Vertex with inverted V not touching eyes, narrower at apex; continued across pronotum as broad, slightly diverging irregular vittae reaching both margins; scutellum white, basal angles narrowly outlined with orange except basally, and apex orange; claval stripe broad in basal two-thirds, narrowly following suture in apical third to apex, corial vitta narrow, costal margin orange-tinged before plaque, apices slightly smoky.

Inner ♂ genitalia as illustrated.

Length: ♂ 2.6 mm.; ♀ 2.7 mm.


17, 1947 and Aug. 6, 1948; Hot Springs, Sept. 11, 1948; Lead, Sept. 11, 1948; Martin, Sept. 11, 1948; Springfield, Sept. 18, 1948. Holotype, allotype and paratypes in collection of writer, paratypes to be deposited in collections of Dr. Severin and The Ohio State University.

Figures 1-6

1. Erythronoeura (Erythridula) pura n. sp., lateral view of style. 2. Frigartus obesus n. sp., head, pronotum, scutellum. 3. Frigartus obesus n. sp., ventral view of aedeagus. 4. Erythronoeura (Erythridula) pura n. sp., lateral view of aedeagus. 5. Frigartus obesus n. sp., lateral view of aedeagus. 6. Frigartus obesus n. sp. style.
Concerning the True Identity of Strigamia fulva Sager and Strigamia bothriopa Wood (Chilopoda: Geophilomorpha: Dignathodontidae)

By RALPH E. CRABILL, Jr., Department of Entomology of Cornell University, Ithaca, New York

In a way it is not surprising that fulva has been confused with bothriopa for so many years considering the disorder that has always enveloped the genus and the nebulous beginning of fulva in 1856. In that year Sager published a very short paper wherein he described several millipedes and a single chilopod, Strigamia fulva, which he characterized very superficially even for his era. The next person to refer to fulva was H. C. Wood, who, in 1862, published a redescription of it and repeated that diagnosis in 1865. Although Wood’s characterization leaves much to the imagination, he at least noted the number of legs and the distinctive prehensorial basal tooth and, like Sager, assigned it to Gray’s Strigamia. There can be little doubt that he had examined the typical series in Philadelphia. In 1862 Wood also described another new species, Strigamia bothriopa from Philadelphia, a form which he obviously considered sufficiently distinct from Sager’s fulva to justify his according it specific rank. He noted that it was “bright red” and robust, whereas fulva was yellowish-orange and “a graceful little animal.”

In 1886 Meinert, working at the Museum of Comparative Zoology at Harvard University, hesitatingly regarded the two forms as conspecific, but, surprisingly enough, his solution was to recognize bothriopa as valid and to place fulva in that species’ synonymy, at the same time transferring both to Scolioplanes of which he was co-author. His action probably influenced Bollman for, when the latter’s notes were published posthumously in 1893, he had included bothriopa in the synonymy of fulva and had referred both to Koch’s 1847 genus Linotaenia. It is likely that the action taken by these two workers has influenced all subsequent investigators down to the present time.

In 1896 O. F. Cook declared that he was unable to separate
Meinert’s robusta from Sager’s julva, but it is clear that he considered bothriopa¹ conspecific with julva. In the same article he suggested that considerable intraspecific variability must be taken into account; undoubtedly he attributed the larger size, pronounced robustness, crimson color, and so on of robusta [= bothriopa] to be the normal variation one might expect in the two forms that he considered referable to julva. In 1912 Chamberlin again synonymized Wood’s species with julva. He discussed and figured what he took to be the true julva, but from the information presented in the article I believe that he was actually dealing with specimens of bothriopa. The plethora of references to julva, with its supposed synonym, bothriopa, in the writings of both American and continental authors since Bollman’s time, together with the apparent rarity of the true julva and its subtle but unquestionable morphological lack of conformity with those forms properly referable to bothriopa have perpetuated the erroneous Meinert-Bollman synonymical precedent.

It is possible to show, however, that the two forms are by no means conspecific. I have examined the typical series of julva, which, through the faithful care accorded it by the staff of the Academy of Natural Sciences of Philadelphia for nearly a century, is still in excellent condition. These specimens were found to conform to the diagnosis presented here.

The most striking characteristic of julva is the presence of more than the usual four preclypeal setae, a feature detected in none of the American or European congeners that I have examined.

Strigamia fulva Sager


¹ Amer. Natural., XXX, pp. 239–242 (1896).
This species may be readily distinguished from all other eastern North American forms by its possession of a laterally divided ultimate pedal pretergite and by the preclypeal setae which always number more than the customary four.

Specific Diagnosis. Length: to 40 mm., most specimens averaging 30–35 mm. Color: fulvous in life and in alcohol, infrequently with a faint pinkish tinge anteriorly and posteriorly, never uniformly pinkish nor crimson. Pilosity: relatively densely pilose, reflecting the habitus characteristic, apparently, of most American, Asiatic and only a few European forms. Antennae: ultimate article distinctly longer than the penultimate. Preclypeal setae: 14–16 in number, approximately equidistant and regularly disposed along the anterior margin of the clypeus, (fig. 9). Labrum: midpiece weakly sclerotized, the pale teeth detected with difficulty, (fig. 4), the whole contrasting noticeably with the strongly sclerotized and deeply pigmented epipharynx. First maxillae: telopodite lappets completely lacking.\(^2\) Prehensorial segment: prosternum broad and short, uniformly or almost uniformly fulvous; ungula rather short, weakly curved, basal tooth thumb-shaped or conical, not subquadrat, (fig. 2); poison calyx\(^3\) strictly cordiform, typically slightly longer than wide, (fig. 5). Ultimate pedal segment: with distinct lateral sutures, each separating the pretergite

\(^2\) Strigamia chionophila Wood, a widespread American form, is distinctive in possessing two definite pairs of lappets which often escape detection unless they are suitably stained.

\(^3\) The poison calyx is the expanded sclerotized proximal terminus of the poison canal; the entire apparatus is readily seen in macerated specimens.
from its pleurites, (fig. 10); coxopleural pores numbering some 8–12, the majority large. Pedal segments: 47–53.

Distribution. From the foregoing discussion it must be clear that many of the records attributed to fulva probably were based upon specimens of bothriopa, which is by far the commoner of the two species. The following records, therefore, are only those for which I can personally vouch: CONNECTICUT: Mt. Higby Reservoir, Hartford county! NEW YORK: Ithaca! (many specimens); Watkins Glen! Elmira! Taughannock Falls State Park! The typical locality is unknown; possibly it is in the state of Pennsylvania. Wood, who was familiar with the types, reported the species from Pennsylvania and Illinois, but this information should not be considered absolutely trustworthy.

Strigamia bothriopa Wood


Linotacnia bothriopa (Wood),—Bollman, Ent. Amer., IV, p. 4, (1888).


Unlike fulva, bothriopa has but four precyopeal setae and a non-suturate ultimate pedal pretergite; in addition bothriopa is sordid red in life and brilliant crimson in alcohol, whereas fulva is usually yellowish-orange or at most faintly pinkish anteriorly and posteriorly. The southern bidens Wood possesses 65–81 pairs of legs and so contrasts conveniently with bothriopa which bears fewer pairs of legs. The color of the prosternum and the shape of both the prehensorial basal tooth and of the poison calyx are also notably different in the two species. Like that of bothriopa the ultimate pedal pretergite of
bidens is undivided laterally as are those of the European species acuminata (Leach) and crassipes (C. L. Koch) to which bothriopa bears a superficial resemblance. However, bothriopa lacks the conspicuous elongate sternital sulci of crassipes (best seen in cleared material), and it also differs from the evidently closely allied acuminata in a number of subtle characters. The ultimate antennal article of bothriopa is markedly broader and longer than the penultimate one, but the two are of about the same breadth and length in the Leach forms that I have examined. The number of pairs of legs is higher in bothriopa (47-53) than in acuminata (33-47). The legs and sternites of bothriopa, like those of the Asiatic hirsutipes (Attems), are relatively densely clothed with long setae, whereas those of acuminata are sparsely, shortly setose. Very distinctive is the difference in labral midpieces. That of the American form is relatively weakly sclerotized; its fimbriae appear very pale and are almost invisible unless stained with mercurochrome or acid-fuchsin. The labral midpiece of acuminata, (fig. 1), on the other hand, is well sclerotized and distinctly pigmented; its fimbriae are relatively strong and rather short.

Specific Diagnosis. Length: to 60 mm., averaging 40-50 mm. Color: in life sordid red, changing rapidly to brilliant crimson in alcohol, thereafter becoming sordid reddish-brown. Pilosity: relatively densely setose, especially the legs and sternites. Antennae: ultimate article much broader and considerably longer than the penultimate. Preclypeal setae: always four in number, medially situated, (fig. 7). Labrum: rela-

**Explanation of Figures**

Figs. 1-10.
tively weakly sclerotized, thus differing markedly from those of *acuminata* and *crassipes*. *First maxillae*: telopodite lappets absent or at most represented by barely perceptible and weakly pilose swellings. *Prehensorial segment*: prothorax very broad and short, reddish except for an elliptical anterio-medial white area which may at times be weakly bilobed posteriorly; ungula rather weakly curved, relatively short, evenly attenuate, basal tooth subquadrate, blunt and broad, (fig. 3); poison calyx very long and thin, its upper fifth abruptly expanded, (fig. 6). *Ultimate pedal segment*: pretergite without lateral sutures, fused completely with its pleurites, (fig. 8); coxopleural pores numbering some 20–40, all small. *Pedal segments*: 47–53.

**Distribution.** Because this species has long been confused with *fulva* I have cited only those distributional records that I consider reliable. **Massachusetts. New York**: West Danby! Ithaca! Robert Treman State Park! Taughannock Falls State Park! Slateville! Lloyd-Cornell Reserve! Lisle Center! Ringwood Wild Flower Preserve! Steuben county! Pennsylvania: "western Pennsylvania." **Virginia**: Clifton Forge! Yorktown! Charlottesville! Griffith! Riceville! Lowmoor! Mt. Rogers, Grayson county! Jordan Mines! **Kentucky**: Louisville! **Indiana**: Upland! Bloomington; Boswell; LaFayette; Westfield; Greencastle; Salem; Brookville; New Providence; Wyandotte.

**Current Entomological Literature**

Compiled by VENIA T. PHILLIPS, Librarian

Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1953 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

**NOTE:** The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (+); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S). Papers published in Entomological News are not listed.


**DIPTERA—** Albuquerque, D. de O.—Sobre um género e uma espécie nova de *Thyreophoridae* do Brasil. [117] 13:


VI. The genera Monomorium, Solenopsis, Myrmicina, and Trachymyrmex. Ibid. 299-300.

Creighton, W. S.—New data on the habits of Camponotus (Myrmaphaenus) ulcerosus Wheeler. [115] 60: 82-84.

Cuttle, E. R.—Two million dollar wasp. (Blasto, the fig wasp.) [Natural Hist.] 62: 420-27, ill.


Review


This is a reprint of the entire Volume XI (351 pages) that is so well known to everyone who has had to do with beetles or their larvae, or who has even occasionally encountered some new larval form that he has wanted to place systematically. The entire order is classified from the standpoint of the larvae, and the characters of all families and subfamilies are given in the synopsis that is illustrated with 125 plates and about 2500 figures.

The Brooklyn Society is to be congratulated on providing a reprint of this valuable work that makes it possible for every entomologist to have his own personal copy. In quality, the reprint is in every respect the equal of the original; it is printed on good glossy stock and finely bound in dark blue cloth.—R. G. S.
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.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel. Koenigsberg, Krs. Wetzlar 16, Germany.


Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.


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.

Wanted—Data on exact location of colonies of Epibembex (olim Bembix) (Hymenoptera), any species, any part of country, for biological studies. Howard E. Evans, Dept. Entomology, Cornell Univ., Ithaca, N. Y.

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THE AMERICAN ENTOMOLOGICAL SOCIETY
1900 RACE STREET, PHILADELPHIA 3, PA.
ENTOMOLOGICAL NEWS
MARCH 1954

Vol. LXV \hspace{2cm} No. 3

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

DIV. INS.
U.S. NATL. MUS.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act
of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in para-
graphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
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.

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The Distribution Centers of the Melanoplini
(Orthoptera; Acrididae; Cyrtacanthacridinae)

By James A. G. Rehn, The Academy of Natural Sciences of Philadelphia

Since the days of Eduard Suess it has been orthodox to ascribe to an Angaran center the role of a *locus communis* for an overwhelming percentage of the elements of the Holarctic biota. While in many cases this may, and probably does, provide an explanation of what has taken place, in others, where it has been assumed to be a basic postulate which perforce must be accepted, this theory can have value only if it is supported by the weight of known evidence.

In vertebrate paleontology this type of evidence is now so increasingly comprehensive that those who consider faunistic histories or movements in any group, must acquaint themselves with at least some of the broad conclusions which have been drawn, particularly in the past few decades, from the steadily augmenting amount of mammalian evidence. While it has long seemed fashionable to ascribe a very secondary role to the Ne- arctic region as a biotic evolutionary center, and to credit the Palearctic with a markedly predominating one in the evolution of the Holarctic biota, this latter is occasionally refuted by fossil evidence. The migrations of whole groups of mammals, or their regional extinction, are, as with the camels and tapirs, sometimes made clearly evident by this record. Admittedly this mammalian evidence is almost entirely Caenozoic in coverage, and in considerable part late Caenozoic, but many tribes of insects are probably no older, and it is important for all ento-
mologists who discuss faunal histories to consider what fellow-workers have ascertained in regard to other animals. Also, when we have little or no fossil evidence for the group from which to reason, we must turn to our knowledge of the existing fauna, and see what we may learn from it.

To digress momentarily, however, in the constant stressing of the role of Angara in biotic history, little attention is given to that similarly ancient, and much larger, part of North America called Laurentia by geologists. To quote Suess himself: 1 "That vast region of North America which is formed of ancient rocks overlain by horizontal Cambrian sediments has received the name of Laurentia. It comprises the whole of the Canadian shield, but if we are to regard it as a tectonic unit, we must include the whole of the flat-bedded superstructure up to some natural boundary. Such a boundary is presented by the Rocky Mountains, the United States chain, and, for nearly their whole length, the Appalachians also. The Colorado plateau, a fragment of table land, bounded on the east by the southern branches of the Rocky Mountains, ought also, perhaps, be regarded as a part of Laurentia." Further (p. 257) he adds: "Laurentia extends from south Texas to the Arctic Ocean through 53 or 54 degrees of latitude, and from the mouth of the Mackenzie to the east coast of Greenland through more than 110 degrees of longitude. . . . Laurentia is a very ancient unit. It behaves towards all the younger folds as a foreland [his italics]."

Of the Nearctic acridid fauna the most numerous in species, and often so areally in individuals of different species as well, is the tribe to which the name Melanoplini has warrantedly been applied. 2 Long known as the Podismae (or Podismini), from one of its Old World genera, which is also now found to have a single representative in the Nearctic Region (P. hesperus [Hebard]) 3, this assemblage has, in the Old World, components distributed over Eurasia from western Europe to China, Korea and Japan, and from subarctic districts to the mountains of

1 "The Face of the Earth" (English translation of the classic "Das Antlitz der Erde"), IV, pp. 251 and 257.
southern Europe, the Himalayas, Formosa and Tonkin. Within this great area it breaks up into a number of genera, although it is also unrepresented over extensive sections of the Palearctic Region, and apparently does not penetrate peninsular India, Burma or Indo-Malaya, and in Indo-China reaches only to Tonkin. All we know of the paleontological history of the tribe is that two existing species, representing two genera (Miramella and Bohemanella), occur in the Pleistocene of Starunia, in the Polish Carpathians.  

In the New World we find members of the Melanoplini extending over a far greater extent of latitude than in the Old World, from the Arctic Circle to at least south-central Argentina and Chile, or well over one hundred degrees of latitude, reaching upwards to arctic alpine or paramo conditions in the Rocky Mountains, the Sierra Nevada, the great Mexican volcanoes, the main Andes, the Sierra Nevada de Santa Marta of Colombia and in the Venezuelan Andes. The sole area in the hemisphere, within these bounds, where they are unrepresented is the Amazonian lowland, an area where numerous other groups, elsewhere widely distributed in South America, are also absent. While as yet not critically studied and hence unreported the tribe is also represented by brachypterous material in my hands from mountain areas of certain of the Greater Antilles. This last fact, alone, is conclusive evidence that their arrival in Antillia was by no means recent. In North America members of the tribe are present virtually everywhere south of the Arctic barren grounds, even in the most extreme deserts and also under arctic alpine conditions, thus exhibiting in that part of the world an adaptability which predicates long association and adjustment, even where it has meant retreat and advance over the greatest area in the world now exposed which was subject to repeated Pleistocene glaciation. In passing it may be pointed out that no Palearctic member of the Podismini is known to occur in true deserts.

The distinguished French orthopterist Dr. Lucien Chopard, in

his classic work on the biology of the Orthoptera, dismisses the origin of *Melanoplus*, the dominant North American genus of the Melanoplini, with the following: "il semble certain que le premier [i.e., *Melanoplus*] est d'origine asiatique." In an earlier study Chopard had reached certain conclusions regarding the development of centers of speciation of that genus in the United States which, unfortunately, do not correctly interpret the evidence he was summarizing, this latter very largely drawn from the researches of certain contemporary American orthopterists, of whom the writer was quoted as one. This aspect of the subject will be commented upon elsewhere.

In the Old World we find the Melanoplini showing marked radiative or development centers in the following areas: (1) the Pyrenees and other mountains of Spain, the Alps, the Italian mountains, the Carpathians and the mountains of all of the Balkan Peninsula and Greece; (2) the Caucasus; (3) the Amur (or Ussuri) region of eastern Siberia, the mountains of China, Japan, Formosa and the Himalayas. Glaciation was undoubtedly a factor which made certain of these various component districts subsidiary evolutionary centers. While species occur in the intervening territories, the above mentioned units would appear to be the centers of marked diversity or most pronounced individuality of types. No member of the tribe occurs in the Palearctic portion of Africa or in Iran, while representation in Anatolia is very limited.

In the New World there are three comparable major evolutionary centers for the Melanoplini, between each of which are areas where the tribe is sparsely represented, but, as already stated, it is absent, within the overall encompassing boundaries, only from the markedly tropical lowlands of Amazonia. The first of these evolutionary centers covers Canada (with Alaska), the United States and Mexico north of the Isthmus of Tehuantepec. The second is in the Venezuelan Andes and adjacent, Glaciation was undoubtedly a factor which made certain of these various component districts subsidiary evolutionary centers. While species occur in the intervening territories, the above mentioned units would appear to be the centers of marked diversity or most pronounced individuality of types. No member of the tribe occurs in the Palearctic portion of Africa or in Iran, while representation in Anatolia is very limited.

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5 "Le Biologie des Orthoptères." By Lucien Chopard. Paris. 1938. [Reference is made to page 14.]

chiefly montane, areas in northern and eastern Colombia. The third covers that portion of South America from approximately 15° south latitude southward to south-central Argentina and Chile, with certain elements reaching somewhat to the northward in the Peruvian and Ecuadorian Andes. But two genera bridge the gap in Central America, these being Aidemona and Trigonophymus, the former of which ranges from the southwestern United States to Colombia, while the latter is an intrusive type from its area of maximum development in southern South America. Our knowledge of the geological and hydrographic history of Central America makes reasonably clear why this break is present, and which Aidemona, clearly from the north, and Trigonophymus, as certainly from the south, have crossed possibly in late Caenozoic times. The geological history of northeastern Colombia and northwestern Venezuela is complex, and has been summarized by Schuchert.  

Analyzing the recognized generic components of the Melanoplini we find that 27 genera occur in Eurasia, of which one is regarded by Ramme as a synonym of another so included, and of these three, i.e., Podisma, Zubovskya and Bohemanella, are also present in the Nearctic, while from the Nearctic and the Neotropical together we know at present 59 genera, of which but three—above-mentioned—also occur in the Old World. Only Aidemona, Trigonophymus (but two species outside of the most southern center 8) and Propedies (but one species outside the same area 9) occur in more than one of the three radiate areas above outlined, and of these Trigonophymus is the sole one present in all three, and in the largest and most impor-

7 "Historical Geology of the Antillean-Caribbean Region." 1935. [Pages 624-695 treat of Colombia and Venezuela.]

8 T. punctulatus and T. notatus, the former reaching northward to Costa Rica, the latter solely Mexican.

9 P. minutus Roberts, from Curacao. The latter island is regarded as part of the Coast Range or Caribbean Andes of northward Venezuela. See Schuchert, idem, p. 678.
tant of these it occurs only in the mountains of central and southern Mexico. Turning to the number of species and subspecies known, as a possible index to evolutionary complexity, and conservatively basing the count on those now regarded as valid by workers most familiar with the respective faunas, we find a maximum of 83 species or subspecies in the Palearctic Region, while the Nearctic and Neotropical representation comprises at least 471 species or subspecies.

In the Palearctic and impinging Oriental regions we find definite localization of most of the genera, with the largest numbers of these found in what may roughly be termed the Mediterranean-Alpine-Balkan montane center (6 genera), northeastern Asia with Korea and Japan (6), southeastern Asia (exclusive of the Himalayan subregion) (6) and the Himalayas and the Caucasus each with 2 (these endemics). Those of relatively broad distribution in the Palearctic are few (4), and, of these, two (Podisma and Bohemaneella) are shared with the Nearctic. However, there is no single area in the Palearctic Region, even of great size, which could be regarded as the outstanding evolutionary center of the Melanoplini, on the basis of number of genera or of species or subspecies there occurring at present. The greatest diversity specifically is found in the Mediterranean-Alpine-Balkan center, but the number of genera there represented is relatively low (vide supra).

In the New World 40 genera occur north of the Isthmus of Tehuantepec, this total exclusive of three shared with the Old World and two with areas to the southward; the Colombian-Venezuelan center has four genera plus Propidies which it shares with more austral America and Aidemona and Trigonophymus with more northern regions; while the Brazilian-Argentine center holds eight peculiar genera plus Propidies shared with the Colombian-Venezuelan one, and Trigonophymus with both of the other New World centers. Samplings of the number of genera present in representative areas of the North American-Mexican center alone give us the following figures: New Jersey and Pennsylvania 6, North Carolina 5, Florida 6, Montana 7, Colorado 8, Texas 13, Washington and Oregon 8,
California 7, Arizona 7. The number of individual genera involved in these sample tabulations (all within the United States alone) totals 32, or five more than all known from the entire sweep of Eurasia.

It is conceivable that genera such as Podisma and Zubovskya have entered the Nearctic from the Palearctic at a relatively recent period, and the same may be true of the Nearctic Prunacris, Buckellacris and Nisquallia, while Bohemanelia, the single component of which was long considered a Melanoplus, may have similarly crossed the Bering land-bridge but in the reverse direction (i.e., from the Nearctic). On the other hand Zubovskya was clearly in North America before the Pleistocene, as its present discontinuous distribution on that continent unquestionably points to glacial ice-sheets as the agency separating the eastern and western sections of its North American distribution.10 It is also within the realms of possibility that the eastern Asiatic forms of Zubovskya (all known from the Palearctic) are not the parent stock, but instead are intrusives from the New World, where the genus is present over a far greater area. Clearly Bohemanelia has been derived from one of the montane lines of the genus Melanoplus, to which it is exceedingly close if actually distinct generically. None of the other very considerable representation of melanoplod genera in the New World shows any very close resemblance to Old World ones, and we are forced to the conclusion that their evolution has taken place in the New World, and that while migration and counter-migration may have taken, and probably did take, place the limited Old World representation certainly cannot be considered the parent stock, or that area the evolutionary center of the whole, in view of the disparity in the development of the tribe in these two great areas.

It is hardly conceivable that evolutionary centers such as that in the southern half of South America have developed in a relatively short period of time from a parent one as distant as east-central Asia (i.e., Angara), particularly where we consider the degree and extent in time of the isolation which tropical America

(i.e., south of Tehuantepec) is known to have had. Instead it seems much more logical and warranted to regard the Melanoplini as a basic New World entity, probably developing rather early in North America, where by far its greatest complexity is found today, the South American centers being established subsequently during certain of the periods of connection with North America. The isolation of the two South American centers from one another is understandable from the viewpoint of Andean orogeny and the development of the great Amazon basin as a barrier to certain forms of life. The presence in North America of genera not widely removed from some of those of the Palearctic Region can as well be interpreted through a westward movement of their progenitors as the usual assumption that the reverse was true. This we know from fossil evidence has taken place in a number of the higher forms of animal life.

To summarize, in the New World we have 59 genera and, conservatively evaluated, 471 species and subspecies of the Melanoplini, these found over a great range of latitude and including almost all possible conditions, or from above the Arctic Circle to about 41° south latitude, and from below sea-level (in parts of California) to arctic alpine summits sometimes bordering perpetual snow (in Washington and Oregon), and from the Atlantic to the Pacific coasts. Three major centers of New World radiative evolution are evident, the separation of which is due to their geological backgrounds. The absence of members of the Melanoplini from areas of the Palearctic, such as North Africa, Iran and much of Anatolia, would indicate that the tribe was not present when these areas received most of their other orthopteran elements of undoubted Palearctic origin. The fact that many, in fact most, of the Palearctic Melanoplini are montane does not militate against this argument, as montane areas

11 Except for Lower Oligocene times this isolation is regarded by Schuchert as having been continuous from the Upper Eocene to at least the Lower Pliocene. See Schuchert, "Historical Geology of the Antillean-Caribbean Region," maps 10 to 16.

are, and long have been, definite features of the apparent regional centers of the Old World, and in the Palearctic regions mentioned where the Melanoplini are absent purely montane species represent other groups of insects. On the other hand in the Nearctic they apparently occupied, and still occupy, almost every type of environment, persisted through the sweeping Pleistocene glaciations, and there developed into one of the most highly diversified existing tribes of the Acridoidea. To disregard the evidence of an existing fauna of remarkable complexity—clearly not a development of a short period of time—is hardly justifiable today. Much of the manner of thought which failed to grasp the obvious conclusion here reached, has been due to an absence of first-hand acquaintance with the elements of some of the faunas involved, and a lack of knowledge of the very broad adaptability to almost all types of environments found in many of the Nearctic Melanoplini. A personal comprehension of the field conditions under which all but two of the Nearctic genera live has enabled me to approach this problem with an open mind. It has been my privilege to study either in the field or in the laboratory, or in both, all the genera and all but a very limited number of the species or subspecies of Nearctic and Neotropical Melanoplini, and as laboratory material all but a few of the genera and the majority of the species of the same known from Eurasia.

A New Milliped of the Genus Cylindrodesmus from Palmyra Island

By Ralph V. Chamberlin, University of Utah

In a small but interesting collection of chilopods and diplopods collected in Hawaiian and other Pacific islands were specimens of a new species of the genus *Cylindrodesmus* taken on Palmyra Id. in 1948. These and the other specimens of the collection were made by N. L. H. Krauss, through whose courtesy I have been privileged to study the material. The species here described makes the third to become known in *Cylindrodesmus*, the others being *C. hirsutus* Poc., the genera-
type which is native to Java and other East Indian islands, and
*C. villosus* Poc. of Rotuma. In addition Dr. Schubart records
what he regards as a distinct variety of *C. hirsutus* from Brazil.

**Cylindrodesmus palmyrae** new species

Body moniliform, the prozonites being conspicuously less in
diameter than the metazonites. The metazonites convex both
antero-posteriorly and transversely. Head above and in front
with the typical clothing of dense, short hairs, laterally with
some longer ones. Metazonites clothed with the usual very
short hairs as well as more sparsely with the typical longer
setae. Cauda in dorsal view subtriangular, with the caudal end
bluntly rounded.

The general color of the body dull, or slightly brownish yel-
low, the color uniform, the head and caudal segments not
abruptly darker, chestnut, as these parts are in *hirsutus*; legs a
brighter yellow.

In contrast with the gonopods of the male in *hirsutus*, in
which the blade of the telopodite is evenly curved and gradually
narrowed to the distal end, the telopodite in the present species
presents a long, thicker proximal division, which in ventral view
is straight, and an abruptly narrower distal portion which
curves ventrad and then cephalad. For details see the accom-
panying figure.

Segments of the male, 19, of the female, 20.

Length 5 mm., being thus smaller than the usual specimens
of *hirsutus*.
Locality. Palmyra Island. 27 specimens taken by N. L. H. Krauss in February, 1948. The types are in the author's collection.

Some Notes on Preparing Whole Insects for Sectioning

By LAWRENCE S. DILLON, A. and M. College, College Station, Texas

The ordinary run of insects have always presented many difficulties in the preparation of whole specimens for sectioning. While standard procedures have yielded quite satisfactory results with such soft-bodied forms as grubs, caterpillars, plant lice, and the like, they do not do so with even those relatively pliable types, such as flies and bees. let alone bugs and beetles. Consequently, when it became imperative that serial sections of whole bees be prepared, special techniques had to be sought out. The author was fortunate in developing a procedure whereby bees, softer beetles like Melyrids, and even the large black horse-fly (Tabanus atratus) could be sectioned. Nothing he could find enabled him to section the adult weevils, dung-beetles, or the like.

Fixation

Of the several fixatives tried, Gilson's fluid proved the most satisfactory. When it was employed on such insects as bees, flies, and melyrid beetles, the specimens remained pliable during the entire procedure, whereas in Bonin's, Zenker's, Hardy's, formalin, and Flemming's W.A. + 0.9% sodium chloride, the exoskeleton tended to become quite hard or brittle. With larger specimens, fixing was quite frequently carried out in vacuo with

1 This study was in part supported by a grant-in-aid from the National Science Foundation for research on honeybee nutrition under the general direction of Mr. Nevin Weaver.

2 The writer is indebted in many and various ways to the following persons: Dr. V. A. Little, Mr. M. Price, and Mr. N. Weaver, of the Department of Entomology, and to Dr. Sidney Brown, of the Biology Department, who made his vacuum oven and other equipment available.
good results. However, the longitudinal dorsal muscles of the thorax often showed a tendency to contract and break free of their anterior attachment; whether this was a result of the vacuum treatment, improper fixation, or of subsequent treatment has not been ascertained.

Although Gilson's has proven most advantageous for use on adult forms, grubs, caterpillars, maggots, and similar soft-bodied creatures are best fixed in Bouin's, where the slight hardening effect aids in maintaining the exoskeleton in more nearly its original shape. Fairly high vacuum (28 inches) applied during the process aids penetration, but caution must be exercised in reducing the pressure, otherwise the specimens may explode.

**Dehydration**

The attempt was made to avoid as far as possible all reagents known to have a hardening affect on chitin, such as higher concentrations of ethanol, xylene, and the like. Consequently, Stiles' procedure, utilizing n-butanol in place of higher concentrations of ethanol, was followed, with good results. This subsequently was found to be improved considerably by the addition of phenol, to the extent of 4%, to each step in the dehydration process, except the second, with which it was poorly miscible. With some considerable latitude, the following schedule was followed: 35% ethanol, 30 minutes; 9 parts of 45% ethanol + 1 part of n-butanol, 2 hours; 8 parts of 60% ethanol + 2 parts of n-butanol, 2 hours; 6 parts of 80% ethanol + 4 parts of n-butanol, 4 hours; 4 parts of 95% ethanol + 6 parts n-butanol, 6 to 24 hours; 2 parts of 95% ethanol + 8 parts n-butanol, 6 to 24 hours.

On several occasions the procedure recommended by Murray (1937) was tried, where phenol and chloral hydrate warmed together in equal parts are used for dehydration (12–24 hours), following fixation first in 10% formalin solution + 0.8% sodium chloride and secondly in Gilson-Carnoy. However, results were disappointing as the specimens displayed considerable shrinkage and hardening; vacuum treatment gave no improvement in these regards.
CLEARING, EMBEDDING, AND SECTIONING

For clearing, a-terpineol was by far the most satisfactory, showing no apparent hardening effects on the exoskeleton. Following butyl alcohol dehydration, it was employed in three mixtures with n-butanol: 1 part of n-butanol + 1 part terpineol; 1 part butanol + 2 parts terpineol; 1 part butanol + 3 parts terpineol; and terpineol, three changes. About 1 hour was given in each step. This reagent was found, however, to possess one distinct flaw; it was difficult to remove from the body cavity. Even after embedding in melted paraffin in a vacuum oven held at 28 inches and 65° for 72 or more hours, it was found in objectionable amounts within the wax and body spaces. Consequently, toluol and toluol-wax was tried following clearing and, proving satisfactory, was incorporated into the procedure.

During the warm months in the environs of the laboratory where this study was carried out, it proved highly advantageous to employ high-melting paraffin or similar waxes; lower melting-point waxes have shown neither advantages nor disadvantages during the cooler periods. After placement of the specimens in pure wax, however, it was found highly beneficial to maintain them at sufficiently high temperatures under vacuum, a vacuum oven being employed for the purpose. A temperature of 65° and a vacuum of 28 inches were usually maintained for at least 24 hours and sometimes somewhat longer, depending upon the size and hardness of the insect.

Before embedding could be considered complete, after the wax had thoroughly hardened, it was essential that all bubbles that were present be removed by means of hot needles. Especially was it requisite to remove the film of vapor that frequently continued to adhere to the exoskeleton despite the vacuum treatment. This was usually performed under a dissecting microscope so that the tiniest bubble could be detected. Likewise, when the ribbons were being prepared, if any bubbles became apparent within the insect, sectioning was discontinued until the space had been filled and the fresh paraffin had become quite hard. For it was found that a film of vapor on the body surface
would prevent the wax from gripping it tightly so that the tissue would tear out or drop out during or following sectioning. Cavities within the body encourage tearing in addition.

When due caution had been exercised, it was possible to section down to 7 \( \mu \) in thickness without undue compression. Sections of greater thinness were not at all satisfactory; however, for general histological purposes, 7 to 10 \( \mu \) seemed to serve quite well.*

**Hydration, Staining, etc.**

Following sectioning, any standard procedure served well. As the specimens cannot be freed of contamination from the fixative in the whole state, it is necessary that they be treated with iodine or lithium carbonate in appropriate solutions before staining. As Gilson’s was most commonly employed, iodine was added to the 70% alcohol and sometimes also to the 50% when large numbers of slides were being handled.

For staining, Mallory’s gave excellent results with good contrast between tissues. In using this stain, sections were left in solutions 1 and 2 for periods of two and four minutes respectively. Destaining proceeded very rapidly and had to be watched closely, for the sections became totally bleached in short order.

**References**


*ED. NOTE:* Dr. A. G. Richards tells me that a static eliminator is most useful in facilitating thin sectioning of insects. Such eliminators remove static by bombarding the knife and specimen block with alpha particles (and are harmless to the operator). The ribbons of any usual thickness (1 to 10 \( \mu \)) just float down across the knife instead of crumpling at the edge or buckling. Convenient forms of alpha emitters are currently available from most of the large supply houses.—R. G. S.
Herbert Osborn: A Brief History of Entomology.*

A Warning

It is often regretted that the U.S.A. and Europe know too little of each other. The above-mentioned book is a piece of evidence as to one side of this saying. The author shall not be blamed because to him "the origin of entomological societies is still a mystery" or for not knowing "when the teaching of Entomology began," but he certainly should have known more about his own period. I shall confine myself to a small selection of statements relating to the Scandinavian countries.

p. 24–28: The Danish, the Norwegian, and the two Finnish entomological journals are missing.

p. 36: "The Swedish collections . . . include probably what has been preserved of his (Linnaeus') original material, though it is said that his first private collection was sold to the British Museum."

All Linnaeus' collection was sold by his widow not to the British Museum, but to a Mr. Smith from whom it came to the Linnean Society, London. In Sweden only insects determined by him in other collections exist.

p. 36: "There (in Sweden) are type specimens perhaps of Fabricius, but Fabrician types are mainly in Kiel. Some said to be in Copenhagen." By far the greater part of Fabricius' types are in Kiel and Copenhagen, half at each place. None in Sweden.

*Ed. Note: The full title is: A Brief History of Entomology, including time of Demosthenes and Aristotle to modern times, with over five hundred portraits. Pp. 1–303, pls. 1–58. The Spahr & Glenn Company, Columbus, Ohio, 1952. The first part has chapters on Entomology in Commerce and Industry, Classification, Economic Entomology, and Medical Entomology. Part II, Regional Entomology, takes up 17 different countries or regions. Part III gives life sketches of many entomologists, and portraits of 522 of them. The portraits go back as far as Redi and Malpighi but include also many of the present-day leaders, with Americans the best represented.—R. G. S.
p. 114: J. C. Schiodte is mentioned only as a teacher of forest entomology. Actually, as keeper of the entomological department of the Zoological Museum, Copenhagen, his main work is taxonomic besides his fundamental descriptions of beetle larvae.

p. 116: “Systema Naturae. The edition of 1758 is usually taken as the date for recognition of species he described or the date on which to fix certain genera.” This is a curious way of denoting the fixing point of binomial nomenclature.

p. 116: “Among his (Linnaeus’) students were . . . possibly Fallen.” Fallén was 14 years old when Linnaeus died.

p. 117: Finland. Three lines on Peter Kalm and two on E. E. Bergroth is all that is told about the country of J. R. Sahlberg, John Sahlberg, the two Reuters, Mannerheim, J. A. Palmén, Saalas, Krogerus, Linnaniemi, Frey, and a lot of younger, very fine entomologists.

p. 48: A purely entomological statement: “Protura . . . have antennae, six legs and a pair of terminal appendages.” They have no antennae, twelve legs (three pairs of abdominal appendages) and no terminal appendages.

All the “probably” and “presumably” and “I do not know” might have been checked by means of a postcard. Only once this is tried, and this is the reason why the entomology of Brazil is so extensively stated—as extensively as it should have been for all countries.

About 50 per cent of the names of foreign entomologists, localities or titles are misspelled.

Writing history is a science demanding special ability and must not be confused with writing memoirs. It is a pity when this happens. Somebody ought to have helped the author by checking his statements or advising him to confine himself to his personal memoirs. As it is I am most unfortunately forced to warn against the use of statements from this book the heading of which entitles it to so great an interest.

S. L. TUXEN
Zoological Museum, Copenhagen
A new name for Phytomyza subpusilla Frost (Diptera)

By S. W. Frost, State College, Pa.

Phytomyza subpusilla Frost was described in The Journal of the New York Entomological Society, Vol. 41: 254–266, 1943, as a miner on the leaves of certain Cruciferae and Compositae, nasturtium, plantain and fern. It appears that subpusilla Frost is a primary homonym of Mallock’s Formosan species published in 1914. The writer therefore proposes a new name propepusilla, placing the species in the genus Liriomyza according to the classification of European workers.

Dicymolomia julianalis Walker (Lepidoptera: Pyralidae) and its Ichneumonid Parasite, Cremastus gracilipes Cushman, Reared from Typha latifolia at London, Ontario

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

On June 1, 1952, heads of cat-tail, Typha latifolia, were examined for the presence of insects, in a swamp adjacent to the north-west corner of Huron and William Streets in London, Ontario. Heads infested with larvae of Dicymolomia julianalis Walker were on dead plants of the previous year’s growth and were recognizable by their considerably fluffed out appearance caused by the loosening of the flowers from the rachis by the activity of the larvae. Claassen¹ says of these infested heads that “the seeds are kept from scattering by being tied together with silk woven by the larvae. Neither wind nor rain is able to tear apart the heads so protected. Accordingly they form a good shelter for the larvae during the winter.” He reports that typically the larvae bore in and pupate in the rachis of the head

but that many remain in the fluffy material in the heads to spin their cocoons and pupate. Cole also refers to *D. julianalis* as being an inhabitant of *Typha latifolia*.

One hundred of the infested heads from the swamp at London were snapped from their stalks and were examined for the presence of larvae. The rachis was pulled out of each head and the felty mass of the head could then be unrolled, revealing the insects within. Of the one hundred heads examined 66 contained one larva, 27 contained two larvae, 4 contained three larvae, 1 contained four larvae and 2 contained one pupa each. The presence of two pupae in the large collection of larvae on June 1 is in accord with the statement of Claassen that "pupation begins about the first of June."

Forty-one of the larvae were preserved in fluid and the remaining larvae and the two pupae were placed in glass jars with ravelled heads of the cat-tail, for rearing. The length of each of the preserved larvae was measured, under a binocular microscope, by means of a scale graduated to 0.1 mm. The lengths varied from 6.0 to 13.5 mm, with an average of 9.9 mm., indicating that many of them were considerably longer than those studied by Claassen who records that full-grown larvae are from 7 to 10 mm. long. The coloration of the larvae corresponded with Claassen's description.

The mass of ravelled heads in jars was examined daily for the appearance of the emerging moths. Between June 17 and July 3 fifteen moths emerged. Claassen reports that "adults emerge during the latter part of June and the first part of July." The moths were identified as *Dicymolomia julianalis* Walker by Mr. H. W. Capps of the U. S. National Museum, one of the specimens being deposited in the collections of that institution and the others in the collection of the University of Western Ontario. No further specimens emerged by July 13, when the material was discarded. On June 19 a single ichneumonid wasp emerged and was identified as *Cremastrus gracilipes* by Dr. L. M. Walkley of the U. S. National Museum, the specimen being deposited in the collection of that institution. This species was described by

Cushman,³ the type-host being *D. julianalis*. Cushman ⁴ also records later rearings of this wasp from the same host.

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**Current Entomological Literature**

Compiled by VENIA T. PHILLIPS, Librarian

Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1953 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

Note: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*) if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol ($) .

Papers published in *Entomological News* are not listed.


McElroy, W. D., J. W. Hastings, J. Coulombre & V. Som-


ENTOMOLOGICAL NEWS [March, 1954]


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J.—Nota sôbre a fêmea de Bathyphebia eminens (Dognin,
Synonymic notes on North American Geometridae. [101]
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Coq. and notes on related species. [52] 46: 373–85, ill.
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J. M. Butler.—Dipterous larvae infesting the intestinal
tract of the coyote, Canis latrans Say 1823. [82] 26: 129–
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F. M. Salzano.—Drosophila gaucha, a new species from
Keister, M. L.—(See Anatomy.) Lopes, H. de Souza.—
Sôbre Rafaela Townsend e Sarcodexia Townsend (Sar-
genitalia dos Drosophilides. IV. A genitalia masculina no
subgênero Drosophila. [117] 13: 245–64. Martinez Pala-

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.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Koenigsberg, Krs. Wetzlar 16, Germany.


Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.


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.

Wanted—Data on exact location of colonies of Epibembex (holm Bembix) (Hymenoptera), any species, any part of country, for biological studies. Howard E. Evans, Dept. Entomology, Cornell Univ., Ithaca, N. Y.

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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.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act
of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in para-
graphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
**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.

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A Remarkable New Genus and Species of Iso-
metopid from Panama (Hemiptera, 
Isometopidae)

By José C. M. Carvalho, Museu Nacional, Rio de Janeiro, 
and Reece I. Sailer,* Entomology Research Branch. 
U. S. D. A., Washington, D. C.

The authors have encountered a remarkable bug among sam-
pies of insects collected in light traps in Panama by F. S. Blan-
ton. This bug belongs to the family Isometopidae, which can 
be readily distinguished from the related family Miridae by the 
presence of at least two ocelli. The specimen which is described 
here as a new genus and species has four ocelli. Since no 
Heteroptera are known to have more than two ocelli and no 
normal insect of any order has more than three,* the unusual 
character of this specimen is readily apparent. The insect is 
small, being scarcely more than 1.5 mm. long, and the ocelli are 
not readily seen. However, when viewed under proper light 
and magnified at 200 diameters, their external appearance is that 
of ordinary ocelli. Only with the discovery of additional speci-
mens will it be possible to determine with certainty whether this 
specimen is a freak or whether it is a representative example of 
the species. In any event, it can be described as a new genus 
and new species on the basis of characters other than the ocelli.

The new genus is placed in the tribe Isometopini, which is so 
far represented in the neotropical region by two genera described 
by the senior author in 1947 (Rev. Brasil. Biol. 7 (2) : 255).

* Except the males of some Coccidae. In these coccids, however, the 
four large "ocelli" are not true ocelli in the morphological sense, but cor-
respond to the compound eyes.—En.
**ISOMETOCORIS** n. gen.

Isometopidae, Isometopini, division Myommaria. General shape of a very small Phylini (Miridae) with spotted dorsum, large eyes and thickened antennae.

**Head.** Overlapping the anterior margin of pronotum, very short, about seven times as wide as long on median line; vertex obtusely emarginate posteriorly, frons broadly rounded in front; eyes slightly protuberant, each occupying the whole side of head, each partially encircling the antennal socket when seen from side; ocelli present, apparently in number four (figs. 1 and 2), distance between frontal pair about half that separating posterior pair, the latter near hind margin of vertex and distant from eyes by a space about twice their own diameter. Rostrum very long, almost reaching apex of abdomen, with first segment thickened, attaining base of head, third segment shorter than the others.

**Antennae.** Inserted in the ventral anterior angle of the eyes when seen from side; first segment surpassing apex of clypeus, very short; second segment about four times as long as first, incrassate, with numerous hairs about half as long as width of segment, these showing a flattened appearance when seen with different proper focus and strong light; third and fourth equal in dimension (fig. 4), pilose.

**Pronotum.** Very short, about three times as wide as long, disc smooth, flat, concave before humeral angles, lateral margins curved towards the head, hind margin slightly bi-concave; collar absent; mesoscutum broadly exposed, setose; scutellum moderately convex, with blunt apex.

**Hemelytra.** Smooth, erectly pilose, with parallel margins, without apparent veins, embolium linear, somewhat reflexed, cuneus a little longer than wide at base; membrane rugulose, uniareolate, with a spurious vein arising at the posterior angle of areola (fig. 3).

Underside with peritreme raised and circular in shape. Legs saltatorial, almost devoid of pubescence, tibiae with short setae about as long as width of tibiae and shorter pubescence, tarsi
very slender with segments of approximately equal length, claws simple.

*Type of genus: Isometocoris blantoni* n. sp.

This genus differs from all other genera of Isometopini by the absence of lateral carina of pronotum, second antennal seg-

![Diagrams of Isometocoris blantoni](image)

*Isometocoris blantoni* n. gen., n. sp.

Fig. 1. Head and pronotum seen from above. Fig. 2. Head seen from front. Fig. 3. Hemelytra with color areas marked. Fig. 4. Antenna showing relative length of segments.

...ment of male distinctly incrassated, veins of membrane each with a spurious vein, shape of pronotum and presence of four ocelli. In McAtee and Malloch's key (*Stylops* 1 (3): 62, 1932) it will run to the couplet which keys out *Lidopus* Gibson, 1917, and *Wetmorea* McAtee and Malloch, 1924, but differs from these genera by the above-mentioned characters.
Isometocoris blantoni n. sp. (Figs. 1–4)

Characterized by its color, size, and structure of antennae.

*Male:* Length 1.57 mm., width 0.71 mm. *Head:* length 0.07 mm., width 0.49 mm., vertex 0.18 mm. *Antennae:* segment I, length 0.10 mm.; II, 0.46 mm.; III, 0.21 mm.; IV, 0.21 mm. *Pronotum:* length 0.21 mm., width at base 0.60 mm. *Rostrum:* length 0.64 mm., segment I, length 0.14 mm.; II, 0.21 mm.; III, 0.10 mm.; IV, 0.17 mm.

*Color:* General color yellowish with reddish and brown spots; antenna yellowish except for apex of first and apical two-fifths of second segments which are reddish, eyes reddish brown, head with lower portion suffused with red, with a yellow area dorsally; pronotum brown, mottled with yellow; hemelytra yellow with numerous fuscous spots each of which bears a seta, a large yellowish red spot on middle of clavus joining suture, corium with three smaller yellowish red spots on apical portion and one deep red to dark spot on basal third touching embolium, apex of the latter deep red, each of the angles of cuneus bearing a red spot, that of the internal angle largest, surface with setigerous dark red spots, membrane infumate; apex of clavus red; underside of body yellow with thoracic tergites and genital segment suffused with red; femora infumate with apices yellow, hind tibiae generally pale but with some reddish spots on basal half of each.

Morphological characters as given for genus.

Female unknown.


This species is named in honor of Lt. Col. F. S. Blanton, whose work as entomologist for the U. S. Army's Caribbean Command has resulted in important additions to the insect collections of the U. S. National Museum.
Larva and Pupa of Thrypticus fraterculus (Wheeler) with New Original notes on the Habits of the Family Dolichopodidae. (Diptera)

By Charles T. Greene, College Park, Maryland

The Dolichopodidae is a large and interesting family of beautiful flies. The males have rather distinctive characters but the females are quite difficult to identify unless you have the males associated with them.

Their known life histories are few and quite different in the different genera.

The larvae of Thrypticus are miners in plant tissue which is very unusual for this genus and family. (Johannsen and Crosby 1913.)

The larva of Medetera aldrichii Wheeler is a predator and sometimes a scavenger on the larvae of Scolytidae in the west.

Larvae of Hydrophorus agalmae Wheeler are aquatic in fresh water. (Greene 1923.)

Hypocarisus pruininosus (Wheeler): a pupa of this species was found in seaweed on the beach in Florida.

Larvae of Dolichopus spp. have been found in damp vegetable mould. (Brauer 1883.)

Larvae of Aphrosylus sp. in tufts of algae on rocks along seashore. (Wheeler 1897.)

In checking all the descriptions of the species in the genus Thrypticus there was only one case where the female genitalia were mentioned. It said they were "small and yellow."

The females of two other species were dissected; they are equipped to puncture leaf tissue. Their larvae are unknown. See Figs. 4 and 5.

Some time after receiving the specimens of T. fraterculus I received two lots of larvae which were similar to fraterculus but both were different species. These were miners in aquatic grass causing a small blotch or blister mine.

One lot was collected in Louisiana and the other from California.
**Thrypticus fraterculus** (Wheeler)

*Larva.* White, long, slender and cylindrical. 11 segments in addition to the head. Segments 1-4 and the last one shorter than the others. Head rather small, broad and partly retractile. The front of the head with a robust, conical, black, horn-like projection above. Anterior spiracle small; with a circular base, height one half the basal diameter; in the centre is a small, chitinous, pale amber colored tubercle. Last segment tapering toward its apex. Near the apex, on the upper surface is a series of small, black spines. On the dorso-central surface of this segment are located the posterior spiracles. Each spiracle has 3 small, elliptical areas, in a triangular style with a small round button; these are all the same color as the segment.

Larva—10 mm. long and .6 mm. in diameter.

The larva makes small blotch or blister-like mines in the blades of *Scirpus acutus*.

*Pupa.* Pale cream colored with 8 abdominal segments of about equal length. Head capsule pointed, directed downward; on its dorsum, near its apex are 2 large, pale bristle-like projections; eyes large. Thorax slightly longer than wide with a large, spine-like projection on each side located near the posterior edge of the eye capsule. Abdomen with 8 segments; first 7 segments each with a row of spines, arched forward at the center, located near the posterior edge of each segment; posterior to these spines are 6 dark bristles, 3 each side of the dorso-central line. These 7 segments each have 4 small, elliptical areas on each side (spiracles); segments 2 to 5 have a large spine-like projection on each side, slightly posterior to the middle; last segment about as broad as long, tapering slightly at its apex; 2 small, pointed spines located dorso-centrally and on each side, slightly posterior to this pair are 3 larger spines, all pointing backward.

Pupa—7 mm. long and 1.5 mm. in diameter.

Two adults labeled IX. 2. 1943.

Reared from *Scirpus acutus* collected at Experimental Pond No. 2, Patuxent Research Wildlife Refuge, Prince George's County, Maryland, U. S. Dept. of the Interior.
Collected and reared by Mr. Francis Uhler of this laboratory. Adults, larvae and pupae were submitted by Mr. Robert T. Mitchell, of this laboratory, to Charles T. Greene, for identification.

**Comparison of Ovipositors**

All of the ovipositors shown are pale yellow, with a narrow tinge of black, here and there, along their edges; they are all sclerotized, thin and blade-like, for piercing and are retractile.

**T. fraterculus** (Wheeler) Fig. 3

Ovipositor very narrow, tapering to a point at its apex; numerous short, pointed, black, spine-like teeth along the upper edge and 5 teeth on the lower apical edge.

Length: about 2 mm., width very narrow.

**T. willistoni** (Wheeler) Fig. 4

Ovipositor higher with the apical end broader and tapering to the apex where there are several black, sharp tooth-like spines above and below.

Length: about 1.75 mm.

**T. abdominalis** (Say) Fig. 5

Ovipositor nearly as high as the previous species with the apical end directed slightly obliquely downward to a point; 6 sharp tooth-like, black spines on the lower edge near the apical end.

Length: about 2.25 mm.

**References**


Distributional Notes on Eutricharea, a Palearctic Subgenus of Megachile, Which Has Become Established in the United States (Hymenoptera: Megachilidae)

By P. D. Hurd, Jr., University of California, Berkeley

In problems of biogeography it is particularly instructive to have on record distributional information relating to the establishment and dispersal of Palearctic species in the New World. The suspected occurrence in the Nearctic region of Eutricharea, a subgenus of the leaf cutting bee genus Megachile, was first mentioned by Mitchell¹ (1934: 304). At that time, he believed the subgenus had not become established in the Nearctic area, though he had seen several specimens which were apparently collected in the United States. Since this material was without sufficiently conclusive data, he regarded the specimens as representatives of introduced species which had failed to become established. In this connection, Professor Mitchell remarked that the nesting habits of the group (in hollow stems and twigs) apparently made possible their wide dissemination over the earth through the channels of commerce.

In 1937, Professor Mitchell² identified a specimen collected by P. H. Timberlake at Rosemont, Virginia, as *Megachile (Eutricharea) apicalis* (Spinola) and stated (p. 416) that the subgenus was present on the continent "by an introduced and apparently not overly successful species." Five additional records (2♂♂, 3♀♀) of *M. apicalis* (including the synonym, *M. virginiana*) are cited by him. These specimens are without specific locality data, but show that the species had been taken under natural conditions in Virginia, New Jersey (?), and Canada. Professor Mitchell further states (p. 417) that the two males recorded as *M. apicalis* may be *M. rotundata* (Fabricius), since the males of *Eutricharea* are more difficult to identify than the females.

Krombein \(^a\) (1948: 14) has reported the capture of two female specimens of *M. rotundata* in the Washington metropolitan area. One specimen was taken in an office of the U. S. National Museum. The other was found in a garden at Arlington, Virginia, apparently causing damage.

In a recent paper, Daly \(^b\) (1952) has enumerated the distributional and floral records for specimens of *M. rotundata* which were collected in Kansas, Missouri and Texas. Of particular significance are the dates of capture which cover the years 1948–1951 and the numbers of individuals (25) reported upon. These data provide quite conclusive evidence that the species has become established in the Great Plains region of the United States. Floral visitations by this species are recorded for representatives of four plant families (Labiatae, Lythraceae, Plumbaginaceae and Scrophulariaceae), and of the seven plant species visited four, according to Daly, are cultivated plants of European origin.

With this information in mind, it is interesting to speculate on the recent captures of two species belonging to the subgenus *Eutricharea* in California. As will be noted in the accompanying list of records, all of the California specimens have been taken during the last four or five years, and from a number of well separated localities within the State. The floral records include representatives of four plant families (Compositae, 3; Euphorbiaceae, 1; Leguminosae, 1; Polygonaceae, 1). Of the six plant species visited by the bees, three (*Cosmos* sp., *Medicago sativa*, *Polygonum aubertii*) are introduced into this country.

**Megachile (Eutricharea) argentata** (Fabricius)


\(^b\) Daly, H. V. 1952. Ent. News 63: 210–211.
Megachile (Eutricharea) rotundata (Fabricius)

FRESNO Co.: Raisin City, ♀, X–15–51, on Centromadia pun-
genus (P. D. Hurd, Jr.), 6 ♀♀, same data (R. F. Smith). SACRA-
Clay).

It seems reasonable to assume that the subgenus Eutricharea has become successfully established in California. The introduc-
tions of the two species, Megachile argenta and M. rotun-
data, probably occurred as a consequence of increased commer-
cial activities growing out of World War II.

It is unfortunate that we do not possess a sufficient knowledge concerning the habits of our native bees for without such information it is virtually impossible to evaluate properly the interspecific influences arising as a consequence of the establishment of the subgenus Eutricharea in California.

In the collection of P. H. Timberlake is a female of M. rotun-
data which was collected at Menges Mills, Pennsylvania, on June 23, 1948, at flowers of Cichorium intybus. This record suggests that rotundata is apparently widely distributed over the Atlantic seaboard.

At the present writing, three Old World species of Eutri-
chara, a subgenus of the leaf-cutting bee genus Megachile, ap-
pear to be established within the United States, being found on the Atlantic seaboard, the Great Plain States, and in California. Their introduction must certainly have occurred as a direct con-
sequence of world commerce.

I am indebted to Professor T. B. Mitchell of the University of North Carolina for confirming the identifications of the Cali-
fornia specimens.
Culiseta inornata Attacking Man (Diptera)
By William F. Rapp, Jr.

Many students of mosquitoes state that Culiseta inornata (Williston) never or seldom bites man and that the species is principally an animal feeder. Dyar ² (1922: 29) stated: "The adult (C. inornata) is not troublesome, probably attacking by preference the larger mammals." Matheson ³ (1944: 226) stated: "They (C. inornata) are said seldom to attack man though the writer was frequently bitten by them while collecting in northern Michigan." More recently Ross ⁴ (1947: 39) stated that in Illinois: "In the early spring the overwintered females bite ferociously, but during the summer this species does not seem to constitute much of a pest even in those regions where it is abundant." Thus, it can readily be seen that the statement that C. inornata never bites man has already been disputed. To further substantiate the claim that it does bite man, the author herein reports some specific instances from Nebraska.

Tate and Gates ⁵ (1944: 7) as a result of their work during the mosquito seasons in 1942 and 1943 found C. inornata to be the third most abundant species in Nebraska and to represent 7% of their light trap catch for two years. However, the author in conducting a mosquito survey of the Missouri River Valley of Nebraska during 1952 found C. inornata to be of minor importance. Furthermore, it was found only in the spring and fall; no specimens were taken during July and August.

From June 1 to 3, 1953, Leslie B. Beadle and the author conducted a survey along the Missouri River and on three nights made human biting collections. As a result of these collections they were able to take specimens of C. inornata biting man.

¹ Entomologist, Nebraska State Department of Health, Division of Sanitation, Lincoln, Nebraska.
At Ponca State Park, a deciduous wooded area three miles north of Ponca, Dixon County, Nebraska, on June 1, 1953 between 7:19 and 7:34 P.M. one female specimen of *C. inornata* was taken. On June 2, 1953, at Fontenelle Forest (Child's Point), Sarpy County, Nebraska between 8 and 9 P.M. three female *C. inornata* were taken while biting man.

From information gained by larval surveys and light trap collections it is evident that this species is abundant in Nebraska during the months of May and June. However, biting collections indicate that while *C. inornata* does bite man, it seems to prefer some other host.

Recovery of Japanese Beetle Parasites Introduced in May 1940

Nematode parasites introduced into a locality in May, 1940, for control of the Japanese beetle were recovered in the vicinity on June 11, 1953.

The nematode *Neoaplectana glaseri* was distributed by the New Jersey Department of Agriculture during the period 1939–1942, with the establishment of surface treated plots at three and one-half mile intervals throughout the sections of the state then infested by the Japanese beetle. Experimental work proved that the parasite spreads through migration of the nematodes through the soil and by the flight of infected adult beetles.

On June 11, during the collection of 200 Japanese beetle larvae for experimental work, dead larvae were found having the appearance typical of nematode-infected larvae. Laboratory examination revealed *Neoaplectana glaseri* larvae in twelve of nineteen larvae submitted.

The plot of turf to which the parasites had been applied on this property was approximately one-quarter mile from the location where the parasitized grubs were found.

This parasite has maintained itself under field conditions for thirteen years and is still exerting an influence on the host population.—HAROLD B. GIRTH, N. J. Department of Agriculture, Trenton, New Jersey.
New Southeastern Records for Zorotypus Hubbardi
Zoraptera

By T. P. Copeland, The University of Tennessee, Knoxville

New state and county records for the small, relatively unknown order Zoraptera were obtained during summer collecting trips in Tennessee, Arkansas, Louisiana, Mississippi, and Kentucky.

*Zorotypus hubbardi* Caudell was taken in Pearl River and Lamar Counties, Mississippi, on Sept. 1, 1953. The collection consisted of 15 apterous females, 20 apterous males, and 6 nymphs with wing pads. Inasmuch as Zoraptera are found in the adjacent states of Alabama, Tennessee, Arkansas, and Louisiana, it is probable that the order has a wide distribution within the state. No previous records are known from Mississippi, however.

Collections were made on Sept. 17, 1953, in three southeastern Kentucky counties: Leslie, Bell, and Harlan. Three dealate females, 35 apterous males, 31 apterous females, and 8 nymphs with wing pads were obtained. This is also a new state record for the order.

New county or parish records for Arkansas, Tennessee, and Louisiana are as follows: for Arkansas—Drew, Jefferson, Chicot, and Hot Springs Counties, 32 apterous males, 21 apterous females, and 4 nymphs with wing pads, Sept. 7–10, 1953; for Tennessee—Knox, Sullivan, Carter, Chester, Perry, Putnam, and Hardman Counties, 51 apterous females, 68 apterous males, and 10 nymphs with wing pads, Sept. 13–16, 1953; for Louisiana—Rapides and Caldwell Parishes, 18 apterous females and 15 apterous males, Sept. 5, 1953.

All collections were made by means of an aspirator. In Knox County, Tennessee, Zoraptera were taken just beneath the bark of a decaying log. All other collections were taken beneath slabs of wood or bark partially buried in old sawdust piles. The single collection from beneath bark was the author's first attempt

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1 Contribution No. 83 from the Department of Zoology and Entomology, University of Tennessee.
to collect from this habitat, and should not indicate an unusual environment. Gurney, Valentine and Wilson, and Deboutteville report collections from within decaying logs and stumps, beneath bark on logs, and from sphagnum moss. Of 43 sawdust heaps examined, seventy-four percent contained Zoraptera.

A Preoccupied Name in the Miridae (Hemiptera)

For the past quarter-century the name Eustictus filicornis (Walker, 1872) has been used for the species that was formerly known as E. grossus (Uhler, 1887). The synonymy of these two names was first indicated in 1926 by Blatchley in a footnote, inserted under E. grossus, at page 884 of his "Heteroptera of Eastern North America."

Walker described the species under the genus Capsus, and his original combination is thus a primary homonym of Capsus filicornis Fabricius, 1803. The name Eustictus grossus (Uhler) must therefore be restored as the proper one for this species.—R. F. Hussey, Univ. of Florida, Gainesville.

New Appointment

Mr. Harold J. Grant, Jr., has been appointed Assistant Curator of the Department of Insects of the Academy of Natural Sciences of Philadelphia as of February 1, 1954. Mr. Grant is a graduate of the University of Colorado, from which he has also received his degree of Master of Science. In addition he has had valuable field experience in our Western States. He will be associated with the Curator of the Department, Mr. James A. G. Rehn, in the preparation of the monograph of the Orthoptera of North America, which has been inaugurated through the support of the National Science Foundation. In this specific project, work on which is now actively progressing, Mr. Grant will be known as the Junior Investigator, assisting and collaborating with Mr. Rehn, the Principal Investigator.

Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian
Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except crustacea. Coverage will be worldwide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1953 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

Note: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of Periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, sheet, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol ($).

Papers published in Entomological News are not listed.


sippi. [92] 13: 252–55. Sabrosky, C. W.—Taxonomy and host relations of the tribe Ormiini in the western hemi-


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Reviews


Part II is on the Zygoptera of Canada and Alaska, beginning with a key to the suborders of Odonata and a key to the families of Zygoptera, pp. 61–62, followed by a statement of the distri-
bution of the Zygoptera of Canada and Alaska, which are provisionally grouped as A, Austral or southern species (6), B, restricted eastern species (2), C, U. S. and Canadian provinces east of the Great Plains (18 spp.), D, Atlantic to Saskatchewan or foothills of the Rocky Mountains (5 spp.), E, Transcontinental species (10), F, British Columbia and western States, eastward to Saskatchewan and Manitoba (2 spp.), G, Species restricted in Canada to the interior, particularly the Great Plains (3), H, Southern British Columbia (5 spp.), pp. 62-65. The total is recognized as 51 species, "a number that is somewhat less than half the total number known from North America north of Mexico."

The systematic account of these Zygoptera occupies pp. 65-278, including keys to genera and species. Under each species are given descriptions of adult male and female and nymph, the habitat, range, distribution in Canada, and field notes. A selected bibliography, pp. 279-286, and an index, pp. 287-292, complete the volume.

The excellent account of the external structure of the Odonata is based on both the Zygoptera and the Anisoptera, as it is evidently designed to serve as an introduction both to this volume and to a later one on the Anisoptera.

Structural details and color patterns of both adult sexes and of nymphs are given for many species; thus the figures of the mesostigmal laminae of the females of Argia, Enallagma, Coenagrion, Nchalcnna, Ischnura, Chromagrion and Amphiagrion are novelties for most of our North American species. The author tells us (preface, p. vii) that he has "collected and studied Odonata for more than fifty years in every province of Canada."

As one result his field notes, mentioned above, are highly interesting to the students of these insects, describing the habitats, pairing and flight periods, with lists of numerous geographical localities in which each species has been observed. Nor are the data of other investigators neglected. Even though realizing that the bibliography "is in no sense a complete" one, we wish that Tillyard and Fraser's "Reclassification of the Order Odonata," in the Australian Zoologist, 1938-1940, had been included.

As the paper is not calendered, except for plate 8, the book is delightful reading. Our copy is bound in an attractive dark green buckram and weighs one pound, 6½ ounces. This book will be of great use to entomologists working on the fauna of the United States, in spite of the limitations suggested by its title. It is a pleasure to recommend it highly to entomologists and zoologists generally, wherever they are located.

Philip P. Calvert.

This volume is more than the story of the lives of two people; in the telling it becomes an exposition of an admirable philosophy of living, and an account of a newly developing science in America. While it is called an autobiography, it is perhaps more about her husband than about Mrs. Comstock, though the lives of the two had a unity of aim and achievement seldom encountered.

John Henry Comstock taught the first entomology course given in an American university. He continued this teaching for 40 years, and among his students were most of the men who became early and important figures in the field. Another distinguished scientist said of him: "He has been probably the greatest teacher of natural history that America has known." These facts, coupled with the use of his books for many years as standard texts in the field, make it evident that his influence was greater than that of any other man in the development of American entomology.

From this account of the events of his life there gradually emerges the picture of a young man of great determination, integrity, and ability, and of much self-reliance. One wonders, had there been a G-I bill-of-rights, whether he would have taken advantage of it, and it seems quite certain that he would not have thumbed a ride. He said; "I have known lots of fellows who left college because of lack of money; but once when I tried to leave college, I did not have enough money to get out of town; so I stayed. . . ."

It is unusual that a man of Mr. Comstock's eventual accomplishments should have married a woman who was to make so large a place for herself in the world of science, art, and writing. Though never active in politics, she was named in 1923 by the League of Women Voters as one of the 12 greatest women of America.

This book, I feel sure, must be considered the final and definitive Comstock biography. It is a warm personal account of two good scientists who were also very fine people.

M. E. Phillips.
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.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Koenigsberg, Krs. Wetzlar 16, Germany.


Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.


Bembicine 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.

Wanted—Data on exact location of colonies of Epibembex (olim Bembix) (Hymenoptera), any species, any part of country, for biological studies. Howard E. Evans, Dept. Entomology, Cornell Univ., Ithaca, N. Y.

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THE AMERICAN ENTOMOLOGICAL SOCIETY
1900 RACE STREET, PHILADELPHIA 3, PA.
ENTOMOLOGICAL NEWS

MAY 1954

Vol. LXV No. 5

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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.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act
of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in para-
graphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
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.

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A New Species of Water Beetle from Michigan (Coleoptera, Haliplidae) *

By Paul J. Spangler, Columbia, Missouri

Among various aquatic beetles taken by the author in Emmet County, Michigan, in 1952, was a series of an unfamiliar haliplid beetle. These were determined as a new species of *Brychius*, a small genus of rare haliplids previously reported only from British Columbia, Alberta, California, Oregon, and Utah. In addition, specimens from Montana and Colorado have been examined by the author. Specimens of the new species were sent to Mr. Hugh B. Leech of the California Academy of Sciences, who concurred with the author’s determination.

Formerly four species of *Brychius* had been described from North America: *B. parvulus* Robts., *B. hornii* Cr., *B. albertanus* Carr, and *B. pacificus* Carr. However, *B. parvulus* Robts. has since been removed from the genus and a new genus, *Apter aliplus* Chandler (1943), has been erected for it. A key to the North American species of *Brychius* was constructed by Carr (1928) and another to the two California species by Chandler (1948). Unfortunately, examination of a series of the various species shows that the characters used for determination are variable and difficult to evaluate. A revision of the genus is greatly needed, but this must wait until sufficient material is available.

The species from Michigan runs to *pacificus* in Carr’s key since the sides of the prosternum anterior to the coxae are coarsely punctate. It may be distinguished from *pacificus* and all the other species by the much denser punctuation on the head.

* Contribution No. 1378 from the Department of Entomology, University of Missouri and the Michigan Biological Station.
infuscation on the base of head between eyes, coarser punctuation on pronotum, and larger average size. In the western species the punctures on the head are separated by at least their width; those on the Michigan species are separated by about one-half their width. The maculation of the latter species is also more pronounced and more confluent.

_Brychius hungerfordi_ n. sp.

Holotype male: Length 4.20 mm.; width 2.15 mm.

*Head* testaceous apically, infuscate around margin of eyes, these margins connected with transverse basal infuscation; punctures coarse, separated by one-half their width, smaller than those of pronotum; clypeus fuscous, closely punctured; appendages testaceous, penultimate segment of labial palpi strongly dilated. *Pronotum* testaceous except a piceous apical spot, lateral margins, two basal spots and an impressed fold on each side extending from base two-thirds the length of the pronotum; punctures larger and less dense than those of head, interspaces micropunctate; disc less densely punctate and considerably depressed; basal half of pronotum converging but little, becoming abruptly incurved in apical half; anterior and posterior margins bisinuate. *Elytra* testaceous with ten rows of setigerous punctures not extending completely to apex, intervals micropunctate; elytral margins, sutural stripe and rows of punctures piceous; apices denticulate. *Prosternum* margined from base, converging strongly to region of fore coxae then becoming nearly parallel converging very slightly to apex; margins and base infuscate, medial portion testaceous; finely and sparsely punctured basally with micropunctures in the interspaces, more coarsely punctate on apical third. *Mid-metasternum* strongly margined, margins continued in line with those of prosternum, sinuate and divergent apically; more finely punctate than prosternum, with micropunctures; margins and base infuscate, depressed behind the middle coxae. *Metasternum* coarsely and sparsely punctate laterally, with deep foveae lateral of the middle coxae. *Antecoxal piece* coarsely punctate laterally, finely and sparsely punctate medially; apex emarginate. *Metacoxal plates* coarsely punctate laterally, becoming less punctate towards coxal
Brychius hungerfordi n.sp.: a. holotype male; b. prosternum; c. left paramere; d. aedeagus.

Ventral segments: first visible sternum piceous, coarsely and densely punctured; next two infuscate medially, the last abdominal sternum testaceous, finely and more densely punctate, noticeably channeled medially from the apex nearly seven-tenths the length of the segment. Legs testaceous except for a poorly defined fusceous ring at bases of femora; fore tarsal segments thickened, first three segments provided with small tufts of hair.

Allotype: Length 4.20 mm., width 2.20 mm. Similar in all respects to holotype except fore tarsi not modified.

Holotype male and allotype, Maple River, McKinley Township, Emmet County, Michigan, July 8, 1952 (P. J. Spangler).
These will be deposited in the U. S. National Museum under type number 62208.

Paratypes: 25 females, 21 males same data as types; 8 females. 5 males, July 7, 1952; 1 female, 3 males, June 24, 1952; 4 females, 13 males, July 20, 1952; 1 female, July 23, 1952, same locality and collector; 1 male, July 23, 1952, same locality (H. B. Hungerford); 5 females, 2 males, August 13, 1952, same locality (Irwin Slesnick).


Variations: Although the holotype and allotype are about the same size, the females average larger than the males. The size varies considerably within each sex. The smallest specimen in the series is a male, 3.70 mm. in length and 1.90 mm. in width, while the largest is a female, 4.35 mm. in length and 2.25 mm. in width.

Although the great majority of specimens are marked as described for the holotype, three were observed to have the third and fourth elytral series of punctures interrupted briefly in the middle of the elytra, and then terminating normally in the apical third as indicated in figure a.

Habitat: This species was collected among plant roots under approximately two feet of water. The roots were exposed, through a gravel bottom, to a considerable current of cold water. A few exploratory collections in the west branch of Maple River and various other streams in the same general vicinity were unfruitful. Other aquatic beetles collected in the area but from beneath the overhanging bank were Sperchopsis tesselatus (Zieg.), Hydroporus stagnalis G. & H., Deronectes depressus Fab., and Colymbetes sculptilis Harr.

Acknowledgments: The author wishes to express his gratitude to Mr. Hugh B. Leech of the California Academy of Sci-
ences for his loan of the western species of Brychius, for suggestions, and verification of the determination.

References

Notes on the Chilopod Genera Linotaenia and Tomotaenia with Description of a New Korynia

By Ralph V. Chamberlin

In reviewing the representatives of the chilopod family Linotaeniidae from the western states, it has seemed desirable to clarify and justify the nomenclature that I believe must be applied to them and to list the synonymies that seem clear together with notes on those that seem probable.

The type of the new Korynia described is retained for the present in the author’s collection.

Genus LINOTAENIA C. L. Koch

Linotaenia C. L. Koch, 1847, Rev. d. Myr., pp. 86, 188.

A genus Strigamia was proposed by Gray in 1842 (Cycl. Anat. and Physiol, vol. 3, p. 547) with no more than the fol-
lowing characterization: "Eyes none. Antennae 14 jointed, moniliform, rather elongate. Feet very numerous, 50 or more." This description is so general as to cover the entire order of Geophilida, providing neither generic nor family characters that might serve to place the genus. Since Gray neither named nor indicated any species for it, Strigamia has been quite generally ignored by European workers. However, in 1856, as indicated above, Sager in America used the name in connection with his new species fulva, thus for the first time validating Strigamia as a genus. Strigamia must date from 1856, with Sager as its author, and not from 1842 with Gray as author.

However, before Sager's paper of 1856, C. L. Koch had already, in 1847, erected the genus Linotaenia for a group of species to which Sager's fulva belongs. Strigamia thus becomes a synonym of Linotaenia.* In 1866, Bergsöe and Meinert set up a new name Scolioplanes, including under it among other forms the species acuminata and cossipes which Koch had previously placed in Linotaenia. It seems puzzling that European workers have continued to use Scolioplanes in spite of the fact that it is thus plainly a synonym of Linotaenia.

Genus TOMOTAENIA Cook

Generotype.—T. parviceps (Wood).

In 1895, Cook sought to restrict Linotaenia, not to replace it, by proposing a genus Tomotaenia to include the American species, which he suggested differed from the European forms "in details of the mouthparts" without, however, giving any hint as to what he supposed these differences to be. However, he named as type of his genus a Pacific coast species, Strigamia parviceps Wood, which does typify well a group of species ade-

* If typical fulva Sager proves to have the last pretergite separated from the corresponding pleurites and this character is accepted as of subgeneric significance, Strigamia would be available for the subgeneric name and Protoplanes Verhoeff would fall as a synonym to it.
quately distinct from *Linotaenia*, a group, so far as known, not represented in the eastern state, but occurring also in Asia.

For an Asiatic representative of this group, Verhoeff in 1913 proposed a genus *Paraplanes*, naming as its type, a new species, *P. svenhedini*. In 1938 he attributed to this genus a California species to which he gave the name *P. californicus* but which, as indicated above, is obviously a synonym of Wood’s *parviceps*, the type of *Tomotaenia*.

**Tomotaenia parviceps** (Wood)


Meinert (op. cit.) described as questionably Wood’s *parviceps* “a specimen which was said to be a type of Dr. Wood” and which “was labeled *Strigamia bidens* Wood’ for which no more definite locality was given than” N. A.?). It seems inexplicable that Dr. Meinert should choose to ignore the original label and describe the specimen under another name without any explanation for doing so. His description was accepted by Attems (1929) as applicable to *parviceps* but not on the basis of any personal study. This identification was undoubtedly erroneous.

This large form, usually of a brilliant red color in life, a color that fades in preservatives, as here conceived occurs over much of California and north as far as British Columbia. Over this range it is subject to much variation in size of the mature
individuals and in number of pairs of legs without, however, showing any correlation between the variations and distribution or habitat, so far as studies so far made show. The variation in number of legs is from a minimum of 61 pairs (cotype of rubelianna from Palo Alto) to 91 pairs. A high number of legs seems to be especially common in Oregon and Washington. The maximum length so far recorded is that for the type of Wood’s epileptica, $5\frac{1}{2}$ in. or 140 mm. Other specimens measured by the author run up to 11–110 mm. Having made notes on the type of epileptica several years ago, it seems desirable to publish a redescription with some figures of this remarkably large specimen.

Tomotaenia epileptica (Wood) (-parviceps). A very large form, strongly attenuated cephalad, more moderately caudad. (The original description gave the color as orange throughout.) The head and dorsal plates, together with the pro sternum, still exhibit the minute white punctuation noted by Wood, with the general color now faded to brownish. The cephalic plate with median length nearly equal to the greatest width (cf. Fig. 1). Frontal suture present. Antennae filiform, contiguous at base. Basal plate of form shown in the figure, somewhat overlapped by the head. Claws of prehensors when closed not attaining front margin of head; tooth at base of claw large, obliquely sub truncate at tip (cf. Fig. 2). Dorsal plates smooth and shining, not sulcate. Spiracles all circular, the anterior ones large, gradually decreasing toward posterior segments. Ventral plates with a median longitudinal sulcus sharply impressed, with a transverse sulcus more or less evident behind middle and in front of proliferous area. Last tergite broad, caudally strongly convex. Last intertergite fused with pleurites. Last ventral plate very broad, its sides convex and strongly converging caudal, its caudal margin incurved. Coxal pores concentrated along and beneath border of sternite, opening into a broad longitudinal channel or furrow. Anal legs slender, the last joints broken off in type. Pairs of legs, 81. Length about 140 mm. Type taken in Oregon, vicinity of Puget Sound, by Dr. Kennedy. (Acad. Nat. Sci. Phila., no. 1080.)
Strigamia epileptica Wood, holotype

1. Head and prehensorial segment, dorsal view. 2. Prehensors. 3. Sternite of third segment. 4. Caudal end, ventral view (the segments somewhat telescoped).

Tomotacnia imperialis (Brolemann) (-parviceps, var.). This was based on a female with 83 pairs of legs taken in Washington. Its length is given as 68 mm. The one character given in Brolemann's description that might be regarded as possibly distinctive is the presence of a median longitudinal sulcus on the basal plate, not usually present or obvious in parviceps. However, occasional specimens of the latter species show a median white line from beneath the surface which it is thought is what Brolemann's specimen shows.
Genus **KORYNIA** Chamberlin


This genus is closely related to *Tomotaenia* in having the coxal pores concentrated along and beneath the last sternite. It is known from species occurring in the Southwest from California to Texas. They are small, slender forms with coxal pores reduced in number, the new species described below being the largest so far known.

**Korynia auxa** new species

Color of preserved type reddish fulvous, the tergites in part with a deeper spot toward each border. Body very slender.

The head small, a little narrowed cephalad, with anterior margin convexly rounded; about equal in length and breadth; frontal line distinct.

Prehensors when closed attaining anterior margin of head; claws armed at base with a rather small, slenderly conical tooth, the other joints unarmed. Prosternum showing no chitinous lines; anterior margin with excision acute.

Dorsal plates not sulcate, the anterior ones somewhat irregularly rugose. Spiracles all circular. Sternites with a median sulcus; moderately puncto-rugose.

Last sternite broad, strongly narrowed caudad, trapeziform. Coxal pores few, along and beneath the sternite. Last dorsal plate shield-shaped but caudally subtruncate. Last intertergite separate from the pleurites which are well developed.

Anal legs of male crassate, not compressed, the claw reduced to a mere point.

Pairs of legs, 73. Length, 38 mm.

Locality.—**CALIFORNIA**, Squaw Valley. One male taken Mar. 23, 1941, by S. and D. Mulaik. Differing from previously known species in larger size and greater number of legs.
Neotropical Miridae, LXIX: A Remarkable New Genus of Phylini (Hemiptera)

By José C. M. Carvalho,* Museu Nacional, Rio de Janeiro, Brazil

Among the neotropical mirids in the collection of the U. S. National Museum, the author found a remarkable new genus of the tribe Phylini herewith described and figured. This work constitutes a portion of a study concerning Miridae in the U. S. National Museum. I am indebted to Dr. Reece I. Sailer who is in charge of the Heteroptera collection.

HAMBLETONIOLA n. gen.

Phylinae, Phylini. Genus of small size, body slightly ovoid, smooth, covered by very long and erect pubescence intermixed with silvery, flat and remumbent hairs. Head rounded in front, inclined, vertex smooth, convex with posterior margin straight; eyes of median size, sessil, touching the anterior margin of pronotum and reaching distinctly beyond the lateral margins of anterior angles of pronotum, smooth posteriorly; seen from the side, frons noticeably rounded, eyes somewhat compressed, distant from gula by a space about half the height of one eye, clypeus not separated from frons by a suture, vertical; rostrum reaching apex of hind coxae, the first joint noticeably incrassate.

Antennae inserted near the anterior margin of eye, distinctly above the inferior margin of orbita, segment I short, incrassate towards the apex; segment II about three times as long as first and about as thick as the latter, narrowed at extreme apex and base, covered by long, erect and somewhat silky hairs, their length equal to or more than diameter of segment; segment III ovoid, almost globose (female) or ovoid narrowed apically (male), strongly narrowed basally and apically, beset with long, black scale-like or flattened hairs; segment IV short, laminate with a narrow cylindrical base. In the nymph this segment

*John Simon Guggenheim Memorial Fellow 1953. Additional assistance was received from the Brazilian National Research Council.
shows remarkable variation since it assumes the color and shape which is to be found on the third segment of adults. It bears also a fossa near apex in which there can be found many very fine hairs (Figs. B, C). The third antennal segment on the adults is the thickest of all.

Pronotum somewhat rectangular, without collar or calli, disc flat, posterior margin almost straight, posterior angles rounded, lateral margins blunt, narrowing towards the head, the anterior angles in contact with eyes, smooth, beset with long erect hairs and scale-like recumbent pubescence; mesoscutum broadly uncovered; scutellum moderately convex, provided with long hairs and scale-like pubescence.

Hemelytra with clavus wider towards the apex, embolium distinct only on basal half, becoming gradually wider and less distinct towards the cuneus, cubital vein distinct on basal half of corium, cuneus about as long as wide at base, cuneal fracture small with distinct incisure, entire surface of hemelytra covered with long erect hairs and flattened, recumbent ones showing silvery reflection under incident light; membrane with two areolae, the apical angle or larger areola widely rounded.

Legs relatively short, femora incrassate, the tibiae beset with long whitish spines, about as long as wide diameter of tibia, intermixed with short and fine hairs, tarsi long, claws with pseudarolia easily visible, reaching beyond middle of claw.

*Type of genus: Hambletoniola antennata* n. sp.

This genus belongs to the group of Phylini with scale-like pubescence intermixed with common hairs and differs from others due to its very peculiar thickened and ovoid third antennal segment. Besides the antennae it is also characterized by its long tibial spines, long pubescence of body and type of pseudarolia.

It is with pleasure that I name this genus for Dr. E. H. Hambleton of the U. S. Department of Agriculture, who has contributed greatly to the advancement of neotropical entomology. Dr. Hambleton was also my first teacher in entomology and I am much indebted to him for his direction and encouragement.
Explanations of Figures

Hambletoniola antennata n. sp. (Figs. A, D, E)

Characterized by its color, structure of antennae and male genitalia.

**Male:** Length 2.8 mm., width 1.2 mm. **Head:** length 0.2 mm., width 0.8 mm., vertex 0.45 mm. **Antennae:** segment I, length 0.1 mm.; II, 0.4 mm.; III, length 0.25 mm., width 0.14 mm.; IV, 0.2 mm. **Pronotum:** length 0.4 mm., width at base 1.0 mm. **Rostrum:** length 0.85 mm., segment I, length 0.28 mm.; II, 0.28 mm.; III, 0.11 mm.; IV, 0.21 mm.

**Color:** whitish yellow sprinkled with small roundish brown dots and silvery pubescence; eyes brownish; second antennal segment brownish orange to black, with dark scale-like hairs, third segment black at base; body covered by minute brown spots and silvery flat recumbent hairs, the spots are not to be seen on mesoscutum and extreme base of corium; membrane hyaline with one roundish black spot beyond the apex of cuneus; underside concolorous with brownish spots on the pleural region, more numerous on propleura; femora and tibiae with brown to black spots, more numerous on anterior surface of femora; rostrum dark at apex; base of first antennal segment and sometimes antennal peduncle and portion of gena brownish to orange in color.

**Genitalia:** Phallus (Fig. F) of the Phylini type. Left paramere (Fig. G) also typical for the tribe, with a few dorsal setae and a somewhat two-lobed left branch.

Morphological characters as given for genus.

**Female:** Identical with male in color and dimensions. Third antennal segment more ovoid, almost globose. In the male this segment is distinctly narrowed towards the apex (Figs. D & E).

**Host plant:** Leucophylum sp.

**Holotype:** male, Mexico (Brownsville, Texas, V. 5. 39, 31903) on Leucophylum. **Allotype:** female. **Paratypes:** male, female and nymph, same data as type, in the collections of the United States National Museum and of the author (type USNM No. 61996).
A New North American Eupogonius with Note
(Coleoptera: Cerambycidae)

By Josef N. Knull, Department of Zoology and Entomology, Ohio State University

In my studies of Cerambycidae, the following new species was discovered:

Eupogonius arizonensis n. sp.

Female.—Narrow, elongate; ground color reddish brown, clothed with irregular patches of recumbent white and yellowish pubescence, longer brown hairs on dorsal surface, antennae and legs.

Head convex; surface finely punctured, clothed with light colored hairs, allowing ground color to show; eyes fringed with yellowish white recumbent pubescence, separated on vertex length of eighth antennal segment; antennae extending to about apex of elytra when laid along side, ratio of lengths of segments 1 to 11, 26: 6: 34: 36: 16: 16: 15: 12: 12: 9: 11, segments with recumbent hairs sparse, longer dark hairs numerous.

Pronotum wider than long, widest in middle, about as wide at base as at apex; sides subparallel, lateral tubercle small, acute; disk convex, a transverse depression at base; surface coarsely, densely, irregularly punctured, recumbent pubescence, allowing sculpture to show. Scutellum semicircular, pubescent.

Elytra at base much wider than pronotum; sides subparallel, apices separately rounded; disk convex; surface coarsely punctured, punctures becoming very fine toward apex, recumbent pubescence short, allowing sculpture to be visible.

Abdomen beneath coarsely, sparsely punctured, last sternite slightly emarginate, surface clothed with recumbent short pubescence, longer hairs arising from punctures.

Length 6 mm.; width 2 mm.


This species is closest to E. pauperi Lec. It can be distin-
guished by the narrow elongate form, small lateral tubercles, coarse sculpture of pronotum and sparse pubescence of dorsal surface.

**Eupogonius fulvovestitus** Schffr.

I erroneously synonymized this species in 1946. Specimens are at hand from Hidalgo Co., Texas, March 26, 1953 and May 23, 1951, D. J. & J. N. Knnull, collectors. In addition to the smooth areas on head and pronotum mentioned by Schaeffer (1905), the scutellum is glabrous, which will distinguish it from other members of the genus in our fauna.

**References**


**Replacement of a Preoccupied Generic Name**

(Orthop.: Acrid.)

In a recent publication (Trans. Amer. Entom. Soc., LXXIX, pp. 121, 124 (1953)) I proposed the name *Loveridgea* for a subgenus of African Pyrgomorphinae (Orthoptera; Acrididae). My friend Mr. Arthur Loveridge, to whom the new entity was dedicated, has advised me that *Loveridgea* was used in Reptiles in 1951 by Vanzolini (Herpetologica, 7, p. 114). Unfortunately the "Zoological Record" list of new generic and subgeneric names proposed in 1951 was not available until after my paper had gone to press, although a full check had been made up to and including 1950. In place of my preoccupied *Loveridgea* I wish to propose *Loveridgacris*, to retain its association with the eminent student of African zoology to whom it was originally dedicated.—James A. G. Rehn.
A European Weevil in North America

By ELBERT L. SLEEPER, Department of Zoology and Entomology, Ohio State University, Columbus 10

In May, 1953, a small series of a weevil from Delaware was sent to the author. In October, 1953, three Pennsylvanian examples of this same species were sent to the author by D. G. Kissinger of Washington Missionary College, Takoma Park, Washington, D. C. At this time Mr. Kissinger stated that he believed it to be an import. Comparison of it with European material by W. J. Brown of the Division of Entomology, Department of Agriculture, Ottawa, Canada and the author proved this species to be Gymnaetron pascuorum (Gyll.).

*G. pascuorum* may be distinguished from other North American members of the genus as follows: smaller and narrower (length 1.6–2.2 mm., width 0.8–1.1 mm.); black, the antennae, elytra, legs, and tarsi reddish brown, the base of the elytra and the sutural line frequently black; vestiture of fine, sparse, prostrate setae, except on elytra where the setae are coarser and erect. The tibiae of both sexes are mucronate.

This species is generally distributed in Europe and is recorded as breeding in *Plantago spp*. The North American specimens examined were from the following localities: Van Dyke, Del., V–13–52, H. E. Milliron, on alfalfa; Newark, Del., several dates from May to August in 1952–53, on strawberry, potatoes, and alfalfa; Lebanon S. F., Del., V–9–53, C. A. Triplehorn; New Castle Co., Del., May and July, 1952; and Leipsic, Del., May, 1952. Mr. Kissinger has collected this species at Stoney Creek Mills, Pennsylvania, VII–24–52, and Pottstown, Pennsylvania, VII–28–53. Examples of *pascuorum* are in the following collections: Delaware University, Entomological Collection, Canadian National Collection, D. G. Kissinger Collection, and the author's collection.

It is possible that this species was first introduced, in nursery stock from Europe, in the vicinity of Wilmington, Delaware. The bulk of the material examined was collected within a 40-mile radius of that city.
It is doubtful if this species will be of economic importance in the United States. The occurrence of it on the aforementioned plants is probably accidental. It is possible that this weevil might cause some damage to alfalfa, if the female should oviposit in the blossoms. *G. teter* (Fab.) oviposits in the ovaries of mullein, *Verbascum thapsus* (L.). The immature stages are passed in the seed pod of mullein.

Cryptophyllaspis liquidambaris Kotinsky in New Jersey (Homoptera)

This species, known as the sweet gum scale, was collected during June, 1953, on sweet gum from Cape May, N. J. This insect inhabits the undersides of the leaves, the oval or circular female scale making a tiny, blunt, conical mound or gall on the upper leaf surface and living on the lower surface in the tiny open pit beneath the mound. It has been recorded from Florida, Georgia, Mississippi, Louisiana, District of Columbia, Texas, Ohio and New York City, but not previously from New Jersey. Apparently this species escaped notice for years, partly because of its unimportance, but principally because collectors are getting scarcer and scarcer.—H. B. Weiss.

The Continuing Abundance of Lacebugs in New Jersey

In *Entomological News* for July, 1952, attention was called to the unusual abundance of lacebugs in New Jersey on various host plants during the summer of 1951. During the summers of 1952 and 1953 this abundance continued, with some abatement in 1952. *Stephanitis rhododendri* Horv., on rhododendron, *Stephanitis pyriodes* Scott on azaleas, *Corythucha ciliata* Say on American buttonwood and European planes, *Corythucha cyp- doniae* Fitch on *Crataegus*, continued to build up numerically during the summer months of 1953 until by the end of the season every leaf on many of their host plants was whitened by adult and nymphal feeding. According to U. S. Weather Bureau records, the winters of 1951–52 and 1952–53 were mild, the latter, even more so than the former. As a result the mortality
among overwintering adults and eggs was reduced and the way was paved for heavy summer populations.—H. B. Weiss.

Records of the Order Zoraptera from South Carolina

By W. St. Amand

In his synopsis of the order Zoraptera (Proc. Ent. Soc. Wash. 40: 57–87, 1938), Gurney states that *Zorotypus hubbardi* Caudell is probably abundant in the Southern States. He lists records from Maryland, Virginia, North Carolina, Illinois (?), Arkansas, Louisiana and Texas. It has been reported from Alabama by Valentine and Wilson (Ent. News 60: 180–1, 1949) and from Georgia by Riegel (Ent. News 61: 124, 1950). In addition, Copeland (in press) reports it from Kentucky, Tennessee and Mississippi.

A record of the occurrence of *Zorotypus hubbardi* from South Carolina seems worthy of note. Collections were made at sawdust piles at the following localities: 8 mi. N of Travelers Rest, Greenville Co.; 4 mi. NW of Newberry County line, Laurens Co.; Edgefield, Edgefield Co.; and near Kirksey, Greenwood Co. At Edgefield specimens were found with termites and at Kirksey with ants but there is no evidence of more than incidental association. All individuals collected are wingless.

Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian

Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

1 Contribution number 97 from the Department of Zoology and Entomology, The University of Tennessee, Knoxville, Tenn.
This list gives references of the year 1953 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

Note: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in *Entomological News* are not listed.

This number is devoted entirely to papers appearing in the Transactions of the 9th International Congress of Entomology, held in Amsterdam, August 17-24, 1951. Publ. at The Hague, v. 1, 1115 pp., 1952; v. 2 (Entitled "Symposia"), 361 pp., 1953.

of forest insects living in tree rind, in Finland. 2: 224–28.

BIOGRAPHIES, OBITUARIES—Swammerdam, Jan, 1637–1680.—As an entomologist by H. Engel. 1: 11–19.


**COLEOPTERA**—d’Aguilar, J.—L’activite cinesthesique des imagos de certains Agriotes (Elateridae). 1: 465–71,


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THE AMERICAN ENTOMOLOGICAL SOCIETY

1900 RACE STREET, PHILADELPHIA 3, PA.
ENTOMOLOGICAL NEWS
JUNE 1954
Vol. LXV No. 6

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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.

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Notes on Odonata of Surinam
VI. The Nymph of Neoneura joana Will.

By D. C. Geijskes, P. O. B. 306, Paramaribo

Of the genus Neoneura the nymph of only one species (N. carnatica Selys) is described by Needham from Cuba. I add here the description of a second species of which exuviae were found recently on rocks in the Maroni-River in Surinam. The identification of the species was secured from a female hatching from one of the cast skins.

Neoneura joana has originally been described from British Guyana. Although the species is not yet recorded from Surinam, it is a very common damsel fly along the rivers in this country. Their nymphs breed on the rocks in the rapids of the rivers.

DESCRIPTION OF THE NYMPH

Head broad and flat, quadrangular, hind angles behind the eyes prominent and spinulose. Eyes large, not bulging. Antennae long and slender, equally brown, paler at the articulations, seven jointed, relative length of the segments 4:5:9:7:4:3:2, segments 3-7 with an apical fringe of hairs.

Mentum broad triangular, reaching backward to between the coxae of the front legs. Only one pair of mental setae present. Sides of mentum in the apical half armed with a row of about 14 short and strong spines. Median lobe prominent and rounded,

finely denticulated. Lateral lobes with four (females) or five (males) setae; movable hook large and curved inward at the end, end hook well developed, separated by a deep cleft from the terminal border, which consists of a straight cut off tooth.

Maxillae on top of lacinia with six large teeth, the third the largest, followed at the lower side by a row of 5-7 smaller ones and at the upper side by two long spines; more below a secondary row of 8-11 smaller plumose setae each side. Galea on top beset with many long plumose setae.

Mandibles with four (right side) or five (left side) stout teeth unequal in size. Right mandible on inner side with one blunt tooth, left mandible with two such teeth.

Prothorax with prominent lateral lobes, the hind margin somewhat excavated. Synthorax not as broad as head, marked with three darker longitudinal bands over the sides; the empty wing pads of the exuviae reaching to the seventh abdominal segment (in the full grown nymph they may reach to the fifth segment).

Legs rather long, the femora flattened to some extent, marked with two cross bands in the middle part, tibiae with one cross band in the basal half. Margins of femora and inner side of tibiae with a row of short spines. Apical inner side of tibiae armed with many short plumose setae, the joints of the tarsi along the under side with two rows of such setae.

Abdomen tapering to the end, the first five segments without setae, the last five segments spinulose especially along the lateral and apical margins. Mid-dorsal line of segm. 9 and 10 without spines. Segments 4-9 marked with three to two darker longitudinal lateral bands, segm. 10 with the exception of the mid-dorsal stripe dark.

Gonapophyses of female reaching behind end margins of segm. 10; inner and outer pair of the same length, outer pair on the

---

EXPLANATION OF FIGURES

Nymph of Neoneura joana Will. (female exuviae)
ventral margin with three dents, terminal spine large sharp-pointed. Gonapophyses of male with the two sharp points reaching just over the hind margin of segm. 9. Gills long lanceolate, tips acute, the sclerotized basal part reaching to the middle at the dorsal margin or farther along the ventral margin; the margins and mid-rib armed with a row of short spines, 11 along the dorsal side, 19 along the ventral side and 10–11 along the mid-rib. Apical half of gills with simple and some branched gill-veins, the margins finely fringed with long soft hairs.

Total length (exuviae) 12–15 mm., gills 4–5 mm. (Examined 2 ♂, 8 ♀ exuviae.)

Of this species only the cast skins were found attached to rocks and larger stones in the rapids of Lamaké and in the Apoma falls in the Maroni River between Surinam and French Guyana (October 1953). Imagines of this species were common at that moment on the same places.

This nymph differs from that of *N. carnatica* by the number of setae at the lateral mental lobe (4–5 in *N. joana*, 3 in *N. carn.*), by the less hairy legs, the longer and more spiny gills and the spinulose abd. segm. 6–10.

The two species have in common: the large truncate head, one pair of mental setae, the row of marginal spines in the apical half of mentum, and the pointed abd. gills divided in a thick carinate basal part and a thin leaf-like apical portion.

It may be noted that the nymph of *Neoneura joana* has much in common with the nymph of *Aeolagrion demerarum* Will, described and figured by myself in Ann. Ent. Soc. Amer. 1941, 34: 722–24, fig. 2.
Notes on the Biologies of three Species of Bombyliidae, with a Description of one New Species

By J. C. Hall, Citrus Experiment Station, Riverside, California

These records on biology, while not conclusive, are published in order that more interest might be created toward studying the habits of this fascinating group of flies. Comparatively little is known about the habits of the family, and much work remains to be done in this respect.

The author wishes to express his thanks to the two men, who, through their efforts, have made this paper possible: Mr. H. B. Leech of the California Academy of Sciences and Mr. R. C. Bechtel of the University of California at Davis.

In December of 1952, Mr. Bechtel collected a total of 70 nests of the mud-dauber wasp, Sceliphron caementarium (Drury), from various areas around Davis, California. From three of these nests emerged three specimens of Toxophora virgata O.S. Of the three nests, one was from the inside wall of a small pump-house and the other two were collected from the underside of a cement bridge. The nests were kept in the laboratory until the spring of 1953. Following is a list of the hymenopterans which emerged from the three nests. From nest number 20, four Ancistrocerus tuberculocephalus sutterianus (Saussure), and one Stenodynerus minimoferus Bohart; from nest number 24, three Rychnium foraminatum blandinum (Rohwer); and from nest number 25, three Stenodynerus minimoferus.

Nothing definite can be said about the specific host of Toxophora virgata as all three species of hymenopterans, mentioned above, fall within the category of the hosts recorded in the literature. It is unlikely, but not an impossibility, that the fly larvae fed on the Sceliphron larvae.

The genus Toxophora is found in both Europe and North America, and most of the host records are found from the former continent. Rearing and host records are not numerous
and are scattered, but from the information available, a good indication of the hosts of these flies may be obtained. Séguy (1926)\(^1\) records the genus *Toxophora* as "Parasites des Guèpes solitaires (*Eumenes, Pelopaeus, Odynerus)*." Osten Sacken (1877)\(^2\) records a species of *Toxophora* reared from the nest of *Eumenes frater*na Say, "feeding either upon the caterpillar stored up in the nest, or upon the young larvae themselves." Austen (1937)\(^3\) records *Eumenes poniiformis* Fabr. being attacked by the larvae of *Toxophora maculata* Rossi.

In 1951 Mr. Leech collected a quantity of *Ceanothus thyrsiflorus* Esch. wood, which was heavily infested with the anobiid beetle, *Ptinus acuminatus* Casey. The wood was placed in a jar and kept there in an attempt to rear some of the beetles. A few months later three bombyliids emerged from the wood, along with several anobiids. The flies proved to be an undescribed species of the genus *Eclimus*.

The cast pupal skins were left protruding, for most of their length, from old anobiid burrows. It was immediately assumed that the beetles served as the hosts. But, at a later date, the spring of 1952, Mr. Leech again collected some wood, this time dead chaparral pea, *Pickeringia montana* Nutt., which was heavily infested with another anobiid, *Vriletta decorata* Van D. From this wood one specimen of *Anthrax oedipus* Fabr. emerged. In this case, by careful tracing it was found that the fly came from a small hymenopterous cocoon in an old anobiid burrow, which had been provisioned with spiders. This later case then makes the previous assumption, that the *Eclimus* species came from the anobiids, open to suspicion as to the host.

The author has been unable to locate any records in the literature on the host, or hosts, of the genus *Eclimus*. He has observed *E. lucifer* O.S. ovipositing in an old log lying near a small stream. All attempts to recover either eggs or larvae failed, and no more information is available at this time.

It was impossible to determine the hymenopteran that served as the host for *Anthrax oedipus*. Species of the genus *Anthrax*

---

have been recorded several times as being parasitic on the larvae of solitary bees and fossorial wasps. Osten Sacken (1877) states that he has observed *A. oedipus* in the Sierra Nevada Mountains, persistently flying around a hole in a pine log, probably containing the nest of some hymenopteran. He also records other species in the genus as being reared from *Pelopoeus, Cemonus, Chalicodoma*, and probably *Megachile*. Brooks (1952) 4 records and describes the pupal case of *A. irrorata* Say, a species closely related to *A. oedipus*, as being reared from *Megachile nivalis* Fries.

The following is a description of the adult and cast pupal skin of the *Eclimus* species, reared from ceanothus wood. The author takes pleasure in naming this fly after Mr. H. B. Leech.

**Eclimus leechi** n. sp.

Body black; wings hyaline, subcostal, costal, marginal, and first basal cells with faint infuscations, faint spots on r–m cross-vein, base of second submarginal cell and at the bases of all the posterior cells.

Female. Front gray pollinose, blackish in center from vertex to a little beyond middle, black pilose in middle, a few whitish scales present; face gray pollinose, white pilose along oral margin; clypeus when rubbed, shining; antennae black, segment one three times longer than second, shorter than third, third segment broadest before middle, tapering to blunt apex, style wanting, segments one and two with black hair above, white below; proboscis longer than head height; palpi half as long as proboscis, first segment twice as long as the second, slender, segment two broad, tapering to a point, with short black hair; occiput gray pollinose on sides, black on upper one-fourth, white pilose, a few black hairs on vertex, golden-yellow tomentum on vertex, a few golden-yellow scales along hind margins of eyes. Thorax black, white pilose, dense golden-yellow tomentum overall, three, long, black bristles at root of wings; scutellum black, thickly covered with golden-yellow tomentum, long white hair on posterior margin; pleura gray pollinose, white pilose, tomentum want-

4 Brooks, A. R. Canadian Ent. 84: 370.
ing; legs black, tibiae somewhat brownish; coxae white pilose, fore and middle femora entirely white pilose, hind femora white pilose on basal half, grading to iridescent black on apical half, with two short, slender bristles on under surface; halteres with stems whitish, knobs black; wings hyaline, following cells faintly infuscated: subcostal, costal, marginal, first basal, area near stigma darker, faint spots on \( r-m \) cross-vein, base of second submarginal cell and at bases of second, third, and fourth posterior cells. Abdomen black, first segment white pilose, rest of dorsum with short, black pile, sides of segments one to four white pilose, five to seven black pilose, entire dorsum golden-yellow tomentose, thicker on median line and posterior margins of each segment; venter white pilose and tomentose, segments six and seven with black pile. Genitalia orangish, with a few golden-yellow hairs.

Male unknown.

*Type* female. Mill Valley, Marin County, California, VI-25-51 (H. B. Leech). Deposited in California Academy of Sciences. Paratypes. 2 females, same data as type. One specimen in the California Academy of Sciences, the other in the author's collection.

The following is a description of the cast pupal skin of *Eclinus leechi*.

Light yellow, with yellow setae and reddish-brown tubercles.

Head. Round in front view. Cephalic tubercles widely spaced, long, and straight, somewhat ridged near base; a small tubercle arises behind and a little inward of each large cephalic tubercle; frontal tubercle trid, dorsal tubercle the largest, slightly proclinate, two ventral tubercles small, without long tapering point characteristic of other tubercles, ridged near base; middle of front with lateral depressions; a single pair of setae located behind each cephalic tubercle, about one-half as long as the tubercles; mouth parts short, not extending length of femora; labrum with a pair of small tubercles, a very small seta alongside each tubercle. Dorsum of thorax bare, a thin seta dorso-laterally above root of wings; wings extending to the third abdominal segment, without setae or tubercles. Segment one of abdomen
with a median-dorsal row of small spines, short setae interspersed between each spine, lateral area bare, three short setae at union of dorsum and venter; segments two to six with a median-dorsal row of larger spines, slightly curved upward, a variable number of short setae interspersed between each spine, a pair of setae at each end of each row of spines, three setae at union of dorsum and venter; seventh segment with a row of short spines, and interspersed setae on posterior margin; eighth segment bare, with a pair of slightly curved terminal tubercles; entire venter of abdomen bare.

The pupal skins are attached to the type and paratype specimens.

A Moisture Gradient Method for Rearing Diptera from Moist Humus

By W. A. McDonald, University of California, Los Angeles

A convenient rearing method has been used with great success by workers at U.C.L.A. to obtain new or little-collected Diptera, especially Nematocera, from moist humus, and to associate the larval and pupal stages with the adult. The procedure involves collecting damp humus or leaf mold in the field and transferring a portion or it to a can set in a pan of water and covered by a rearing cage. Thus moisture gradient is established which will permit immature forms present in the humus to develop and emerge into the cage for a considerable period following their collection.

At U.C.L.A. we use discarded syrup cans 9½" wide by 12½" high which contain about one cubic foot of loosely-packed humus over a two-inch layer of salt-free sand. The can, with several small holes punched through its bottom, is set into a pan in which a two-inch water level is maintained. Over the humus can is placed one of our mosquito-rearing cages, measuring 15" by 15" by 36" and made of 32-mesh plastic screen stretched on a frame of ¾" fir, with ⅛" masonite top and bottom, a window of cellulose acetate film and a muslin sleeve. The screen, window and sleeve
are held to the frame by thin strips of masonite and small brads. A hole is cut in the cage's bottom to admit the top of the humus can.

After the adult flies have emerged and hardened for a day or so, they can be collected with a 24" straight glass aspirator on a rubber mouth-suction tube which is inserted into the cage through the muslin sleeve. The flies are easily sucked from the sides of the cage where they tend to congregate, especially if the cage is placed by a window. Nematocera can be blown into an alcohol vial, other Diptera into a cyanide tube. Some of the humus should also be put into a Berlese funnel to obtain the Acarida, Apterygota and larval insects present.

Our first experience with this method, using wet humus found below a perennial spring, produced a great variety of Tendipedidae and Heleidae, including a new species of Helea (W. W. Wirth, personal communication to J. N. Belkin), a few fungivorous, sciarids, psychodids, lauxaniids, rhagionids and all stages of Tabanus monocnsis Hine, adults of which emerged five weeks after the date of collection.

From two to five minutes a day is sufficient time for aspirating the adults and replenishing the water level. Should space for the apparatus be lacking at the laboratory or university, it can be kept in the worker's garage or back porch and inspected by him each day on his way to or from work. When the humus finally ceases to yield specimens it can be examined for pupal skins, long-lived larvae, etc. The adults, in alcohol, are sorted to family and stored for eventual shipment to specialists.

The little time required by the method just described should appeal to entomologists involved in insect surveys as well as Diptera specialists who must often associate immature and adult stages.
Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian
Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical, and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1953 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Philadelphia, and the Review of Applied Entomology, Series B, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:) unless otherwise noted. References to papers containing new forms or names not so stated in titles are followed by (+); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol ($) . Papers published in Entomological News are not listed.


ORTHOPTERA—Amand & Cloyd.—(See Diptera.)


Dondale, C. D.—(See Hymenoptera.)


Rautenberg, L. E.—(See General.) Remington, C. L.—Two new genes, “whitish” and “blonde,” producing pale males and females of Colias philodice. [85]


—Further notes on Hypera brunneipennis and its parasite, Bathyplectes curculionis. [76] 46: 1114. Ehara, S.—A
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man.—Coleoptera and Diptera reared from owl nests. [36]
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A.—Una nueva especie de Athyreus (Scarab. Geotrop.).
1954. Pallister, J. C.—Homopterus hondurensis Darlington
89: 292–93, ill. Puisségur, C.—(See Diptera.) Reichen-
bach-Klinke, H.-H.—Der histologische aufbau des proven-
trikels der Adephega und seine bedeutung für taxonomie
—Rindenbewohnende staphyliniden aus Guatemala. [28]
3: 600–10 (*k). Schoning, R. v.—Biologisch-ökologische
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einigen in Guatemala gesammelten cossoninen. [28] 3:
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HYMENOPTERA—Baldwin & House.—Sawflies. (See
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fly, Neodiprion sertifer (Geoffr.) [43] 85: 437–46. &
M. M. Whalen.—A virus disease of the European pine saw-
fly, Neodiprion sertifer (Geoffr.) [43] 85: 433–37, ill.
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by the wasp Philanthus flavifrons Cresson. [56] 56: 26–27.
1954. Brown, W. L., Jr.—The neotropical species of the
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and subfamily classification of the family Formicidae.
The ants of California. Palo Alto, Calif. Pacific Books,
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Wheeler [52] 46: 618–19.) Creighton, W. S.—A new sub-
species of Xenomyrmex stolli from northeastern Mexico
(Formicidae). [13] no. 1634, 5 p., ill. —The rediscovery of
1635. 7 p., ill. DeBach, P.—Thysanus flavopalliatius
(Ashm.) parasitic on Comperiella bifasciata How. in Cali-
—(See Coleoptera.) Domenichini, G.—Studio sulla mor-
List of Titles of Publications Referred to by Numbers in Entomological Literature in Entomological News.

10. American Journal of Tropical Medicine & Hygiene. Baltimore, Md.
34. Bonner Zoologische Beiträge. Bonn, Germany.
43. Canadian Entomologist. Ottawa, Ont.
44. Canadian Journal of Zoology. Ottawa, Canada.
48. Dusenia. Curitiba, Parana, Brazil.
49. Ecological Monographs. Durham, N. C.
52. Entomological Society of America, Annals. Columbus, Ohio.
61. Eos; Revista Española de Entomología. Madrid.
63. Faune de l'Union Française (Formerly Faune de l'Empire Français).
64. Florida Entomologist. Gainesville.
72. Institut Scientifique de Madagascar, Mémoires, Ser. E. Tananarive.
85. Lepidopterists’ News. New Haven, Conn.
88. Mexico Univ. Instituto de Biología. Anales. Mexico City.
90. Microentomology. Stanford University, California.
91. Mocambique; Documentario Trimestral. Lourenço Marques.
93. Musei Zoolgici Polonici, Annales. Warsaw, Poland.
95. Naples Univ. Instituto e Museo Zoologico, Annuario.
97. Natural History Miscellanea (Chicago Academy of Sciences).
103. Notulae Entomologicae. Helsingfors, Finland.
111. Pan-Pacific Entomologist. San Francisco, Calif.
114. Polskie Pismo Entomologiczne. Wroclaw, Poland.
121. Rio de Janeiro. Instituto Oswaldo Cruz, Memorias.
123. Riviste di Parassitologia. Rome, Italy.
125. Royal Entomological Society of London, Proceedings, Ser. B.
126. Royal Entomological Society of London, Transactions.
129. São Paulo, Brazil. Instituto Biologico, Arquivos.
131. Smithsonian Miscellaneous Collections. Washington, D. C.
134. Sociedad Mexicana de Historia Natural, Revista. Mexico City.
139. Société Fouad I d'Entomologie, Bulletin. Cairo, Egypt.
140. Société Linneenne Lyon, Bulletin Mensuel.
146. Systematic Zoology. Washington, D. C.
149. Tijdschrift voor Entomologie. Amsterdam.
150. Tohoku University. Science Reports, Ser. 4. Tohoku, Japan.
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14. — Rehn (John W. H.) — Classification of the Blattaria as indicated by their Wings (134 pp., 13 pls., 1951) ............................................. 5.00

THE AMERICAN ENTOMOLOGICAL SOCIETY
1900 RACE STREET, PHILADELPHIA 3, PA.
ENTOMOLOGICAL NEWS
JULY 1954

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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.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act
of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in para-
graphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
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.

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My Last New North American Fleas

By C. Andre森 Hubbard, Tigard, Oregon

The fleas listed here as new, bring to 50, the number described by the writer and clears from his desk the accumulation of odds and ends through the years. The types are all deposited in the U. S. National Museum, first paratypes in the British Museum.

Thomomys and the Dactylopsylla

Investigators realize the almost endless variety found in western pocket gophers. Hall mentions 38 from Nevada, Bailey 15 from Oregon, around 10 are recorded from Washington. Their giant fleas (Dactylopsylla) are almost as variable. D. comis, the first of these northwest giants to be described, ranges everywhere in the Cascade Mountains and east in Oregon and Washington. West of the Cascades one finds a variable series in which the differences are to be found in the breadth of the VIII St. male, its apical angle, shape of its membranous appendage; and apical outline of VII St. female. The four listed below as new are all between 4 and 5 mm. in length.

Dactylopsylla comis scapoosei new subspecies

Closest to D. c. comis but with VIII St. male very narrow, apical angle rounded but very flat and membranous flap approaching the rectangular. VII St. female generally without undulations. Types were taken off Thomomys d. douglasi (type host) at Scapoose, Columbia County (type locality), Oregon on May 8, 1951.
Dactylopsylla comis tacoma new subspecies

Like D.c. comis but with VIII St. male apically angulate the angle obtuse, the membranous flap large, bulbous in outline. VII St. female without undulations. Types were taken at Tacoma, Washington (type locality) off Tacoma pocket gopher (type host) on February 26, 1951.

Dactylopsylla comis walkeri new subspecies

Like D. c. comis but VIII St. male with acute apical angle, the membranous flap small and circular in outline. VII St. female with posterior squarish lobe. Types were taken at Wedderburn, Curry County, Oregon (type locality), off Thomomys m. helleri (type host) on September 18, 1949. This flea bears the name of Professor Kenneth Walker of Puget Sound College, Tacoma, Washington, long time friend of the writer.

Dactylopsylla moorei oregona new subspecies

Close to D. m. moorei from southwest Washington and separated from the range of the parent by the great Columbia River. Found in the northwest section of Oregon the new subspecies differs from D. M. moorei in that VIII St. male is narrower, the apical angle apically rounded flat, with very much smaller membranous flap and somewhat circular in outline rather than rectangular. VII St. female variable, with or without squarish posterior lobe and concave dorsal margin. Types were taken at Devils Lake, Lincoln County, Oregon (type locality) off Thomomys hesperus (type host) on September 8, 1949.

Lagurus and Amphipsylla sibirica

There appears in February on Lagurus at one location in central Washington a small number of fleas close to A. s. pollionis. The writer found one male and one female only during 1949, 1950, 1951, sorted out of hundreds of other Lagurus fleas from the same locality west of the Columbia River. Lagurus taken east of the river did not carry the flea. Since the Washington form is separated from A. s. pollionis of Alberta, Canada by two natural barriers, the Columbia River and the Rocky Mountains.
and since differences between the two have been called to the attention of the writer by Dr. Karl Jordan, he here establishes.

Amphipsylla sibirica washingtona new subspecies

Close to A.s. pollionis but with these differences: Male: Frons not so strongly curved in upper part. Spinlets on abdominal terga 3, 4, 3, 1, 1. Hind tibia on outer surface with 12 subdorsal
lateral bristles, on inner surface an oblique row of 6. VIII St. with a longitudinal row of 5 long bristles. Dorsal margin of finger and especially upper posterior angle more rounded and the two spiniforms nearer together. Apical ventral sclerite is straighter and the bulbous tip is more abruptly curved upwards. Female: Apical margin of VII St. undulate, armed with 5 major, 4 medium and 6 small bristles to the side. Types were taken at 18 miles east of Ellensburg, Washington (type locality), off Lagurus curtatus pauperrima (type host) on February 6, 1951.

The Allotype Male of Paratyploceras oregonensis Ewing

This, the mystery flea of the far West, was described by Ewing in 1940 from a single female taken off a mink at Mercer Lake, Lane County, Oregon on March 12, 1933 by H. H. Stage. The writer suspected the flea to be off Aplodontia but over a period of 40 years and hundreds of Mt. Beaver records had never taken it. On May 1, 1951, six Aplodontia r. rufa were taken by the writer at Crown Point, Oregon. Five were without fleas but the sixth carried 14 which upon examination proved to be 7 males and 7 females of P. oregonensis, the first ever seen by the writer. The pattern of the male genitalia now available; the writer places the genus between Rectofrontia and Actenophthalmus with the male suggestive of R. fraterna and A. heiseri, and is described as follows. Process large, well rounded and entire. Finger small in comparison to P., slender, apically rounded to pointed, extending to apex of P. with unusually large articulating surface with P. and armed posteriorly with several small bristles. VIII St. hooked (like regular logging dog), vertical arm with many posterior bristles. Pygidial area similar to Micropsylla. Female VII St. entire, high and undulate in outline. Spermatheca similar to R. fraterna but with more barrel shaped body. Genal teeth vary from 5 to 7 in this flea and fifth segment of tarsus II with 5 pairs of lateral plantar bristles, fifth segment of tarsus III with 6 pairs. Types bear writer's number 2800.
Olympic Mountains of Washington

For a number of years Dr. Murray Johnson, physician and surgeon of Tacoma, Washington has been the leading naturalist in the Olympic Mountains. From the many fleas sent to the writer by him the following three are now described as new.

Oropsylla arctomys eatoni new subspecies

Close to O. a. arctomys Baker but with following differences. Male: Finger narrower, proportions different; acetabular above lowest point of anterior margin of F. and posterior margin of P.; additional bristles present; VIII St. with only 3 major bristles close to apex. Female: VII St. entire, a squarish lobe in outline; spermatheca with body smaller, less rounded, tail longer. Types were taken off Marmota olympus (type host) in Olympic National Park, Washington (type locality) on August 12, 1951. This flea bears the name of Mr. Alden Eaton, late of Seattle, long time friend of the writer and victim of heart disease at 45.

Thrassis fousti new species

In the writer's opinion this flea lies midway between Th. acamantis Roths. and Th. spenceri Wag. with male genitalia being proportioned between the two, and in the female VII St. being entire and squarish. Types were taken off Marmota olympus (type host) in Olympic National Park, Washington (type locality) on August 12, 1950. This flea bears the name of Mr. Guy E. Foust, late of Sacramento, California, brother-in-law of the writer and victim of heart disease at 50.

Nearctopsylla martyoungi new species

Close to N. hyrtaci Roths. but with following differences: Male. Pronotal comb more strongly curved, spines greatest so far found in genus, totaling 39; Pronotal area from comb to base almost as wide subdorsally as the subdorsal spines are long. Bristles on abdominal tergites more numerous; tergum VII sinus extends only half so deep and at its margin there are about a dozen bristles arranged in two irregular rows; Process and
finger nearly the same; manubrium not so narrow towards the tip; posterior margin of dilated upper end of vertical arm of XI St. more evenly convex, ventral arm very much broader. The female is unknown. Dr. Karl Jordan has supplied the above differences. The holotype male (only specimen) was taken off *Scapanus townsendi* (type host) on Hurricane Ridge, Olympic National Park, Washington (type locality) on August 12, 1950. This flea bears the name of Mr. Martin Young, late of Portland, Oregon, cousin of the writer, a Marine flame thrower who in a volunteered mission to burn out a Japanese pill box accomplished the mission on the Island of Guam at the cost of his life.

Western Squirrels and *Monopsyllus*

The writer has before him two fleas of western squirrels which he considers new, the first to be called

**Monopsyllus ciliatus fasteni** new subspecies

Close to *M. c. kincaidi* Hub. but differing from it and all other ciliatus in that the VII St. female is with a broad rectangular lobe suggestive of the *M. eumolpi* complex. The male is unknown. The types were taken off a chipmunk (type host) 10 miles north of Potlatch, Latah County, Idaho (type locality) on July 22, 1945 and bear the writer's number 2506. This flea bears the name of Dr. Nathan Fasten, Seattle, Wash., major professor of the writer while at the University of Washington.

**Monopsyllus vison reeheri** new subspecies

This is the form of *M. vison* found west of the Rocky Mountains. The writer has collected it in Idaho, Washington and Oregon. The constant difference is in the VII St. female which is entire and squarish in apical outline. The types were taken at Hepner, Oregon (type locality) (western limit of type host range) off *Tamiasciurus h. richardsoni* (type host) on June 15, 1950 and bear the writer's number 2760. This flea bears the name of Mr. Max Reeher, federal entomologist at Forest Grove, long time friend of the writer.
A New **Meringis** from the Southwest

The writer has before him specimens of *Meringis arachis* Jord. from all over its range and a small series close to it but differing in the female which shall be called

**Meringis cochisei** new species

The male of the new species is similar to *M. arachis* but in the female the spermatheca is differently shaped from all described *Meringis*, being elliptical. The types were taken off Hog-nosed Skunk (true host probably *Dipodomys*, the skunk its predator) in Baboquivari Mountains, Arizona (type locality) on January 16, 1931. The flea bears the name of the famous Indian Chief Cochise who ranged through the type locality and left his name on many natural objects in Arizona.

**Nomenclature Notice**

All comments relating to the following proposals should be clearly marked with the file number and should be in the hands of Francis Hemming, Secretary, 28 Park Village East, Regent's Park, London N.W.1, England before November 11, 1954.

Details on the following are in *Bull. Zool. Nomencl.* Part 6, Vol. 9:

- **immigrans** Sturtevant 1921, as in *Drosophila immigrans*, proposed validation of (pp. 161) (File Z. N. (S.) 711).
- **pruni** Geoffroy 1762, as in *Aphis pruni*, proposed validation of (p. 163) (File Z. N. (S.) 428).
- **Lachnus** Burmeister 1835, and **Cinara** Westwood 1835, proposed designation of type species (p. 174) (File Z. N. (S.) 174).

In Part 7 of Vol. 9: **Melanargia** Meigen 1828, proposed validation of (p. 221) (File Z. N. (S.) 708).

Ratios as a Means of Specific Differentiation in Collembola

By Kenneth Christiansen, American University of Beirut

It has long been customary to use organ-length ratios as characteristics in separating Collembolan species. In the course of preparation of a forthcoming revision of the Nearctic Entomobrya, a large number of measurements were taken, transformed into ratios, and treated statistically.

In all of these ratios the overall size of the individual (less the intersegmental membrane areas) was taken as the denominator and the length of one of twenty-two different organs taken as numerator. These organs were: left antennal segments, head length, thoracic and abdominal segment lengths, manubrium, dens, left femora 1 and 3, left tibiotarsi 1 and 3, left unguies 1 and 3, and left empodial appendages 1 and 3. Following Jeannenot the ratios were considered as following a normal curve distribution and the standard deviation and error was calculated by methods essentially identical with hers. During conversations with Prof. Selim Khamis of the Economics Institute of this University, it was pointed out that this procedure was of dubious validity when dealing with ratios, and for accuracy, a special series of formulae, specifically designed for ratios should be used. Several series of data were recalculated upon this basis and the conclusion was drawn that the changes so produced either strengthened or did not materially affect the ideas exploited below.

It was found that whenever a large number of different organs were measured, a high level of significant and very significant differences were present between most species. In an attempt to better understand these results, a series of populations of Entomobrya nivalis and Entomobryoides purpurascens were measured and treated statistically. It was found that the levels of difference between many of these populations were indistinguishable from those between most species. Of the cases where the differences between species were clearly distinguishable from those between populations, all, save one, dealt with
forms so widely separated taxonomically that the ratio differences were of no real value.

A further point illuminated in this study was the relationships between the common pattern forms of *E. nivalis*, i.e., pattern A—usually called typical *E. nivalis* and pattern B—usually called *E. multifasciata*. The various populations were so divided that each population consisted solely of pattern A or pattern B. There was no correlation between the ratios and the type of pattern. The frequency of significant and very significant ratio differences between populations of *E. nivalis* was as follows: between A and B, very significant differences—7, significant differences—9; between A and A or B and B, very significant differences—7, significant differences—10.

**Conclusion**

The evidence, described above, indicates that the difference among organ-body ratios between some populations of Collembola are of such a high level as to be difficult to distinguish from those between species. This fact combined with the great changes in such ratios during growth, already exploited by Agrell¹ and Denis and Jeannenot,² make the utilization of such ratios as specific characters a doubtful taxonomic procedure. It can be argued that these cases are peculiar to the genera studied, but until a sufficient number of studies are available upon other groups, we have no basis for such an assumption.

It can also be argued that a sufficiently wide selection of specimens from different populations would also overcome these difficulties; but, this has not been customary in the past, and because of the rarity of collections, it is not possible for the huge majority of species.

**Literature Cited**

The Insect Fauna of an Iraq Oasis, The City of Baghdad


Baghdad, largest city in Iraq and existing on its present site on the Tigris River for some 1200 years, is situated centrally in the great palaearctic desert belt and is in effect a large oasis. The ancient and extensive irrigation which makes human life possible on the hot, level plains here has also permitted the presence of a far greater variety of plant and animal life than would otherwise be found. The date palm, so important in the economy of the country, forms large groves in peripheral areas and smaller groves or scattered trees occur throughout the sprawling city. Eucalyptus and citrus trees are planted extensively and Oleander (Apocynaceae-Nerium oleander) is the common hedge. Many people have rose gardens rivalling in beauty any to be found elsewhere; and it is a local custom to have well-kept and constantly irrigated gardens in which the hot evenings are spent. The mild winter climate with snow unknown and frosts uncommon permits bananas to survive occasionally in sheltered gardens.

The annual rainfall averages 134 mm. (five inches), nearly all falling in the five cool months (November-March); the remainder of the year is virtually rainless, with usual maximum temperatures over 37.8° C. (100° F.). Temperatures of 45° C. (113° F.) are common, with 43.3° C. (110° F.) the mean normal daily maximum in August when the dates ripen.

Various observers, mostly British, have recorded many species of Baghdad insects but have confined themselves mostly to their specialties and considerable gaps occur in the records of various orders due to the absence of collectors in them. The present brief survey attempts to give a general picture of the insect fauna and contains unpublished records which contribute to a filling-in of the gaps. No effort has been made to cover all of the orders. Several non-insect but related arthropods are included as an aid to picturing the fauna. Personal records are from September 1950 through August 1952.
Class **CRUSTACEA**—Order **Isopoda**

Pale sowbugs or woodlice live in the leafy trash of irrigations or under objects lying on the soil where some moisture is present. *Porcellio* and *Porcellionides* have been recorded.¹

Class **ARACHNOIDEA**—Order **Scorpionida**

Scorpions are common; some are considered dangerous. *Buthus*, *Hemiscorpius* and *Orthochirus* are recorded.² ³

Order **Scolopugida**

These strange spider-like arachnoids with "mandibles" or chelicerae operating vertically as in vertebrates may occur about lights in the evening in their search for insects but are not commonly seen. *Galeodes arabs* Koch may be the species.

Order **Araneae**

Spiders, which forage freely over the Arctic tundra and in dense high mountain forests, are equally adaptable to desert conditions though generally paler in color. White spiders were taken on Oleander and a more ordinary-colored one ran over soil, June 22, which had a surface temperature of 54° C. (129.2° F.) at the time (3:20 p.m.). Only ants and mantids could tolerate this temperature here.

Order **Acarina**

Mites are not as conspicuous elements of the soil litter as in other areas, such as Arctic tundra. They were taken as nymphs and adults on the common bat, *Pipistrellus kuhli* Kuhl, as were adult ticks (*Argas fischeri*) (det. Hoogstraal). The common dog tick, *Rhipicephalus sanguineus* (Latr.) (det. Bequaert), was taken from man, dogs and the common hedgehog (*Hemiechinus calligoni*).

Class **CHILOPODA**

No large centipedes have been noted. *Scolopendrella* and *Scutigera* types of small to medium size occur.
Class Insecta

Collembola

Collembola occur in the soil litter of irrigations but are not numerous. Dry soil litter under trees may produce a few of small size.

Thysanura

Houses for the most part appear to become too hot for Thysanura, which are also not common elsewhere. By far the commonest type noticed is small, ovate and dark with the body produced as a shield over the legs, and living in ant nests (Messor barbarus semirufa André and Cataglyphis bicolor orientalis Emery).

Diplura

A Japyx-like species occurred in the nests of the above Cataglyphis.

Odonata

Odonata are generally scarce and appear to be confined largely to the vicinity of abandoned irrigation canals containing stagnant water. Large dragon flies may occasionally be seen hawking over the gardens and were seen to take winged ants (Camponotus thoracicus xerxes Forel) from an evening marriage flight.

Orthoptera

Orthoptera probably is the most important order of insects here. Baghdad, like other oases in the Middle East, has a large and varied fauna. The major groups are:

Blattaria: Blattidae. Three roaches are common in the houses, Periplaneta americana L., Blatta orientalis L. and Polyphaga aegyptiaca L.

Mantodea: Manteidae. The mantid, Mantis religiosa L., is a large species in gardens but the most striking in adaptation to a desert life is the genus Eremiaphila. The species are short, flattened dorso-ventrally, and run actively on long legs after their prey. The legs also permit them to keep the body above the hot ground. One was seen June 22 running in a light breeze at 3:20 p.m. over soil at a surface temperature of 54° C. (129.2° F.).
Saltatoria: Acrididae. Among the locust genera are *Anacridium*, *Platypterna*, *Ochrilidia*, *Schistocerca* and *Tropidopola*. *A. aegyptium* L. resembles the migratory locust (*S. gregaria* F.) but is larger and has a generally more even color and smaller spots. Both occur sporadically in the gardens. *Sphingonotus* (*savignyi* Sauss., *satrapes* Sauss. and *carinatus* Kr.) are adapted to extreme desert conditions but occur in the city.

Saltatoria: Tettigoniidae. The katydid, *Tettigonia viridissima* L., and *Decticus albifrons* L. may range over the desert as well as the local gardens.

Saltatoria: Gryllidae. The crickets, *Gryllus burdigalensis* Latr., *desertus* Pall. and *domesticus* L., are common in gardens and *burdigalensis*, or near, may be a minor pest in houses, eating holes in fabrics. *Gryllodes sigillatus* (Walker) is a house pest for the same reason and was also captured while eating a hole in the abdomen of a common live beetle, *Oenera hispida* Forsk.

Saltatoria: Gryllotalpidae. The mole cricket, *Gryllotalpa gryllotalpa* (L.) and much smaller species frequent gardens and may come to lights.

Chopard and Uvarov,⁴ and the latter subsequently, have contributed much to a knowledge of this orthopteran fauna. Rehn⁵ has identified many of the present collection.

**Isoptera**

Dr. A. E. Emerson has kindly determined the following new records of termites, which have seldom been noted in the Middle East:

 Amitermes: *Amitermes vilis* (Hagan). The species was described nearly a century ago from alates from Iran, and the present collection offered the first opportunity to correlate the soldiers and workers with them. All castes of termites were emerging from one site April 23, 1952 at 8:30 a.m. following a heavy electric storm and shower during the night. The silty soil was left muddy and there was some standing water. They were emerging from bare holes no larger than necessary for their passage on top of a ridge bordering an irrigation canal. The few soldiers and many nymphs were milling about the exits
while the alates were hurrying out and fluttering off into the bright sunshine. As I passed through the city, more alates were noted flying at Sharjah and the Colleges of Engineering and Arts and Science shortly after 9:00 a.m. It was evident that conditions were appropriate for a general emergence. The common sparrows (Passer domesticus biblicus) were flying up and capturing them with difficulty. Where the termites were flying in the middle of the city, very few plants were available to them for woody food and they were doubtless emerging from wood beams of the predominately brick and tile buildings. This insect is, therefore, one of the most directly harmful of Baghdad species.

Amitermitinae: Microcerotermes diversus Silvestri. Termites in a date palm grove containing an understory of orange trees, and alates falling in a pool May 11, 1952.

Additional species taken elsewhere in Iraq which probably will be found in Baghdad are Anacanthotermes vagans (Hagan) from Basra, Reticulitermes, probably lucifugus (Rossi), from the Zubair desert and a new species of Microcerotermes from the desert near Baghdad.

(To be continued)

Entomological Departments

Believing such material to be of interest to its readers, ENTOMOLOGICAL NEWS herewith solicits articles similar to the one here presented and giving information on the organization and activities of entomologists in colleges, universities, museums, and in governmental and other groups.

University of Kansas

The Department of Entomology at the University of Kansas in Lawrence is one of very few separate entomological departments not a part of an agricultural school. It has, therefore, a nearly unique opportunity to emphasize non-agricultural aspects of entomology (although two courses in agricultural entomology and one in insect toxicology provide general training in these fields).

A considerable group of graduate students is currently enrolled, including individuals specializing in each of the principal entomological fields. Staff members are as follows: Ray-
mond H. Beamer (Professor and Curator of Snow Entomological Museum), Robert E. Beer (Assistant Professor), Kathleen C. Doering (Associate Professor), H. B. Hungerford (Professor), Charles D. Michener (Professor and Chairman of Department), and Robert R. Sokal (Assistant Professor).

Systematics is perhaps the field for which the Department is best known. Systematic research has been facilitated by the presence of the Snow Entomological Museum in the same building (Snow Hall) which is occupied by entomology and certain other biological departments. This Museum is financially a unit separate from the Department but because of shared personnel and close physical association it has remained philosophically close to the Department. Because of the interests of newer staff members, the collections of mites and of bees have grown particularly in recent years. The museum is, however, especially famous for its large collections of Homoptera and aquatic Hemiptera, assembled primarily through the efforts of Dr. Beamer and Dr. Hungerford. The availability of the Kansas Science Bulletin as a place of publication for the large works which so often result from systematic research has had an important influence on the growth of this type of research at the University of Kansas.

The systematic fields currently or recently investigated by staff members are as follows: aquatic Hemiptera (Hungerford); Cicadellidae and delphacine Fulgoridae (Beamer); Fulgoridae and Cercopidae (Doering); Apoidea or bees, saturniid moths, and chigger mites (Michener); Acarina or mites (Beer). Because of difficulties in their study a course on mites is offered by Dr. Beer and intensive work on these arthropods is being carried on.

Two staff members (Michener, Sokal) are particularly interested in problems and mechanisms of evolution; Michener’s principal concern in this connection has to do with systematics in relation to evolution while Sokal’s is in connection with ecology in relation to evolution, using biometry as one of the tools. Special course work provided to further understanding of evolutionary problems includes Speciation and Population Genetics, both offered in cooperation with Dr. J. A. Weir, a geneticist in the Department of Zoology, and Biometry, offered by Dr. Sokal.

The fields related to morphology receive special emphasis in course work, separate courses being given (by Doering) in external morphology, internal morphology, and insect histology. A course in insect physiology is also given.
Insect behavior and ecology receive considerable attention. Groups on which such work is going on or has been completed in recent years include sawflies and mites (Beer), aquatic hemiptera (Hungerford), and bees (Michener). Studies of the origin and development of social behavior in bees are receiving special attention from Dr. Michener and a group of graduate assistants. Much of the work being carried on by Dr. Sokal and his assistants on the origin, development, and genetics of DDT resistance in Drosophila and the housefly is behavioral in nature.

A University owned natural history reservation along the wooded bluffs of the Kaw River valley eight miles from Lawrence provides excellent opportunities for field ecological studies. A prairie area on the reservation and others near Lawrence are available for study although the region in general is hilly and wooded where not cultivated. Recent investigations by graduate students making use of the reservation include studies of the biology and ecology of chiggers, of the ecology of centipedes and millipedes, and of the arthropod ecology of mammalian nests. A resident ecologist (Dr. Henry S. Fitch) on the natural history reservation provides help on all such studies.

The applied field of entomology that receives principal attention at the University of Kansas is Medical Entomology. Because of close working relationships with the Department of Bacteriology it is possible for graduate students to undertake transmission problems requiring extensive bacteriological work. Tularemia in particular has been the subject of several such studies. Problems in the biology and systematics of medically important arthropods are also encouraged; for example, there has been a long series of studies of chiggers conducted in this Department.

Other entomological offices on the University campus are those of the Entomologist of the Kansas State Board of Health (Richard Lyness) and of the State Entomologist, Southern Division of Kansas (Michener). The field work in connection with the State Entomologist's office is carried on by L. A. Calkins throughout the year and by Dr. Beer and others in summer.—C. D. Michener.
Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian
Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1954 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol ($) . Papers published in Entomological News are not listed.


Stultz, H. T.—Tortricidae. (See Hymenoptera.)
Tanaka, Y.—(See Anatomy.) Tsuchiya, M.—(See Anatomy.)

Akesson, B.—(See Anatomy.)


Review


This work forms Volume 20 of a series dealing with the subject of inland waters. The author presents data on the biology of the Chironomidae (Tendipedidae) and Ceratopogonidae (Heleidae). These data have been gathered from many sources, many of them from his own writings and that of his associates. Among the numerous topics treated may be mentioned adaptation to environment, food habits, respiration and oxygen consumption, parthenogenesis, intersexes in relation to parasitism, parasitism, types of habitat, distribution, and the importance of the immature stages as food for fish. The numerous text figures illustrate details of structure, the graphs and tables deal with the statistics on chemical analyses, influence of temperature, counts of larvae found in fish stomachs, etc. The volume closes with a literature list of 47 pages, a checklist of the Chironomid species mentioned in the text, and a subject matter index that includes also names of the fish studied.

The author, Dr. Thienemann, for many years Director of the Hydrobiological Station at Plön, and Professor Emeritus at the University of Kiel merits thanks for placing this great summary before the limnologists, ecologists, entomologists and students of the life of inland waters.—O. A. Johannsen, Cornell University.
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.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Koenigsberg, Krs. Wetzlar 16, Germany.


Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.


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.

Wanted—Data on exact location of colonies of Epibembex (olim Bembix) (Hymenoptera), any species, any part of country, for biological studies. Howard E. Evans, Dept. Entomology, Cornell Univ., Ithaca, N. Y.

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4.—Hebard (Morgan)—The Blattidae of Panama (148 pp., 60 pls., 1920) 3.00
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8.—Rehn (James A. G. and Rehn, John W. H.)—The Eumastacinae of southern Mexico and Central America (84 pp., 6 pls., 1934) ......................... 2.50
9.—Pate (V. S. L.)—The Generic Names of the Sphecoid Wasps and their type species (103 pp., 1937) ......................................................... 2.50
10.—Huckett (H. C.)—A Revision of the North American species belonging to the genus Pegomyia (131 pp., 9 pls., 1941) ......................... 3.00
11.—Townes (Henry K., Jr.)—Catalogue and reclassification of The Nearctic Ichneumonidae (925 pp., 1944) ......................................................... 15.00
12.—Phillips (Venia Tarris)—The Biology and Identification of Trypetid Larvae (161 pp., 16 pls., 1946) ......................................................... 5.00
13.—Braun (Annette F.)—Elachistidae of North America (Microlepidoptera) (110 pp., 26 pls., 1948) ......................................................... 4.50
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THE AMERICAN ENTOMOLOGICAL SOCIETY
1900 RACE STREET, PHILADELPHIA 3, PA.
ENTOMOLOGICAL NEWS
OCTOBER 1954

Vol. LXV No. 8

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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.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act
of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in para-
graphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
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.

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

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A New Venezuelan Ambrysus (Hemiptera: Naucoridae)

By Ira La Rivers, University of Nevada, Reno

Subfamily Ambysinae Usinger, 1941
Genus Ambrysus Stal, 1862

Ambrysus maldonadus sp. nov.

*General appearance*: A rather “square” species when superficially compared with the remainder of the genus. Size 10.5–11.0 mm. long and 6.75–7.0 mm. wide. Dorsum nearly unicolorous, somewhat lighter anteriorly, yellowish brown, embolia distinctly lighter than background color along outer edges, scutellum reddish-brown. Venter, particularly abdomen, lighter yellow than back, legs bright yellow.

*Head*: Prominently punctate, shiny; comparatively broad due to shallow concavity for reception of head into anterior margin of pronotum; vertex scarcely and only broadly protuberant before eyes, a prominent tuberculation on each side adjacent to anterior eye corner. Eyes slightly elevated above general head surface; viewed from above, outer and posterior eye edges forming a smooth, uninterrupted semicircle, the thin border along the posterior surface being only suggestively angulate at juncture between the two sides. Labrum rather weakly rounded along lower edge, ratio of length-to-width 26::50 (52%), uniform in color; mouth-parts similar to head in color. Head ratios are

(197)
(1) total length to width (including eyes) 40:67 (60%)
(2) anterior distance between eyes to posterior distance 28:34 (82%)
(3) anterior distance between eyes to inner eye length 28:30 (90%)
(4) posterior distance between eyes to greatest length of head posterior to this line 34:8 (24%).

Pronotum: Punctate-glistening, generally light brownish in background color, with yellowish-white around borders; two conspicuous thin black lines each about midway between center and lateral edge of its side, the lines curved slightly outward and unattached either fore or aft; thin blackish line producing a rather wide posterior border to pronotum, with large punctures spaced along posterior border of thin black line, punctures obsolete along mid-line; lateral pronotal edges smooth, curved, curvature more pronounced at hind angle (postero-lateral angle), per cent of curvature (viewed perpendicularly to the frontal plane of section) about 18 (av. 66:12); venter dark brownish centrally and posteriorly, light yellow laterally, some pilosity along posterior edge and concentrated about median anterior keel; keel ridged its entire length, including posterior sloping face, which latter is the shortest portion of keel, ratio of anterior keel ridge to total keel length (including posterior sloping face), 55:80 (69%); prosternum fused with propleura, the point of union being nowhere a plane surface, the circular juncture at posterior sloping edge of keel being a marked depression, the juncture laterad of this being a raised keel. Pronotal ratios are

(1) width between anterior angles to width between posterior angles 65:130 (50%)
(2) median length to greatest width 47:130 (36%)
(3) distance between anterior and posterior angles on same side to perpendicular distance between anterior angle and baseline of pronotum 65:63.

Scutellum: More or less unicolorous, noticeably redder than pronotum in groundcolor with faint lightening in color laterally; ratio of three sides, anterior and two laterals, 96:70:69.
**Hemelytra:** Unicolorous deep brownish-red except for lighter areas in embolia, shiny, punctate, each puncture with a whitish spot; embolium well defined at its posterior edge in contrast to many Ambrysi in which the caudal emboliar limitations are obscure, long and narrow, length-to-width 68::20 (29%); emboliar crease pronounced anteriorly, very close to inner emboliar margin, beginning about midway and extending to anterior edge, embolium bicolored, light yellow in anterior two-thirds, reddish-brown posteriorly but without any abrupt contrast between the two. Hemelytra moderately exposing connexival lateral non-spinose edges posterior to embolia, and attaining abdominal tip. Wings functional, as long as hemelytra, and possessing a large “costal” cell.

**Venter:** The prothoracic venter has been discussed above. Emboliar venter lighter in color than thoracic venter. Connexival segments completely non-spinose, the angles of each segment being inconspicuously acute-angulate, each angle pressed closely to anterior corner of succeeding abdominal segment so as to give an almost smooth line to the general lateral contour, the slight depressions at these junctions are visible only with some moderate magnification; lateral connexival edges everywhere completely smooth under high magnification, lacking any suggestions of serration or dentation; connexival lateral curvature weak, no sudden inward dip of the edge in the shadow of the adjoining segment’s angle; both sexes lacking the hydrofuge pelt on the medial posterior three-fourths of the abdomen, the bare, glistening surface beginning at anterior edge of segment IV and expanding caudad into a long, narrow wedge including the accessory genital structures; female subgenital plate consisting of a large, conspicuous, rounded medial process flanked by small, depressed lateral angles, the medial process extending considerably caudad of the side angles (see illustration); the outline of this subgenital plate is distinctive enough to segregate this species from any other Ambrysius; male genital process absent, represented only by a rounded angle, and with two distinctive, rather elongate blackish processes lying as indicated
in the accompanying illustration. These processes are tentatively referred to as “procts.”

*Legs.* Forelegs: coxa and trochanter usual for the genus. Femora swollen somewhat more than is normal for the genus, ratio of length to greatest median width is 64:50 (78%); tibia normal, combined tibia-tarsus, when closed, slightly overlapping adjacent (proximal) end of femur.

Midlegs: coxa and trochanter usual for the genus; femora rather robust, ratio of length to greatest median width 60:15 (25%), length 2.8 mm.; tibia with usual spination for the subgenus *Ambrysus,* distal end ventrally with two prominent transverse rows of spines set across width of tibia, the terminal row set solidly across tibial apex, and composed of blunt spines unevenly decreasing in size outwardly, the secondary or proximal row not quite extending the tibial width and composed of similar blunt spines progressively and rather evenly decreasing in size outwardly, ratio of length to median ventral width 135:15 (11%), length 2.2 mm.; tarsus long, narrow, yellow. 3-segmented, first segment larger than usual although the smallest of the three segments, typically elongated beneath second segment, third segment the longest, terminating in two moderately curved claws somewhat swollen at bases.

Hindlegs: coxa and trochanter usual for the genus; femora rather robust, ratio of femoral length to median width 68:17 (25%), length 3.0 mm.; tibia essentially an enlargement of mesotibia, although comparatively more elongate, ratio of length

1 The relative proportions of these processes have not been discussed in any of my previous papers on Ambrysi, but an examination of other species of *Ambrysus* incident to describing *A. maldonadus* showed these structures to be quite varied in form in the genus. For the most part, as far as the remainder of the genus is concerned, these “procts” seem of relatively minor importance compared to the male genital processes as means of establishing species lines, but may, from the example provided by the new species, be expected to be occasionally valuable units of species measurement.

2 For a generic summation of leg structures, which are remarkably similar in general aspect for the group as a whole, see pp. 290–291 in *La Rivers,* 1951A, Univ. Cal. Publ. Ent. 8: 277–338.

to median ventral width 68::6 (9%), length 3.4 mm.; tarsus an enlargement of mesotarsus, and more conspicuously spined beneath with large, sparse bristles.

**Fig. 1.** Showing the diagnostic genitalic accessory structures of *Ambrysus maldonadus*. A. A general dorsal view of the specialized abdominal tip of the male, showing the conspicuous black "procts"; the dashed line originating at "A" terminates at the point usually bearing the male genital process. B. View of the female subgenital plate tip (venter) and an enlargement below of the smoothly rounded, non-process-bearing edge of the male. Drawn from the types. Lines indicate 1 millimeter.

**Distribution:** see types.

**Type locality data:** VENEZUELA—Territorio Amazonas: *Mount Marahuaca* (Upper Cunucurnuma River), 27(v)50, el. approx. 4,000 ft.—J. Maldonado C. (Collected during an expedition sponsored by the University of Puerto Rico.)

**Location of types and etymology:** Holotypic male and allotype in the collection of the writer, Reno, Nevada; two paratypes (male and female) in the collection of J. Maldonado Capriles, to whom the species is dedicated.

**Comparative data:** *Ambrysus maldonadus* will form an additional monotypic group, differentiated by its distinctive "procts" and especially by the structure of the accessory genitalic structures, particularly those of the female. It will segregate in the following manner from all other Ambrysi known to me:
1. Metatibia ventrally with more than 3 distal, transverse rows of spines, the terminal row longest, each row decreasing in length proximally (Subgenus Picrops) Ambyrysus usingeri.
 Metatibia ventrally with 3 or less such rows (Subgenus Ambyrysus).

2. Prosternum fused to propleura.

3. Prosternum free from propleura. (remainder of subgenus)

3. Female subgenital plate rounded at tip with a small sharp angle flanking the rounded central tip on each side; male lacking a genital process, and possessing the large, conspicuous, black "procts" (see illustrations). Ambrysus maldonadus.

Without the above combination of characters (while other Ambrysi with fused propleura-prosternum may lack the genital process in the male, the shape of the tip of the female subgenital plate is entirely distinctive in A. maldonadus, as is the prominence of the "procts")... (remaining species)

Obituary

Dr. Malcolm Burr, Fellow of the Royal Entomological Society of London and long a Corresponding Member of the American Entomological Society, distinguished author of "The Insect Legion," and also known for his comprehensive and basic studies of the Dermaptera, and of various groups of the Orthoptera, was struck and killed by a motor lorry July 13, 1954, in Istanbul, Turkey. A sketch of Dr. Burr's life and work will appear in an early number of "Entomological News."

Gift of Lepidoptera to American Museum

The J. B. Smith and G. D. Hulst Lepidoptera Collections, containing more than 32,000 specimens, including almost 6,000 species and 1,171 holotypes, has been given to the American Museum of Natural History, New York, by Rutgers University. This valuable collection of North American moths is especially noteworthy for its noctuids and geometrids.

In announcing this gift, Dr. Mont Cazier of the Museum's Department of Insects and Spiders stated that it represents an example of inter-institutional co-operation resulting in ultimate benefit to science as a whole. He credited the co-operation of Dr. Bailey B. Pepper, Chairman of the Department of Entomology at the New Jersey Agricultural Experiment Station of
Rutgers, Dr. John B. Schmitt, Associate Research Specialist in Entomology at the Station and Dr. William H. Martin, Dean of the College of Agriculture at Rutgers, with having made the acquisition of the collection possible.

Dr. J. B. Smith, who collected the noctuids, was New Jersey State Entomologist and Professor of Entomology at Rutgers University at the end of the last century. Dr. G. D. Hulst, a minister, is well-known for his work on geometrids.

At the Museum the collection will be under the supervision of Dr. Frederick H. Rindge, Associate Curator.

The Insect Fauna of an Iraq Oasis, The City of Baghdad


(Continued from p. 182)

Dermaptera

Earwigs are common, and Labidura riparia (Pall.) has been identified.6

Embioptera

Embiids of moderate size were flying from March 25 into May. Their silken runways are obscure compared with those of tropical species.

Hemiptera (Heteroptera)

Bugs (Pentatomidae: Chroantha ornatula (H.S.) and Brachynema virens (Klug) 6 heavily infested spiny plants (Alhagi maurorum Med.), one of the commonest plants of the irrigated areas.

The apparent absence of bedbugs (Cimicidae: Cimex sp.) is notable. The story told is that former and foreign rulers of Mesopotamia deliberately introduced bedbugs into the jails to prevent prisoners from enjoying a full night’s sleep. The experiment was unsuccessful and the insects are unknown. The prevalence of tile floors and high temperatures may be responsible factors.
The backswimmer bugs (Notonectidae: Anisops sardea H.-S. and varia Fieber) became numerous in a swimming pool in the latter part of the season and especially November, 1950. They disappeared with the drainage of the pool later that month, only to reappear in smaller numbers in April and the following October-November.

Hemiptera (Homoptera)

Coccids have been the object of extensive collecting by Bodenheimer. Genera with Baghdad records include Aonidiella, Aspidiotus, Asterolecanium, Aulacaspis, Coccus, Lecanium, Lepidosaphis, Mytilococcus, Parlatoria, Phoenicoccus, Pseudococcus and Salicicola. An unpublished record of Parlatoria blanchardi (Targ.) is from date palms at Dujailah April 30, 1951 (det. E. O. Essig). Common ants (Acantholepis frauenfeldi Mayr) were in attendance. Aphids were a considerable pest on Oleander and roses throughout the two winters 1950-52. Among their predators were the ant, Tapinoma nigerrimum Nyl, a minute wasp which oviposited on the aphids, and coccinellid beetles as well as the aphis-lions below.

Neuroptera

As would be expected in desert areas, the ant-lions, aphis-lions and other Neuroptera are abundant. The fauna is large, diverse and includes such striking types as Palpares and Nemoptera. Ant-lion pits in the dry soil are particularly noticeable in the spring and fall but were also seen on January 26. Aphis-lion larvae are also active in the winter.

Hymenoptera

The hymenopterous fauna is characterized by the scarcity of Chalastogastra, the relative inconspicuousness of the Terebrantia, the moderate development of Vespoidea and Apoidea and the prominence of Sphecoidea seasonally and Formicoidea at all times. Morice has listed various species from Iraq, many of which will doubtless be found in Baghdad though not specifically so recorded. Among these are mutillids, scoliads, psamnochrids, Sceliphron, Chlorion, Sphe, Cerceris, bembecines, ha-
lictids, andrenids, megachilids, eumenids, odynerids and chrysids. New records are: A large black and gold bee, Halictus holtzi Schulz (Halictidae) from *Acacia Farnesiana* Willd. flowers, the vespids, *Vespa orientalis* L., *Polistes olivaceus* Deg. (= *hebraeus* F.) and *gallicus* L. and *Eumenes campaniformis* v. *esuriens* Fabr. Some of the observations on ants have previously been published.

**Coleoptera**

The coleopterous fauna is characterized by the abundance and size of tenebrionids, the common species having the elytra fused and therefore flightless. One of the most conspicuous throughout the year is *Oenena hispida* Forsk. Along the sandy shores of the Tigris River are cicindellids such as *Cicindella melancholica* and on the open plains is the scarab, *Scarabaeus gangeticus* Castln. The hydrophilid, *Ochthebius*, depends on irrigation ditches and unidentified coccinellids are common on the Oleander hedges, preying on aphids.

**Lepidoptera**

The moths and butterflies are one of the best known groups through the efforts of Peile and others, and especially, in later years, Wiltshire. The commonest species personally observed appeared to be *Pieris rapae* L. though *Papilio machaon* L. and *Lycaena phloeas* L. were striking when flying in the gardens. The fauna is mostly palaeartic with the largest element Anatolian—Iranian.

**Diptera**

The dipterous fauna appears to be little known. A few have been identified. The most numerous and conspicuous is the housefly, *Musca domestica* L. and it and the abundant blowfly (*Calliphora vicina* R.D.) and fleshfly (*Sarcophaga (Parasarcophaga)*) occur throughout the year. Mosquitoes (*Culex pipiens* L.) are seldom an important pest though they feed in houses throughout the winter. Biting midges (Ceratopogonidae) may be locally a pest, as in May, and sandflies (*Phlebotomus*) are one of the insects of greatest medical significance, being the vec-
tor of the prevalent cutaneous Leishmaniasis (Baghdad boil). The dogfly (Hippoboscidae—*Hippobosca longipennis* Fabr.) is widely distributed as is the sheep botfly (*Oestrus ovis* L.). Horsetflies (Tabanidae: *Tabanus regularis* Jaen.) occasionally bite, as on May 19, and deerflies of the same family (*Chrysops* sp.) are rare. The syrphid (Syrphidae: *Tubifera tenax* (L.)) appears common as are asilids and other representatives of the major groups of Diptera.

**Siphonaptera**

Fleas (Pulicidae: *Ctenocephalides felis* (Bouché) and *Pulex irritans* L.) were taken from a mongoose and a nest of feral kittens in our garden was crawling with unidentified fleas. The heat and dryness, however, do not appear favorable for their general occurrence.

**Literature Cited**

12. British Museum (Natural History), 1951. Identifications in person.

Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian

Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1954 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*): if containing keys are followed by (k): papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in Entomological News are not listed.


Olson, A. L., T. H. Hubbell & H. F. Howden—The burrowing beetles of the genus Myco-


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.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Koenigsberg, Krs. Wetzlar 16, Germany.


Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.


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.

Wanted—Data on exact location of colonies of Epibembex (olim Bembix) (Hymenoptera), any species, any part of country, for biological studies. Howard E. Evans, Dept. Entomology, Cornell Univ., Ithaca, N. Y.

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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.
Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act
of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in para-
graphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
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.

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Notes on Erebia rossii Curtis (Lepidoptera: Satyridae)

BY PAUL R. EHRlich, Lawrence, Kansas

Since the publication of his paper on Erebia rossii the author has had the opportunity of examining the specimens of that species in the collection of the Carnegie Museum and of observing it in the field.

Of special interest at Carnegie was a long topotypical (paratype?) series of E. rossii kuskoquima Holland. These specimens were, on the whole, not as well marked as the sample examined by the author previously, tending more towards gabieli dos Passos. Of three males from St. Michael, Alaska, in the collection, two were typical kuskoquima, the third closer to gabieli. Three males from the mountains between 40 Mile and Mission Creeks, Alaska, were all close to kuskoquima. An interesting record was a single battered male, misidentified as "Erebia mancinus," from "Cape Thompson, Arctic Ocean." This locality is near the northwestern corner of Alaska, approx. 68° N., 166° W.

Unfortunately E. r. gabieli was described when insufficient comparative material was available. It is possible that the name may prove applicable to the populations which exist in the mountains of northern British Columbia and the southern Yukon. It is more likely, however, that when the distributional patterns of rossii are well known, gabieli will have to be relegated to the synonymy as merely representing a step in a cline.

1 Contribution no. 878 from Department of Entomology, University of Kansas, Lawrence.
Erchia rossii presents many interesting problems in distribution and subspeciation; problems which may well be solved now that the Arctic is being rapidly opened to scientific investigation. Such questions as whether the increasing forest in the Mackenzie Delta region will eventually prove to be an effective barrier to rossii, whether the Pas and Gillam records of ornata indicate that it is at least to some degree adapting itself to life in the taiga, and whether rossii populations in British Columbia and the Yukon are examples of relict endemism or of the "island hopping" type of dispersal, may be answered by ecological studies in critical areas.

Perhaps the most easily acceptable (but still extremely hypothetical) explanation of the present distribution of rossii would be that it has been dispersing, since the Wisconsinan, either from an Alaskan refugium or from Asia via the Bering Strait. The insect is now established over most of the North American tundra, with the exceptions of the northern part of the Arctic Archipelago (where the climate is probably too rigorous), Arctic Labrador and Quebec, and possibly Coats Island and Mansel Islands in northern Hudson Bay. The single Labrador record of rossii, if authentic, would indicate that it has gained a foothold in northern Labrador, having come over from southern Baffin Island.

During the summer of 1952 the author observed rossii in the field at Coral Harbour, Southampton Island, N.W.T. Although, because of pressing duties, it was not possible to make a detailed study of rossii, more than 60 individuals were collected and some cursory observations were made. The insects were common in the low, wet, Carex meadows between the ridges of high, dry tundra. They were most abundant in the larger meadows, especially in the lush vegetation around good sized lakes, but were also found in small marshy areas in the high tundra itself. The former habitat is shared principally with Colias hecla Lef.; the

3 On July 24, 1952 the author collected briefly near Cape Southampton, Coats Island, in the type of locality in which rossii was common at Coral Harbour, Southampton Island, 150 miles to the north. A short series of Colias hecla Lef. was taken, but no rossii were seen.

latter, with several species of Boloria. It is to be expected that when the life history of rossii is completely worked out, its larvae will be found to feed only on a species or a group of species of sedge which is restricted to the large wet meadows. On the warmest, stillest, brightest days, male rossii flitted weakly over the meadows in the typical satyrid manner, not rising more than a foot or so above the tundra. The females' flight was even weaker, the individuals rarely rising more than a few inches above the Carex. When disturbed, the insects would rise higher into the air and allow themselves to be carried a hundred yards or more by the omnipresent breeze.

Because of its weak flight, prevailing winds cannot be discounted as a possible major guiding agency in the dispersal and subspeciation of rossii. It is not inconceivable that in certain areas prevailing winds may even restrict gene flow along a cline to one direction, allowing mutated genes with selective advantage appearing in the "downwind" end of a cline to build up there without spreading to the other end. All of this is, of course, highly theoretical, but should, the author feels, be investigated.

Insects Reared from Lepidoptera ¹ (Hym., Dipt.)

By Ralph B. Priddy, University of Pittsburgh, Pittsburgh, Pennsylvania

The following records are based on rearing of material collected by the writer during the spring and summer of 1953 in western Pennsylvania. The writer is greatly indebted to H. K. Clench, C. F. W. Muesebeck, and C. W. Sabrosky for identifying most of the species involved.

On June 27, 1953, at Linesville, of six sphinx larvae feeding on horse gentian. Triosteum sp., three were large and nearly mature; the other three were very small but otherwise identical. All were placed in a rearing cage in the laboratory and fed leaves of Triosteum. The three large ones spun cocoons on July 1 and emerged, one on July 20 and two on July 21, as adult bumble-bee

¹ Contribution No. 10, Pymatuning Laboratory of Field Biology.
moths, *Haemorrhagia diffinis diffinis* Boisduval. The three small larvae of the same species proved to be retarded in growth due to parasitism. About July 1 were seen three light yellow, wooly cocoons formed by the parasites—one from each of the three small caterpillars. One of these cocoons was fastened to a *Triosteum* leaf directly under the shrunken body of the host larva. Another was found fastened to a leaf and the third to the net cover of the rearing cage; two of the caterpillars apparently had been able to crawl away after the parasites emerged from them. One was found dead several inches away.

The three parasite cocoons were placed in a plaster rearing chamber, and on July 4 and 6 the adults emerged by cutting a circular opening at one end of the cocoon. The one whose cocoon had been found under the body of its host emerged on the earlier date. These parasites were determined by C. F. W. Muesebeck as a species of *Apanteles* closely related to *agricola* Viereck (*Hymenoptera, Braconidae*), but apparently distinct and seemingly undescribed. Muesebeck notes further (*in litt.*) that this species is presumably the one recorded by Weed (*Entomologica Americana, 4(8): 149, 1888*) as *Apanteles limenitidis* Riley var., which was reared from the same host, but that it is really a distinct species, not a variety of *limenitidis*. No other records of parasites of *Haemorrhagia diffinis* or its races have been found by the writer.

On April 12, 1953, at South Park, Allegheny County, the writer collected several cases of the bagworm, *Thyridopteryx ephemeraeformis* Haworth, from twigs of chokecherry and kept them in a closed jar in the laboratory at room temperature. From some of these cases, on April 28 and 29, emerged five adult *Pseudogawurax anchora* (L.w.) (*Diptera, Chloropidae*). A much larger number of empty puparia was found in the cases, suggesting that most of the flies had emerged before the cases were collected. The latter also contained remains of chrysalis skins but no eggs of the bagworm, which should occur there at that season. It cannot be determined from these circumstances whether the larva of *P. anchora* is a predator of the eggs of the bagworm or merely a scavenger. The bagworm cases were
carefully examined and no indications of other insects were found in them, nor did any emerge later.

The larva of *P. anchora* has been described by some writers as parasitic or predatory on insect larvae and spider egg cases, and by others as feeding on dry chitinous material, including egg shells, cast larval skins, and chrysalis skins. It has not been recorded previously from the bagworm. Howard (U.S.D.A., Div. Ent., Bull. no. 5, Tech. Ser.: 44-45, 1897) listed *P. anchora* as a scavenger, stating that its larvae and puparia were found in old cocoons of *Hemeroaampa leucostigma* S. and A., the larvae of which had been destroyed by *Iseropus coelcbs* (Walsh). The *Pseudogaurax* larvae fed upon the dry remains of the caterpillar or were found in the dead pupae. The adults emerged in September, December, May, July, and August. Howard also cites Osten Sacken as finding *P. anchora* feeding gregariously upon the chrysalis of the cecropia moth, and Fernald as rearing it from the cocoons of the gypsy moth, *Porthetria dispar* (L.). Coquillet (U.S.D.A., Div. Ent., Bull. 10, n.s.: 70-72, 1898) reared this species from egg shells of *Corydalus cornutus* L. and noted that the larvae also fed upon larval exuviae and chrysalis skins of *Hemeroaampa leucostigma*; in the latter case adult *Pseudogaurax* issued on April 9, 17, and 18, from cocoons collected the previous September. In 1908, Kahl reared a specimen (Carnegie Mus. Acc. No. 3748) which emerged July 27 from the cocoon of a promethea moth taken July 25 at Pittsburgh, Pennsylvania. Auten (Ann. Ent. Soc. Amer., 18: 244, 1925) reared *P. anchora* from nests of the spider *Epeira cornuta*. Kaston and Jenks (Bull. Brooklyn Ent. Soc., 32: 161-165, 1937) reared four specimens from an egg sac of *Argiope aurantia*, the orange garden spider. Breland (Jour. N. Y. Ent. Soc., 48: 259-261, 1940) found it occurring in cecropia cocoons collected at Brooklyn, New York, on November 11, 1937, and March 19 and December 15, 1938. The larvae of *P. anchora* occurred within all parts of the dried tissue of the cecropia. Many were themselves heavily parasitized (up to 10 in one puparium) by a small chalcidoid, *Pleurotropis* sp. Sabrosky (in litt.) states that *P. anchora* has also been reared from egg masses of various mantids, but not, to his recollection, from bagworm cases.
Trachys pygmaea (Fab.) the Hollyhock Leaf Miner in New Jersey (Col.: Buprestidae)

By Harry B. Weiss

The genus *Trachys* was first recorded in our fauna by E. Gorton Linsley in 1948. Between June 6 and June 18 of that year Dr. Linsley collected a series of *Trachys pygmaea* (Fab.) on hollyhock leaves in Rutherford, New Jersey, and recorded his findings about this species, which is indigenous to Europe, Asia Minor and North Africa, in the Journal of the New York Entomological Society, Vol. LVI, December, 1948, p. 251. My interest in this species was revived in March, 1954, when C. A. Frost of Framingham, Mass., advised me that he had received specimens from R. H. Jackson, labeled "Montclair, N. J., July, 1953," together with information that hollyhock leaves had been damaged by larval mines and adult feeding.

Mr. L. Donald DeBlois, who has charge of the economic insect survey work in New Jersey, was asked to determine the geographical distribution of the species in the State of New Jersey, and his crew of inspectors examined hollyhock plants at 105 locations, mostly in gardens, between June 23 and June 30, 1954. They found the species at 19 places, as follows: Bergen County—Fair Lawn, Ridgewood, Hackensack, Lyndhurst, East Rutherford; Passaic County—Hawthorne, Paterson, Passaic, Clifton; Union County—Cranford; Essex County—Bloomfield, Glen Ridge, Montclair, Verona, Orange, Newark, Nutley, Belleville, Irvington. Inspections made in Hudson, Middlesex, Monmouth, Morris, Somerset, Mercer, Burlington and Camden counties were negative. The species was found to be generally distributed in an area of about 270 square miles extending from Ridgewood in the north to Cranford in the south and from Hackensack in the east to Verona in the west. At nine of the 19 localities the species was fairly abundant, either as adults or as larvae in mines.

The species apparently overwinters in the adult stage, the beetles appearing in the latter part of May. Eggs are deposited
on the uppersides of hollyhock leaves (*Althaea rosea*), and each is covered with a shining, blackish secretion which hardens into a flat circular or oval mass about 0.8 mm. long and 0.6 mm. wide with a slightly convex upper surface. Upon hatching, the larva starts mining at once and the dark secretion covering the egg remains on the leaf at the edge of the mine long after it is empty. At first the mine is circular but as the larva develops the mine becomes irregularly oval or blotch-like. Completed mines containing full grown larvae varied in size from 15 to 20 mm. long by 5 to 14 mm. wide.

During the last week of June, adults, pupae, and partly and full grown larvae were apparent. Some leaves contained from one to 25 mines varying in size from 3 mm. in diameter to completed mines containing pupae. Each mine is inhabited by a single larva and pupation occurs within the mine. In severe infestations the mines coalesce, involving most of the leaf; the entire mesophyll of the leaf is consumed leaving only the transparent upper and lower epidermis.

The full grown, legless, whitish larva, 5 mm. in length, is typically buprestid in shape, with retracted head, deeply lobed segments, with the abdominal ones becoming narrower posteriorly. The dorsal surface of the first thoracic segment is marked by a large, dark, subrectangular area. The dorsum of the second thoracic segment carries a smaller, similar dark area. The third thoracic and the first six abdominal segments are each marked dorsally with a dark, circular dot resting upon a dark, larger, oval area. The dark markings on the dorsal surfaces of the remaining abdominal segments are reductions and modifications of the others. The markings on the ventral body segments are similar in size and shape to those on the dorsal side. The pupa is about 4 mm. long and from a maximum width of 2 mm. it tapers anteriorly and posteriorly to a width of 1 mm. The larval markings show quite plainly through the transparent upper and lower leaf surfaces. The elytra of the adult are bright green or blue green, the head and pronotum brilliant cupreous, the ventral surface black with a cupreous lustre. The adults resemble *Pachyschelus* in shape and size.
Professor E. Martin Hering in his "Biology of the Leaf Miners" (Dr. W. Junk, 's-Gravenhage, Netherlands, 1951) illustrates the adult, larva and blotch mine of a related species *Trachys minuta* L., that mines the leaves of *Salix, Ulmus, Tilia* and occurs on Rosaceae and Amentiferae. Another foreign species *Trachys troglodytes* Gyllh., mines the Dipsaceae: *Succisa, Knautia* and *Scabiosa*.

It is not known how long *Trachys pygmaea* (Fab.) had been in this country before its discovery by Dr. Linsley in Rutherford, N. J., in 1948. It is not unexpected to find introduced species in the Rutherford area of New Jersey, considering the enormous amounts of nursery stock that were brought into that area from foreign countries many years ago by several large nurseries. In view of the great popularity of hollyhock (*Althaea rosea*) as a garden plant it is expected that in years to come *T. pygmaea* (Fab.) will be as widely distributed as its host. It may already occur in states adjoining New Jersey.

### The Nomenclatural Status of the Fire-Brat

Last year 1 drew attention to the fact that the fire-brat (*Thysanura, Lepismatidae*) had originally been described under the name *Lepismodes inquilinus* Newman and that this should therefore take precedence over *Thermobia domestica* (Pack.), the name at that time in common usage. However, in view of the frequency with which the latter name has appeared in the literature over the past fifty years and on account of the inadequacy of Newman's original description, application has been made to the International Commission on Zoological Nomenclature to place the name *Thermobia domestica* on the Official List of Specific names in Zoology, the names *Lepismodes inquilinus* and *Thermobia furorum* (Rovelli) on the Official Index of Rejected and Invalid Specific Names in Zoology and the name *Lepismodes* on the Official Index of Rejected Generic Names. It is suggested that whilst this matter is receiving the consideration of the Commission the name *Thermobia domestica* should be used.—M. J. Delany, Univ. of Florida, Gainesville.

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.

Disinsectization. "Disinsectization" and "disinsectize" have appeared recently upon the entomological horizon, blossoming forth in printed administrative instructions issued by the Plant Pest Control Branch of the Agricultural Research Service of the United States Department of Agriculture. These words seem strange to the eye and sound strange to the ear but it is not strange to find them coming from Washington.

Everyone, of course, has a perfect right to manufacture transitive and intransitive verbs by adding the suffix "ize" and to form nouns from verbs by adding the compound suffix "ization," and also to use the prefix "dis" to convey the meaning of undoing or reversal.

In order for something to be disinsectized it first has to be insectized, and in order for it to be disinsectized properly, there has to be a method of disinsectization. If one's property is infested by ants, it is then said to be antized. To correct this situation it should be disantized by a method of disantization. Extending the principle to ticks, we have tickize, distickize and distickization. For roaches we can have roachize, disroachize and disroachization, for grubs, grubize, disgrubize and disgrubization. The possibilities are endless.

Some of the monstrosities made by tinkering with suffixes and prefixes are not generally adopted and have a short life, but others remain in use for years. Most new verbs seem to be made by advertising men and newspaper writers. Although the past never stays put and one expects vocabularies to be constantly extended, it is hoped that such irritating words as disinsectization and others of like ilk are not the beginnings of entomological gobbledygook which we can very well do without.—Harry B. Weiss.
Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian
Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1954 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.


For records of papers on medical entomology see Review of Applied Entomology, Series B.

Note: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*): if containing keys are followed by (k): papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in Entomological News are not listed.


of Elmidae from California. [111] 30: 125–31, ill. Ciampo-
lioni, M. & C. Antonelli—Prime osservazioni biologiche sul
Temnorrhinus mendicus Gyll. nell'Italia settentrionale.
[Redia, 2d ser.] 38: 230–37, ill. Cloudsley-Thompson, J. L.
—(See Anatomy.) Cobos, A.—Revision de las Ectinogonia
Spinola, sensu strictus. Buprestidae. [Rev. Chilena Ent.] 
impeixus (Muls.) (Coleoptera, Coccinellidae), a predator of
Adelges piceae (Ratz.) (Hem., Adelgidae), with notes on
its parasites. [40] 45: 243–78, ill. Dethlefsen, E. S.—
Revisional notes on the genus Brachytarsoides Pierce (Pla-
tystomidae). 1. New North American species and subspe-
and morphology of the external genitalia of Carphophilus
obsoletus Er. (Nitidulidae). [124] 29: 45–50, ill. Edwards,
J. G.—The type of Syneta simplex subalpina Edwards.
host-selection-principle as applied to Bruchus (Calloso-
bruchus) maculatus F. [139] 38: 297–303. —The effect of
weevily-seeds on the oviposition of Bruchus (Calloso-
Hammad, S. M.—The immature stages of Metopalthal-
nus serripennis Broun (Lathridiidae). [124] 28: 133–38,
il., 1953. Helfer, J. R.—A new Hippomelas from Cali-
iles Juan Fernandez (Trechidae). [Rev. Française d'Ent.]
(Mulsant) reared from Toyon (Cerambicidae). [111] 30:
and Blethisa Bon, with remarks on Elaphrus larvae (Carab-
diae). [Lunds Univ. Årsskr.] n.f. Avd. 2. 50: no. 2, 12
pp., ill. McLeod, J. H.—Note on a staphylinid predator of
earthworms. [43] 86: 236. Martinez, A.—Nuevas es-
pecies de Oogenius Solier. Scarabaeidae. Rutelinae. [Rev.
Chilena Ent.] 3: 75–86, ill., 1953 (publ. in 1954). Olave O.,
L. E.—Buprestis nove-maculata Linnaeus en Chile. [Rev.
Chilena Ent.] 3: 74, 1953 (publ. in 1954). —Una especie
nueva Chilena de Buprestidae. Curís (Cylindrophora) iri-
Park, O.—The Pselaphidae of South Bimini Island, Ba-
hamas. British West Indies. [13] no. 1674. 25 pp., ill. (*).
Pierce, W. D.—Fossil Arthropods of California No. 19.
The Tenebrionidae-Scaurinae of the asphalt deposits.


Reviews


This book provides keys to all the insect families in the United States, with the exception of some of the beetles. Numerous line drawings illustrate the characters used in the keys and there are many habitus pictures as well, and a complete glossary. For each family there is a short paragraph, usually of a few lines to half a page or more, that tells something of the habits of the insects and of their importance.

In size and general make-up this book resembles Essig’s “College Entomology” (Macmillan, 1942). It, too, has only a short chapter of 52 pages on anatomy and metamorphosis and then concerns itself with the classification into orders and families. In addition, and not found in Professor Essig’s book, the concluding 184 pages deal with: Relations to man, control, collecting and preserving, activities and projects (electric questioners, cages, rearing, photography), and a list of experiment stations and entomological societies. Continuing the comparison, we may say that the Essig book offered more information on the various insect groups, using more text material (about 20% more per page by closer spacing of the lines) and giving less space to illustrations. In the present volume much space is wasted by illustrations that are frequently excessively large in relation to the detail they are to show, and by the way they are arranged. And if we draw our “Comstock” into the com-
parison we may then see how much entomology can really be
tacked into approximately 1000 pages!
These comparisons are intended to help describe the book,
not as a criticism. It is, evidently, a practical book for actual
use in learning the distinguishing features of the orders and
families by means of the keys and a study of the figures, rather
than merely a reference book. Especially gratifying is the fact
that all American families are said to be included in the keys,
with the exception of some of the rare or minute families of
beetles that are listed but marked as not keyed. However, there
is an orthopteran family (Eumastacidae) that has escaped men-
tion entirely. The fact that this book avoids giving too much
information not pertinent to its primary aim is in keeping with
the times, and the so prevalent student resistance to the more
fundamental or theoretical aspects of a subject.

The reviewer would not favor a beginning course in ento-
omology based mainly upon the identification of insects. In
chemistry, one begins with "general chemistry," not with qualita-
tive analysis; in zoology with a course in "general zoology." Why
not, in fairness to our science and to the student, begin
entomology with a broad, general course?—R. G. Schmieder.

BRUES, CHARLES T., AXEL L. MELANDER and FRANK M. CAR-
penter. 1954. Classification of Insects, Keys to the Living
and Extinct Families of Insects, and to the Living Families

The present edition of this widely known and useful work
differs from the preceding one only slightly, chiefly in being
longer (917 vs. 672 pages) and in containing a section devoted
to fossil insects. The format has not changed at all and the
illustrations (line drawings of key characters) are the same as
in the 1932 edition, even bearing the same numbers. However,
there are added to these about 100 figures in the keys to the
extinct orders and families.
Part I contains keys to the families of 27 orders of insects—
seven less than previously dealt with, the difference being ac-
counted for by a reduction in rank to subordinal status for the
Gryllloblatodea, Phasmatodea, Mantodea, Diploglossata, Ho-
moptera, Megaloptera and Raphidioidea. A key to the classes
of living Arthropods lists twelve, an increase of one, due to the
addition of the tongue worms (Pentatomida), here elevated
from ordinal rank. Part II, with keys to the families of ter-
Terrestrial Arthropods other than insects has changed so little that no comment is necessary.

The extinct families of insects are treated in the third, and new, part of the work which also provides a key to the extinct orders (44 listed, of which ten are considered valid). These keys are not intended for use in classifying insect fossils, but merely to indicate taxonomic differences of the forms involved and to illustrate current classification. Included in this section is a chronological list of the extinct orders, a table of the geologic periods and a conspectus of the extinct families. Each order and family has its range in time indicated in the key.

The glossary of technical terms, index to genera and higher categories, and one to common names, are retained. Following each key is a list of selected references of monographic or equivalent scope, which remains one of the most useful parts of the work. In this edition these total about 8000 entries as opposed to the 4000 and some odd previously noted.

Some criticism might be leveled by specialists disagreeing with the systematic treatment of their own groups (as, why are the Eumastacids accorded only a subfamilial rank when the Tetrignids are treated as a family? [Orthoptera]), but on the whole the treatment is logical and conservative. Less logical is the presentation of a key to the larvae of the Hymenopterous insects in which one half of the forms are separated by morphological characters while the others are split off by ethological or ecological ones, when in the latter case perfectly distinct morphological characters are known (from the works of Grandi, Richter, Reid, Soika, G. C. Wheeler, etc.). Some important omissions may be noted in the references, e.g., Muma, M. H. 1951. The Arachnid order Solpugida in the United States. Bull. Amer. Mus. Nat. Hist., 97 (2) : 35-141, from the references listed behind the key to the families of that order.

As a basic reference for students of systematic entomology the work remains unsurpassed.—Harold J. Grant, Jr.
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14.—Rehn (John W. H.)—Classification of the Blattaria as indicated by their Wings (134 pp., 13 pls., 1951) ..................................... 5.00

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**ENTOMOLOGICAL NEWS**

**DECEMBER 1954**

**Vol. LXV**

**No. 10**

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**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.

Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in paragraphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.
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.

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Ecological Notes on Three Species of Solitary Bees

By Frank P. Sivik, North Carolina State College, Raleigh

Studies on the ecology and life history of solitary bees have become important because of the vital role of these bees in the pollination of many plants (Linsley et al., 1952). Such studies, furthermore, may contribute to our understanding of the phylogeny of the group (Michener, 1953). It is the purpose of this paper to record notes on three vernal species, all of which were originally described and named by Mitchell (1936, 1937 and 1951). Both Andrena macra and Megachile rubi visit flowers of Rubus sp., and the latter also visits Cuscuta and Senecio. Megachile oenotherae usually visits Oenothera sp. but has been found on Ceanothus sp. and Pentstemon sp.

No mating of any of these three was ever seen to occur at the nesting site during the writer’s daily visits.

During rainy weather A. macra and M. rubi remained in their burrows.

Andrena macra. The adult males and females were described from specimens collected for a period of 19 years, the first being in 1935. As far as the writer knows this bee is found only in North Carolina about five miles outside of East Raleigh. The nesting site, exposed mostly to the west, is near a railroad bank and about two yards from a small pond. This bee appears to nest gregariously, and apparently the species requires a hard-packed soil in an area where water is available throughout the nesting season. A. macra makes its appearance almost simultaneously with the first flowers of Rubus sp.

The first day of flight for this bee was on April 14, 1954, with the males coming out first. They were prevalent for six days
and on the seventh and final day of their flight just a few were flying. The males preceded the females by only one day and their parasites, *Nomada* sp., by six. Six days after the males emerged, some of the females were noted entering the burrows, head first, laden with pollen. The parasites were in flight, hovering over the site, for 54 days. Neither the parasites nor the host remained outside of the burrow during the night.

The burrows were not spaced equally near each other; they appeared to be very close in some instances but not in others. They averaged 5 mm. in diameter and penetrated the clay soil as a smooth circular hole. There were many “push-ups” near the burrows but no attempt was made to measure them because of the existing terrain, which was sloping in some places.

Square yard counts of burrow entrance holes were made, using a measured square yard string. Fifty such counts were made with a total of 228 burrow holes. After digging 50 of these holes (a straw was used to indicate direction of the burrow and a post-hole digger and trowel were used for digging), the writer noted that some of the burrows were not finished and if finished (?) were not occupied. The depth of the burrows ranged from three inches to one which was three feet, the average being 18 inches. The burrows went straight down. No eggs or any of the immature stages were located.

The female cleans and excavates the tunnels. Two were observed bringing up soil particles; this process was checked for 1 1/2 hours. It took an average of 2 1/2 minutes for the bees to go down and come up with a load. They carried the soil particles under the abdomen with the hind pair of legs, while the front and mid pair furnished locomotion. As the bees backed out of the nest to the opening, the soil particles were pushed up out of the hole by means of the hind legs with the ventral surface of the abdomen serving as a guide. Usually they gave a good, final push with the tip of the abdomen, and the soil particles were out on the ground level. When this was accomplished the bee waited a second and then hurriedly continued down the cavity. Once a female bee was observed removing a pine needle, about two inches long, from its burrow and this was done in the same manner mentioned above.
Two females, in separate burrows, were noted with their heads just slightly out. With urging the bees flew off. These bees were in cell-like burrows which were about the same depth as the length of the entire body of the bee. The inside surface of the burrow was very smooth and no "push-ups" were nearby.

The type soil at the *A. macro* nesting site was worsham loam. The chemical analysis is as follows: a pH of 5.5, very low in calcium, phosphorous and potassium and contains 0.4 per cent of organic matter.

This nesting site was under observation for 19 years—how long it existed prior to this time is unknown. Unfortunately, the bee population is greatly decreasing which may be due to a weed-killer used by the railroad or by many other factors, such as predators: for example, dragon-fly adults or even birds which are very numerous in the area.

*Megachile (Xeromegachile) rubi.* A few individuals were found nesting in sandy loam, on and along an almost unused, unpaved road, about eight miles east of Raleigh, along the Neuse River. On April 29, 1954, both males and females were flying; how long they were out prior to this date is unknown. This species was first collected in 1922 and in North Carolina is found at Raleigh and at Harker's Island near Beaufort.

Two females were observed excavating nests. They removed the soil particles with their hind legs, placing the soil outside of the nest with a fast, quick, hard push, aided by the tip of the abdomen, which then patted the soil into place. The eight nests investigated showed no particular exposure, i.e., facing either north, south, east or west. All of the nests, in about a 45° slope, averaged 1 1/2 inches down from the ground level and were horizontal, 3 1/2 inches. Two of the burrows had three cells, three had two and three had only one cell; all were arranged end to end. Both the cell caps and cell walls were made from leaves of the sweet birch, *Betula lenta* L., which was in a thick growth near the site. The cell walls were roughly rectangular and appeared to be cemented together. Each cell was about 5/8 inch long and 1/4 inch in diameter, with about 8–10 pieces to the cell wall, and with about 4–5 to the cell caps. The insect egg was placed on its end, off center, on top of the pollen
mass. The larval stage was about 11 days. The full-grown larva did not completely fill the cell as in each there was about \(\frac{1}{8}\)th of the pollen remaining in the bottom of the cell. It took one day for the pre-pupa to spin the cocoon. The type soil at this site was cecil sandy loam. The chemical analysis is as follows: a pH of 5.6, medium in calcium, very low in phosphorous and potassium and contains 0.4 per cent of organic matter. No parasites were noted at this nesting area.

*Megachile (Megachiloides) oenotherae.* The first *M. oenotherae* was collected in 1922. According to Mitchell (1936), its range is from New Jersey, along the coast to Texas and Oklahoma. Two males were observed to spend the night inside the blossoms of *Oenothera fructicosa* L. A female was observed making its nest in one of the *Andrena macra* burrows, using *Oenothera* petals for the cell caps and what seemed to be the *Oenothera* leaves for the walls. This was the only one observed.

References


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.

Von Frisch on Orientation in Bees. In a recent paper ¹ entitled: "Competition between the heavens and the earth in the orientation of bees," Professor Karl von Frisch and Martin

Lindauer have added greatly to our knowledge of the means that bees use in finding their way between their feeding place and their hive. Earlier papers by von Frisch, and by his student Lindauer have been reviewed previously in the pages of Entomological News.

In this paper we learn of the use that bees make of landmarks (features of the landscape) as well as of their use of the sky-compass (position of the sun, and the direction of vibration of the polarized light from the blue sky that is dependent on the sun's position) in directing their flights.

If one trains bees to a feeding station in a certain direction from the hive, and if these bees are then moved overnight to a new and distant locality, they will, in the morning, immediately set out to search for food in the same direction and at the same distance as on the previous afternoon.

In one experiment, for example, bees were trained to anise-flavored sugar solution, 600 feet west of the hive. The locality was a narrow mountain gorge and the bees had to fly through trees and across an arm of a lake to reach the food. The hive was then moved overnight to a locality of broad meadows where a food station had been set up 600 feet west of the hive, with similar stations to the north, south and east. In the morning, on their first flight, 27 of the 29 trained and numbered bees were observed again. Of these, 20 appeared at the west station, 5 at the south, and 1 at the east station. Each bee was captured when it made its first appearance at a station, so that there was no dance communication with others. Of 12 experiments of this sort, 2 were negative, and these were on days with an overcast sky. It seems, accordingly, that in addition to sighting the sun (we already know that for bees' eyes the sun is visible through the clouds), the presence of blue sky with its polarized light is necessary. This narrows down the question to this: Is the sight of the blue sky alone sufficient, without a direct view of the sun?

One afternoon, a hive was set up on a narrow strip of lake shore, along a narrow gauge track, at the base of a mountain.

Here the hive was in the shadow of the mountain, and on their flights back and forth to the food station, in a SE direction, the bees were never out of the shadow—they never had a direct view of the sun, only of the blue sky. After one afternoon's training, the hive was moved overnight to a region of broad, open meadows. The next morning, the hive was opened and the flights of the bees to the four food stations that had been set up (in the NE, SE, NW, and SW) were observed. In overwhelming numbers the bees flew immediately to the SE, the training direction. This shows that a view of the blue sky suffices for orientation; and it also shows that although trained only during the late afternoon of one day, they were able to locate this same direction the next morning, even in a totally different landscape. Thus the bees must be able to calculate the right direction in relation to the sun (or to the polarization pattern of the sky that changes with the sun's position) for other times of the day than that for which they have been trained, and in any landscape. "Knowing then that the sun's position and the direction of vibration of the polarized light of the sky are linked together in this manner, one may imagine that the dome of the heavens must constitute a compass of convincing intensity to the comprehensive gaze of the bee's facetted eyes."

The next question taken up was: Are striking landmarks or is the sky-compass of greater significance in orientation? In a field partly enclosed by woods, a hive was set up close to a woods-field boundary, that ran straight north-south. The food station was placed ca. 600 feet south of the hive, so that the flights from hive to food were close and parallel to the woods. Moved overnight to a similar field and placed close to a woods boundary running east-west, the bees were found to disregard the original flight direction (which now would have taken them out into the open field, at right angles to the woods) and flew from the hive along the edge of the woods (which meant flying west, instead of south as in the first field).

On another afternoon, bees were trained on the shore of a lake, so that their flight closely paralleled the shore. They were
then removed overnight to another lake with a shore line running at right angles to that of the previous afternoon. Both lakes were in flat, open country, surrounded by meadows. In still another experiment, the bees and the food station were placed 600 feet apart and 3 feet from the edge of a straight stretch of country road. The next morning, the bees were tested beside a similar road but running at right angles to the first. In all these experiments it was the striking landmark that determined the orientation; bees disregarded the compass direction and followed the woods line, lake shore, or highway. Only when the training has been carried out at some distance from such a landmark does the sky-compass become the means of orientation. Apparently it is the *continuity* of the line of the lake shore, woods, etc., that so impresses the bee.

Bees were not influenced by a large tree close to their line of flight, or even by a grove of trees. When moved to a new location with a similar large tree or grove, again standing alone in a flat landscape, the bees nevertheless flew in the correct compass direction.—R. G. Schmieder.

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**NOTICE**

Beginning with the January issue 1955, *Entomological News* will no longer include the “Current Entomological Literature.” This section began with the very first issue of the *News* in January, 1890, and has constituted, over the years, one of the important services that the *News* has been happy to render its subscribers.

In recent years, the volume of papers published in entomology throughout the world has become so great that the listing of the titles is a function now performed by special bibliographic publications. This makes the work that the *News* has been doing largely a duplication, the labor and expense of which can no longer find sufficient justification. Although many subscribers have found in the “Literature” an inexpensive and convenient
way of keeping abreast of current publication, the amount of space taken up in the journal (over 40% of its text pages during 1954) is far too great for material that is of only temporary value (since all titles appear later in the Zoological Record). It is felt that ENTOMOLOGICAL NEWS can be made a more valuable publication by devoting all its available space to original articles and to news items. Contributors will then find that their shorter scientific papers will appear in print without so long a delay, and, if our readers will cooperate by sending in news of recent advances, of events as well as personals, all will be better informed as to what is going on in the entomological world.

To subscribers who have heretofore depended upon "Current Entomological Literature," we suggest the use of the following:

**BIBLIOGRAPHY OF AGRICULTURE.** Edited by the U. S. Department of Agriculture Library; for sale by the Superintendent of Documents, Washington, D. C. $8.00 per year. The part on "Entomology" lists practically everything indexed in ENTOMOLOGICAL NEWS plus references to economic entomology. Published monthly, it carries an annual index, both author and subject, in its December number which appears early in January. Available in all U. S. depository libraries and in most others of a specialized nature.

**Agricultural Index.** The H. W. Wilson Co. 950–72 University Ave., New York 52, N. Y. (Covers many entomological and biological journals and Experiment Station publications.) $12.00 per year.

**Review of Applied Entomology.** Series A, Agricultural. 40 s. per year. Series B, Medical and Veterinary. 20 s. per year, post-paid. Issued by the Commonwealth Institute of Entomology, 41 Queen's Gate, London S.W. 7, England. (These journals print abstracts.)

**Biological Abstracts.** Executive office, c/o University of Pennsylvania, 3815 Walnut Street, Philadelphia 4, Pa. The complete edition makes up a very large annual volume, and
costs $50. Each of the five sections is available separately at from $5 to $9 per section.

ZOOLOGICAL RECORD. The *Insecta* section may be purchased separately from the Commonwealth Institute of Entomology, 41 Queen’s Gate, London S.W. 7, England. The price for this section is 30 s., and it has the added advantage of appearing some months before the complete edition of the Record (for example, the section dealing principally with the literature of 1951 was published in February, 1953, while the completed volume appeared in November, 1953). The *Arachnida* section is smaller and the price is 7 s. 6 d., obtainable from the Zoological Society of London, Regent’s Park, London, N.W. 1.

Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian

Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1954 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.


For records of papers on medical entomology see Review of Applied Entomology, Series B.

Note: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol ($) .

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—Attraction of zebra males by female pupae.
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—Le venin de vipère utilisé comme nourriture par une Tinéide.
—Moth traps and their lamps: an attempt at comparative analysis.
—Some notes on Boloria in central Colorado (Nymphalidae).
[85] 8: 64–66, ill.
—Una especie nueva argentina del género Carpella (Geometridae).
—The identity of Crambidia allegheniensis (Lithosiidae).
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—Preliminary report on the relative attractiveness of different heights of light traps to moths.
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[85] 8: 67–74, ill.
—A revision of the genus Hypenodes Doubleday with descriptions of new species (Phalaenidae).
—On transporting Lepidoptera safely.
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—Some host plant records derived from rearing experiments.
—A guide to collecting the plant-boring larvae of the genus Papai-


A Book on German Dragonflies

In 1937 Miss Cynthia Longfield published a book of 220 pages, illustrated with text-figures and 38 plates, on the Dragonflies of the British Isles. A review by the late Prof. Clarence H. Kennedy, in the *Annals of the Entomological Society of America* (31: 180, June, 1938), brought this work to the attention of American students of these insects. In 1949 a second, enlarged edition of Miss Longfield’s book appeared with 256 pages; a special feature was the inclusion of 12 colored plates from original drawings, prepared by W. F. Evans for private circulation in 1845, and 4 colored plates by C. A. Hammond. Now comes a comparable publication for German dragonflies: *Die Libellen unserer Heimat*, by Hans Schiemenz, of the Zoological Museum of the Humboldt University of Berlin, Urania Verlag, Jena, 1953, 154 pages, 30 plates in colors and 31 text-figures. The contents are divided into three parts: A—General part, on dragonflies and their ancestors, structure and functions of the dragonfly's body and the life of dragonflies; B—Special part on the systematics, identification and habits of the German dragonflies; C—Practical part, on the observation, capture and preparation of dragonflies, the rearing of their larvae in aquaria and an identification table for both imagoes and larvae. There are a glossary, an (incomplete) bibliography of European Odonata from 1839, and alphabetical subject and author indexes.

Part B occupies more than a third of the book. Here each species is treated under the headings: size and coloring, distribution, biotope, flight period, pairing and oviposition, eggs, larvae, overwintering, developmental period and special mention.

The colored illustrations of the species are aquarelles by Kurt Schuster with, usually, backgrounds of appropriate vegetation or, in one case, the buildings on both sides of a city street through which an Aeschna cyanea is hunting its prey. The colors of the bodies are carefully executed, the wings are merely sketches which suggest the iridescent flutings but give no details of the all-important venation. In this respect they are inferior to the colored plates of Miss Longfield's second edition. There are, indeed, very few (4) figures of the venation throughout the book. Much information on the life, development, habits and general ecology of dragonflies is to be found in this book, some of it drawn from the author's own observations.

German, as well as the scientific, names are given for each species in order to make these insects known to wider circles. "Many people, above all the young, understandably enough, are frightened by the scientific Greek-Latin designations." Dr. E.
Straub has cooperated with the author in the selection of these German names. A few examples are Binsenjungfer for the genus Lestes, Glänzende Binsenjungfer for Lestes dryas, Gemeine Binsenjungfer for Lestes sponsa. The Aeschnidae are die Edellibellen, the genus Aeschna is the Mosaikjungfern, Aeschna grandis die Braune Mosaikjungfer, Aeschna coerulea die Alpen-Mosaikjungfer. Both Enallagma and Agrion (in the Selysian sense) are Azurjungfer, while the species names are based on the shapes of the black markings of abdominal segment 2, thus Becher-Azurjungfer for Enallagma cyathigerum. Incidentally, Calopteryx and Agrion are retained in the Selysian sense. The common names for the same species, in most cases, have not the same meaning in Miss Longfield's and Herr Schiemenz's books.

Herr Schiemenz lists 80 species for Germany, 2 of which are central European but not yet certainly recorded for Germany. Miss Longfield's total for the British Isles is 44.

No indication of price accompanies the copy of Herr Schiemenz's book which we have seen.

Philip P. Calvert


Readers of the News whose memory goes back to 1927 will recall that in that year the first of Mr. Snodgrass's essays on the structure and functions of insects and of other arthropods was noticed in our pages. From time to time others of his series were reviewed. Now the two most recent have appeared and we are glad to signalize them.


"True metamorphic characters, as here understood, are adaptive structures, temporarily assumed usually by the young insect for its own purposes, that have no phylogenetic counterpart in the adult evolution, and which are discarded at the transformation to the imago" (page 6). The term nymph is "limited to
the young of ametabolous or paurometabolous insects that in all essential respects, except those of immaturity, resemble their parents and have no important characters that obscure their likeness to the adult" (page 7). Larva is defined as "an immature post-embryonic stage that has acquired for its own use adaptive characters that its adult ancestors did not possess, or which are not carried over into its own winged instar" (page 7).

In connection with larval heteromorphosis much attention is given to parasitic larvae both with and without a planidial stage, meaning by the term planidial a stage in which the larva actively moves about "to find its host or to attach itself to a carrier which will transport it to the nest wherein are the host eggs or larvae on which it is destined to feed" (page 62).

"The reason for holometabolism, that is, for metamorphosis that involves the intervention of a pupal stage between the larva and the imago, is not to be found in the external characters of the larva. The young mayfly or the young dragonfly differ externally from their parents more than do the larvae of some endopterygote insects, but yet they transform without a pupal stage" (page 53). "The more different a larva becomes from the adult of its species, the more specialized its musculature must be, and, therefore, it is in such insects as Lepidoptera, Hymenoptera and Diptera that the greatest degree of muscle reconstruction occurs between larva and imago" (page 106). "The essence of holometabolism is the muscle transformation" (page 107).

There are slightly more than 13 pages of references at the end of the paper. Every entomologist, whatever be his special field of study, will find much to interest him in this essay.

The second of these contributions, on the dragonfly larva, emphasizes many features touched on in its predecessor. Special attention is given to the head, feeding apparatus, alimentary canal, thorax and abdomen. Some unusual points of view are expressed in the following quotations from the summary, pages 35–36. "The respiratory chamber of the intestine is probably the colon rather than the rectum. The cercoids are here regarded as true cerci. The caudal gills of zygopterous larvae are lobes of the epiproct and paraprocts. Only the thorax of the larva resembles the corresponding part of the adult; the larval head and abdomen are constructed entirely for purposes of the aquatic larva, the thorax serves equally well for both larva and adult." The final suggestion is made that "The dragonfly larva should be an interesting subject for experimental studies on the role played by hormones in metamorphosis."

Mr. Snodgrass's great ability is that of being able to stand off at a distance and view the relations of insect life which the rest of us, working in the forest, cannot see for the trees.

Philip P. Calvert
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