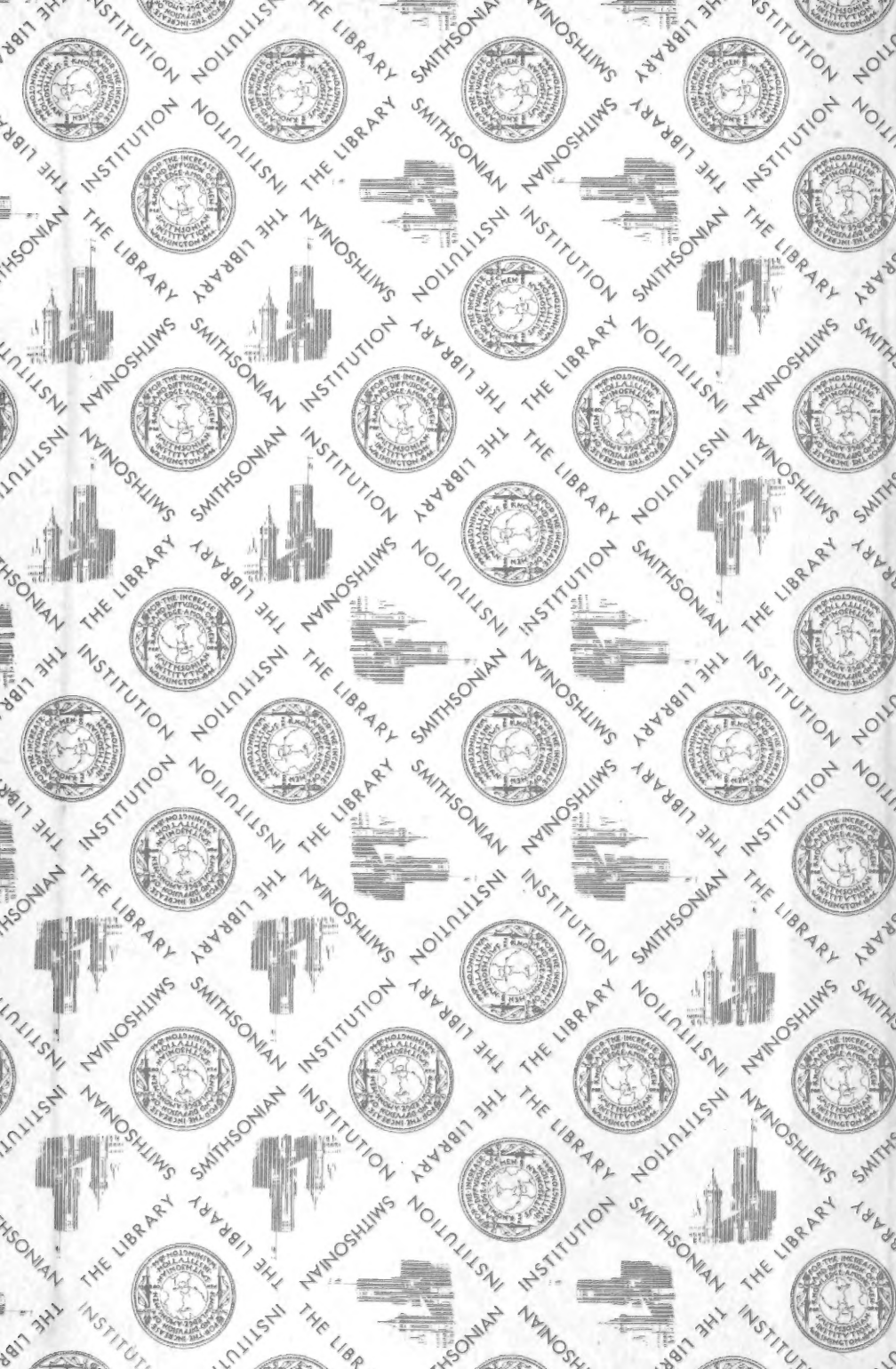
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VOLUME LXXIII, 1962

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ENTOMOLOGICAL NEWS

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Overwintering Activity of the Blowfly, Phormia regina

ROBERT C. WALLIS, The Connecticut Agricultural Experiment Station, New Haven

Blowflies are a common summertime pest in urban and suburban residential areas (1–4). In addition, evidence from recent research has established that these flies are capable of serving both as vectors and as reservoirs of enteric viruses (5–9). Recently it has been shown that the poliomyelitis virus multiplies in the blowfly, *Phormia regina,* during short periods of incubation—even following simulated "hibernation" conditions (10). Furthermore, the infection spreads throughout internal organs of *P. regina* after ingestion of the virus (11) so that the fly qualifies as a "propagative vector" rather than merely as a mechanical transmitter. Theoretically, it could provide an excellent extra-human season-to-season reservoir of the virus. However, while much is known of the physiology of *P. regina,* there is little in the literature concerning the critical part of its life history in which it overwinters in the adult stage. Therefore, a special study of overwintering activity was conducted.

PROCEDURE

In a residential area of New Haven, Connecticut, known to have a population of *P. regina,* a special study of fly activity was conducted during the period December 1, 1960, to March 31, 1961. A search for hibernation places revealed a site on the outside south wall of a two-story heated brick building where adult flies aggregated during the approach of cold weather.

Subsequently, daily observations on the activity of these flies were made until March 31, 1961. Daily weather conditions, time of emergence and duration of sunning periods were noted. When flies were disturbed or left their resting place on the wall, the sites to which they returned were noted to determine places used for hiding. Once a week throughout the winter specimens were captured for identification and determination of sex. From December 1 to March 31, the number of (1) days of sunshine at noontime, (2) cloudy days at noon, (3) days *P. regina* failed to come out of hibernation, (4) days they were active, (5) days observations were made, and (6) days no observations were made were noted. In addition, the local data from the U. S. Dept. of Commerce Weather Bureau for the month of February were studied for evidence of correlation between meteorological factors and fly behavior.

Results

Observations were made on each of 99 days during the four-month period. During this time there were 62 days that were cloudy at noon. Observations were made on 61 of these but no *P. regina* left their protected hiding places. There were 59 days with sunshine at noon, and observations made on 38 of these days revealed flies coming out and sitting in the sun. On the remaining 22 days of the period no observations were made.

Sampling of the population revealed no predominance of either sex; both male and female flies exhibited the same type of daily activity. On warm sunshiny days they came out of their seclusion and rested on a vertical brick wall only during a short mid-day period. Activity was rarely seen prior to 11:00 A.M. and was usually ended between 1:00 and 2:00 P.M.

The two factors correlated with daily fly activity throughout the four months of observations were temperature and a high percentage of the possible duration of sunshine when the low index of cloud cover occurred during the mid-day period. For example, comparing fly activity with data from the U. S. Weather Bureau for the month of February, it was found that even when the maximum temperature remained as low at 34° F,

the flies came out of hiding at mid-day if the sun was shining. On overcast days, even when the temperature was higher, there was no activity.

During the coldest months, January and February, there were 22 days with sunshine at noon that the flies were active. In January, activity was seen on 12 such days, and inactivity on 14 cloudy days. On the remaining five days, no observations were made. Activity was seen on 10 days of sunshine in February, and inactivity occurred on 15 cloudy days; for the remaining three days, no observations were made. In March, activity was seen on 10 sunshiny days, and no activity was seen on 19 cloudy days; for the remaining two days, no observations were made.

Discussion

In recent years details of the overwintering activity of blowflies have become of interest because of the role these flies may play in the ecology of enteric viruses. The question has been presented, "Can this blowfly be a host providing an extra-human reservoir for the overwinter survival of the virus in nature?" To answer this, it was not only necessary to know whether the fly overwinters in the adult stage, but also whether it becomes periodically active and can provide intervals of warmth comparable to the two-hour incubation periods that allowed virus build-up within the fly in the laboratory (10).

This is similar to the situation that occurred years ago when the housefly, *Musca domestica,* still outranked the blowfly as a household pest, and its significance in disease transmission was under discussion. Although there was a great deal of controversy among entomologists, the story was summed up in 1915 by Hewitt (12). He outlined three categories of overwintering activity: (1) Dormant—in cold northerly latitudes where the adult fly remained inactive in protected hiding places; (2) Periodically active—in more temperate latitudes periods of increased temperature resulted in adult fly activity at times when they would usually be dormant; and (3) Permanently active—in southerly areas where warm weather permitted adult fly activity the year around.

Hewitt's conclusions about *M. domestica* are applicable to the overwintering of the blowfly *P. regina* in that it is quite likely that investigators in different latitudes can observe blowflies in any of the three stages of adult overwintering activity. In southern communities where there is year around warm weather and breeding medium available, year around activity and breeding of the flies may generally occur. However, in more northerly temperate and north temperate climatic regions, the classification of intermittent adult activity most nearly fits the blowfly. This was observed in New Haven, Conn., during the coldest winter period in recent years. Since both males and females were present and periodically emerged from winter hiding places to bask in the sun, the term "hibernation" as pointed out by Hewitt, is really not applicable. Rather, the term "overwintering activity" is recommended for the cyclic adult activity exhibited during the winter months by *P. regina.*

Summary

During an unusually cold winter season in New Haven, Conn., the overwintering activity of the blowfly *Phormia regina* was studied from December 1, 1960, to March 31, 1961. With the onset of cold weather the adult flies retreated to protected hiding places and emerged for brief mid-day periods regularly throughout the winter months. Daily activity occurred independently of air temperature (U. S. Weather Bureau recording) above 35° F; it correlated with days that sunshine occurred during the mid-day period. The flies remained in hiding on cloudy days even when air temperatures were above 40° F. This cyclic activity of the overwintering fly could not be truly called a winter "hibernation" and deserves more elucidation since recent studies involve the blowfly in the ecology of enteric viruses.

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Records of the Larvae of Epiophlebia laidlawi Tillyard from the Darjeeling Area (Odonata: Anisozygoptera)

Arthur Svihla, Ford Foundation; University of Florida—University of Mandalay Program, Mandalay, Burma

The sub-order Anisozygoptera has but two living representatives, the Japanese *Epiophlebia superstes,* and the Himalayan *E. laidlawi.* A single larva of *E. laidlawi* was described in 1921, but the adult remains unknown. In spite of searching

(1), the larva was not found again until Asahina obtained it in 1958. Then, in October, 1960, at the site described by Dr. Asahina, five more larvae were collected (2).

In the latter part of March and the first part of April, 1961, four days were spent in the Darjeeling area with the express object of searching as many streams as possible for specimens and if possible collecting the as yet unknown imago.

The stream where specimens had been obtained during the previous October was revisited. In the interim, however, the spot had been used as a crematorium as evidenced by the prayer flags suspended over the stream, the remains of a funeral pyre on the shore, as well as the presence of charcoal and human bone fragments among the rocks in the stream. No specimens were found in the stream below the funeral pyre perhaps because of the contamination mentioned as well as to the resulting rise in water temperature. However, above the site and above the waterfall mentioned in the previous account (2), larvae were found and collected, showing their continued presence in this stream.

On April 1, 1961, in a stream two miles above Sonada numerous larvae were found. This stream is at an elevation of approximately 6,000 feet, at marker number 440 on the Siliguri-Darjeeling Railroad, and is the stream that yielded the greatest number of larvae. The population can be roughly estimated from the fact that in one small riffle 25 larvae ranging in size from $\frac{1}{4}$ inch up to $1\frac{1}{2}$ inches, which is the size of the ultimate instar, were collected. In other sections of the same stream the larvae were almost as numerous, in fact it soon became monotonous to collect so many for there must have been hundreds in this stream alone.

Although larvae were found in other streams such as the one at marker 440A, and the one at marker 460, they were not as numerous as in the stream at marker 440. Larvae were also found in the stream in the immediate vicinity of Sonada but the streams around Kurseong yielded none.

A search for the imagoes as well as exuviae was also made but none was found. The season at this time of the year,

March–April, is apparently too early for the appearance of the adults of this species. No odonata of any species were seen in this area, in fact, very few insects of any kind were in evidence. The months of June–July may prove a better season for obtaining the adults of *Epiophlebia laidlawi,* which still remain unknown.

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A Pictorial Review of the North American Chipmunk Fleas. Part II, Monopsyllus ciliatus (Baker) with Five Subspecies [1]

C. Andresen Hubbard, Tigard 23, Oregon

It is probably the treeless Great Plains of the United States that form the natural barrier between the ranges of the western chipmunks of the genus *Eutamias* and the eastern chipmunks of the genus *Tamias.* The remainder of the fleas to be discussed in this series of papers likewise fail to cross this almost treeless area.

Chronology: For the Western Chipmunks

On the 7th day of June, 1900, Mr. Edward Erhorn collecting in the small county of Santa Cruz, California, south and west of San Francisco Bay, secured a chipmunk from which he removed at least two fleas, a male and a female. These were given to Carl F. Baker at Stanford University.

[1] This is the sixth paper by the author while working under National Science Foundation grant 14023. Any correspondence regarding it should be addressed to B. E. A. Malaria Institute, Amani, Tanga, Tanganyika, Africa, where the writer is studying the fleas of British East Africa and their hosts under the Fulbright program and N. S. F.

At about the time of Erhorn's collection but far to the north around Red Deer, Alberta, Canada, G. F. Dippie collecting for N. Charles Rothschild of Tring, Herts, England, took a series of fleas off red squirrel (*T. r. baileyi*). The specimens are dated 20 August 1900. But Dippie had been busy the previous year at Banff, Alberta, and here on July 22 and August 8, 1899, took the same flea off the chipmunk *E. m. borealis*. On 3 May 1902, W. Wenmann, also working for Rothschild, collected this flea to the west at Hospital Creek, north of Golden, British Columbia, Canada.

During May of 1936 while working about Seven Oaks, San Bernardino County, in southern California Glenn Kohls of the Rocky Mountain Laboratory removed two female fleas from a silver gray squirrel which he sent to the late Dr. Karl Jordan.

Gus Augustson, now of Madera, California, working high in the Sierra Nevada Mountains in Cascade Valley, eastern Fresno County, California, removed a series of fleas from the Inyo chipmunk on August 27, 1941.

Betty S. Davis collecting 5 miles west of El Salto, Durango, Mexico, on July 8, 1951, removed a series of fleas off a chipmunk which eventually reached Traub and Johnson.

These five collections represent the five species of chipmunk fleas found today in the West for Baker's fleas became *ciliatus* (Part Two of this series), Rothschild's became *cumolpi* (Part One of this series, p. 253, ENTOMOLOGICAL NEWS, Vol. 60, No. 10. Reprints still available), Jordan's became *fornacis,* Augustson's *eutamiadis* and Traub and Johnson's *polumus* (Part Three of present series).

For the Eastern Chipmunks

By September 20th, 1899, Dippie had crossed Canada and at Branchtown, Ontario, took a small series of fleas off the chipmunk *Tamias striata.* These were sent to Rothschild and became *Tamiophila grandis* in 1902, to be the first of the described American chipmunk fleas.

From an undisclosed locality in eastern Canada, Jordan in

1925, described a female flea off *Tamias striatus* as *Ceratophyllus acerbus* and from the same host taken in the Adirondack Mountains of New York described the male in 1929. Today this flea is *Monopsyllus acerbus*. The writer's "English Duo," Jordan and Rothschild, now both deceased, those wizards and pioneers of siphonaptery are, then, responsible for the descriptions of the two eastern chipmunk fleas (Part Four of present series).

Monopsyllus ciliatus (Baker)

1904 *Ceratophyllus ciliatus* Baker, *Proc. U. S. Nat. Mus. 27*: 397.

This, the parent species, of what in this paper involves 5 subspecies, has the following pattern and characteristics in the modified segments.

Modified Segments: Male. The finger F is roughly boot-shaped. The writer prefers to liken the finger to a man's leg and foot, that portion of the leg from just above the knee joint and with immovable knee. This gives a toe position for the two black spiniforms; heel and instep positions, more or less; the stout posterior bristle at knee position, above or below; anterior angle (spur), more or less, above or below the midpoint. The process P is apically broad or narrow.

Female. The outline of the VII sternite always looks like the side view of the heads of the statues on Easter Island. There is the chin, more or less as the lower lobe; the mouth, shallow or deep, as the sinus; the nose, more or less as the upper lobe; the forehead as the upper angle. The body of the spermatheca varies from top-shape, with a flattened side, to ball-shaped; its tail is finger like, with crook.

As one views the five subspecies here considered, side by side, it is evident that the face of the modified segments towards the investigator gradually diminishes in surface from one end of the series to the other. This review is arranged according to the amount of surface of the modified segment in the subspecies under consideration. In the series of 5 here represented, the one with the greatest expanse of modified segment is

Monopsyllus ciliatus protinus (Jordan) 1929
1929 *Ceratophyllus ciliatus protinus* Jordan, *Nov. Zool.* 35 : 34.

This is the most common subspecies of *ciliatus* found in collections. It is always generously represented. Those from which Jordan described it were from Sumus, British Columbia, off Cooper's chipmunk collected by Allan Brooks.

Modified Segments: Male. The finger was described by Jordan as being "always strongly dilated posticad." Actually this subspecies has the most boot- or foot-shaped finger of the series. At toe position are the two black spiniforms. The heel is not too pronounced. The heavy bristle on the posterior border of the finger is comparatively low. The spur on the anterior border is feeble. Process P is prominent, broad and flat apically and armed with the usual small bristles.

Female. Apical outline of VII sternite with lower lobe chin-like, prominent; sinus shallow, mouth-like; upper lobe extending slightly beyond lower lobe, nose-like. Spermatheca body top-shaped with one side slightly flattened; appendix (tail) finger-shaped and crooked.

Length: Male 2.50 mm, Female 2.75 mm.

Range: Cascade Mountains and favorable spurs into the Great Basin, west to the Pacific Ocean; Alaska south into Northern California.

Deposites: Type specimens are in the collection of the British Museum housed in the Zoological Museum, Tring, Herts, England.

Records: There are numerous records for this flea in all collections. It would be impossible to record them all. Insofar as chipmunks are in and out of every nook and cranny, in every burrow and up every bush and tree it is the accidental occurrence of these fleas upon other animals that makes the records interesting. The writer has this flea off martin, skunk and weasel as predators, off rabbits, conies, mountain beavers, wood rats, meadow mice, deer mice, pocket gophers, all these as strays; flying squirrels, silver gray squirrels, pine squirrels and chipmunks.

Preferred host: Holland in his Fleas of Canada, 1949, states that he believes this flea to prefer pine squirrels as hosts, but the writer is inclined to believe that the true hosts of the flea are the western chipmunks of the *townsendi* group.

Monopsyllus ciliatus mononis (Jordan) 1929

1929 *Ceratophyllus ciliatus mononis* Jordan, *Nov. Zool.* 35: 34.

This subspecies was described from materials taken off *Eutamias frater* (chipmunk) and its predator *Mustela arizonensis* (weasel) by A. B. Howell at Pine City, Mono County, California, during August of 1922. This subspecies, like the preceding, is well represented in most collections.

Modified Segments: Male. The finger F is more foot-shaped than boot-shaped. It is expanded apically about the same as in the preceding but is perhaps not so thick through the instep region. The heavy bristle on the posterior border is about halfway along it. The spur on the anterior border is the most prominent of the series and is about midway along the border, about even with the apex of the process. The process P is the most slender of the series. Apically it is only slightly rounded. It is armed with the usual small bristles.

Female. According to Jordan the apical outline of the VII sternite consists of an upper lobe much broader than the lower, its apex rounded and oblique lower margin once feebly incurved; lower lobe subtriangular in lateral aspect, its dorsal margin rounded. The writer would simply say, a feeble upper and lower lobe separated by a wide sinus not too deep. The spermatheca is midway between a top-shape and a ball-shape in body, with tail finger-like and slightly crooked.

Length: Males and females from 2.50 to 3.00 mm.

Range: This is from the southwestern part of the United States, and is found throughout the Sierra Nevada Mountains, then eastwards across the Colorado River into the southeastern portion of Arizona whence the Rocky Mountain Laboratory has specimens, which are typical, from the Chiricahua Mountains.

Deposits: Type specimens are in the collection of the British Museum.

Records: The many records in the various collections are off chipmunks, pine squirrels and silver gray squirrels. The term "Rock Squirrel" is on the slides from the Chiricahua Mountains.

Preferred Host: It seems likely that this flea prefers the chipmunks of the Sierra Nevada Mountains. Most specimens examined are so labeled.

Medical Importance: The writer is informed that the specimens of *M. ciliatus* with which the Plague Laboratory of the Public Health Service in San Francisco experimented were taken at Steamboat Springs, Nevada, a few miles south of Reno. The writer has taken the flea a few miles west of Steamboat Springs at Incline Creek (Lake Tahoe) and there is no doubt that the flea is *M. c. mononis*. Eskey and Haas of the Plague Laboratory reported in 1940 that 9 out of 35 specimens of the flea were experimentally infected with plague but that none of the 9 transmitted the disease to healthy guinea pigs.

Monopsyllus ciliatus ciliatus (Baker) 1904

1904 *Cetratophyllus ciliatus* Baker, *Proc. U. S. Nat. Mus. 27*: 397.

This is the first of the *ciliatus* to be described. It has the least amount of expansion in the apex of the finger. It is also a rarity and a collector's item in flea collections. This is the flea which Mr. Edward Erhorn collected off a chipmunk on the 7th day of June, 1900, in Santa Cruz County, California. It lays down the pattern of the boot-shaped finger in the male and the profile face-shape in the VII sternite of the female. The writer carefully studied the types through the courtesy of the U. S. National Museum. Through the years the type slides have been pretty badly mauled. In the female a break directly through the VII sternite makes reconstruction almost necessary. The writer has almost 100 camera lucida sketches of the types. From these he offers:

Modified Segments: Male. Finger F not well expanded at apex. Toe not too long; with the usual 2 black spiniforms. Heel sharp but not too prominent. Anterior angle, slight and at about apex of process. Posterior bristle low, below midpoint

of border. Process P broad, dome-shaped and armed with the usual small bristles.

Female. VII sternite resembles profile of face with chin and goatee. Or, lower lobe prominent, like a chin with goatee; sinus as a shallow mouth; upper lobe, pointed as a nose and not jutting out much beyond the lower lobe, if at all. The spermatheca is typically top-shaped with one side flattened in body, the tail finger-like and slightly crooked.

Length: The original lengths given by Baker were: male, 2.30 mm, female, 2.50 mm.

Range: This flea has a very limited range and is found in a small area south of San Francisco Bay and from the Bay to the north perhaps as far as Russian River in California.

Deposits: The types bearing the number 6906 U.S.N.M. are in the United States National Museum.

Specimens Examined: The writer has been able to find only 6 specimens of this flea in collections. All were in his hands during this study, including the type pair collected by Erhorn in 1900. Not too far from where the types were collected Frank Prince of the Plague Laboratory, San Francisco, took a male of this flea off a chipmunk (*E. sonomae pricei*) 5 miles west of Mt. View, Santa Clara County, during March of 1943, and a female off a gray squirrel (*S. griseus griseus*) 12 miles southwest of Saratoga, Santa Cruz County, on June 11, 1949. Dr. G. F. Ferris of Stanford University working to the north in Marin County removed 2 females of this flea from a chipmunk (*E. sonomae alleni*) taken near Inverness during 1947. All of these, the writer decided were quite typical.

Monopsyllus citiatus kincaidi Hubbard 1947

1947 *Monopsyllus ciliatus kincaidi* Hubbard, *Fleas of West. N. Amer.* 232.

In this the fourth of the subspecies, the finger F looks short and squat because of the large expansion at the apex. The VII sternite of the female has an upper lobe like a long nose. The flea was described off chipmunks (*E. a. luteiventris*) from the Wallowa Mountains of northeastern Oregon.

Modified Segments: Male. The finger F is greatly expanded at the apex, in fact, the most expanded of the series. Toe and heel areas are equally expanded and generous. This large expansion at the apex makes the finger look short and squat. Actually it may be only slightly shorter than the foregoing subspecies. Spur on anterior margin absent, stout bristle on posterior border below the midpoint. Process P broad, apically rounded and armed with the usual small bristles.

Female. Apical outline of VII sternite with lower lobe almost missing, upper lobe long, nose-like. Spermatheca is almost ball-shaped, with an appendage that is finger-like and crooked.

Length: Males and females 2.50 mm.

Range: This flea is probably found throughout the Rocky Mountains north of Grand Canyon, Arizona, south of the Canadian Border and west into northeast Oregon and extreme eastern Washington.

Deposits: The types, on a single slide bearing the describer's number 2530 and dated July 30, 1945, are in the U. S. National Museum.

Specimens Examined: The collection of the Rocky Mountain Laboratory has a series of this flea from all over Montana and Idaho, all of which have been studied by the writer. There are also specimens from Utah. While the records show these fleas off chipmunks, usually the fleas can also be taken off pine squirrels.

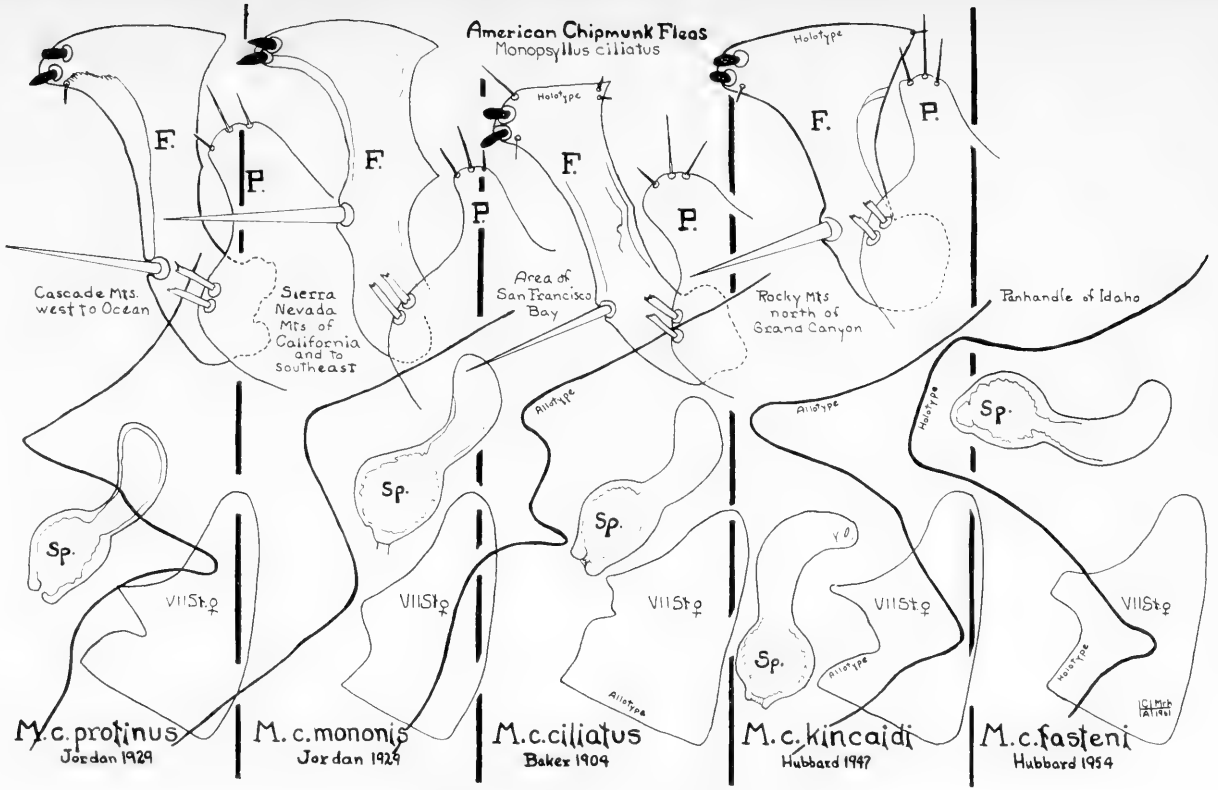
Preferred Host: The writer believes these fleas prefer various of the Rocky Mountain chipmunks as normal hosts but are just as likely to be found on pine squirrels and the predators of both.

Monopsyllus ciliatus fasteni Hubbard 1954

1954 *Monopsyllus ciliatus fasteni* Hubbard, *Ent. News* 65: 174.

In this, the fifth of the subspecies of *ciliatus,* the male is as yet undescribed. Coming as it does from the north portion of the range of *M. c. kincaidi* it seems likely that the male will be of the pattern of *kincaidi.*

This subspecies was described from 2 females taken off a chip-



Five subspecies of *Monopsyllus ciliatus* (Baker).

munk in the panhandle of Idaho. It has the most pronounced upper lobe in the VII sternite outline of the series.

Modified Segments: Female. Apical outline of VII sternite without apparent lower lobe, the upper lobe broadest of the series, being broad and rectangular. The spermatheca seems to be midway between *kincaidi* and *ciliatus* in shape.

Length: Female 2.50 mm.

Range: The range is not definitely known but it seems that the flea is probably limited to the panhandle of Idaho and adjacent eastern Washington.

Deposits: The type bearing the describer's number 2506 and dated July 22, 1945, is in the U. S. National Museum. The host was chipmunk, the locality Potlatch (10 miles north), Latah County, Idaho.

Specimens Examined: Only the type specimens are known.

Preferred Host: Probably the chipmunk is normal host.

Key to Subspecies of Monopsyllus ciliatus by Range

1. San Francisco Bay Region of California.....*ciliatus*
2. Cascade Mountains to Pacific Ocean.....*protinus*
3. Sierra Nevada Mountains and southeast.....*mononis*
4. Rocky Mountains north of Grand Canyon.....*kincaidi*
5. Panhandle of Idaho, eastern Washington.....*fasteni*

Conclusions: As was the case in *Monopsyllus eumolpi,* the writer feels that as new isolated areas are found and studied new differences will appear, and new subspecies of *Monopsyllus ciliatus.* At the moment only the above five have been recorded.

The Collembola of New Mexico. VI. Isotominae: Guthriella, Proisotoma, Isotomurus [1, 2]

HAROLD GEORGE SCOTT [3]

Eleven species of springtail insects are recorded in this part. Two have been reported previously from New Mexico: *Proisotoma frisoni* (by Scott, 1958), and *Isotomurus retardatus* (by Folsom, 1937). Specimens will be deposited with the Academy of Natural Sciences, Philadelphia, Pennsylvania.

Genus **GUTHRIELLA** Borner, 1906

KEY TO THE SPECIES OF GUTHRIELLA

NOTE. All three known species of *Guthriella* are Nearctic.

1. Furcula reaching collophore.....**muskegis** (Guthrie, 1903)
   Furcula not reaching collophore.....2
2. Tenent hairs present.....**vetusta** Folsom, 1937
   Tenent hairs absent.....**antiqua** Folsom, 1937

Guthriella vetusta Folsom, 1937

NEW MEXICO RECORD. Berlese sample of oak litter, 7,400 ft., Sandia Mts., Bernalillo Co., 29–v–1951.

DISTRIBUTION. Calif., N. M.

Genus **PROISOTOMA** Borner, 1901

KEY TO SPECIES OF NEARCTIC PROISOTOMA

1. Manubrium naked ventrally.....2
   Manubrium setate ventrally 6
2. Dentes smooth dorsally.....3
   Dentes lobed dorsally.....4
3. Tenent hairs present.....**ewingi** Folsom, 1937
   Tenent hairs absent.....**schotti** (Dalla Torre, 1895)

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

[2] Part V appeared in Ent. News, 72(10) : 261–67.

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

4. Abd III subsegmented.....**subsegmenta** Scott, 1959
   Abd III not subsegmented.....5
5. Abd IV more than twice as long as III.....
   .....**excavata** Folsom, 1937
   Abd IV less than twice as long as III.....
   .....**laticauda** Folsom, 1937
6. Abd III subequal to or slightly longer than IV.....7
   Abd III shorter than IV.....12
7. Dentes shorter than manubrium.....9
   Dentes subequal to or longer than manubrium.....8
8. Dentes subequal to or slightly longer than manubrium.....
   .....**schafferi** (Krausbauer, 1898)
   Dentes definitely longer than manubrium.....10
9. Eyes 8 and 8.....**laguna** Folsom, 1937
   Eyes 5 and 5.....**minima** (Absolon, 1901)
10. Abd III and IV subequal in length.....11
    Abd III longer than IV...**communa** (MacGillivray, 1896)
11. Abd V and VI ankylosed.....28
    Abd V and VI not ankylosed.....**rainieri** Folsom, 1937
12. Mucro 1-toothed.....21
    Mucro 2- or 3-toothed.....13
13. Dentes with 10 or fewer coarse dorsal folds.....15
    Dentes with 15–20 coarse dorsal folds.....14
14. Furcula not quite reaching collophore..**titusi** Folsom, 1937
    Furcula reaching collophore.....
    .....**longispina** (MacGillivray, 1983)
15. Dens with lateral subapical bladder.....16
    Dens without lateral subapical bladder.....17
16. Mucro 3-toothed.....**vesiculata** Folsom, 1937
    Mucro 4-toothed.....**bulbosa** Folsom, 1937
17. Dentes rounded apically.....18
    Dentes not rounded apically.....19
18. Manubrium longer than dentes.....
    .....**brevipenna** (MacGillivray, 1896)
    Manubrium shorter than dentes.....
    .....**obsoleta** (MacGillivray, 1896)
19. Eyes present.....20
    Eyes absent.....**frisoni** Folsom, 1937
20. Eyes 8 and 8.....**minuta** (Tullberg, 1871)
    Eyes 5 and 5 or 4 and 4.....**sepulcralis** (Folsom, 1902)
21. Furcula reaching collophore.....**immersa** (Folsom, 1924)
    Furcula not reaching collophore.....22

22. Manubrium with one or two pairs of ventral subapical setae 23
Manubrium with three pairs of ventral subapical setae ..... **tenella** (Reuter, 1895)
23. Eyes 8 and 8 24
Eyes 5 and 5 ..... **decemoculata** Folsom, 1937
24. Unguis with inner tooth 25
Unguis without inner tooth 26
25. One tenent hair ..... **tenelloides** Folsom, 1937
No tenent hairs ..... **aquae** (Bacon, 1914)
26. Manubrium three-fifths length of dentes 27
Manubrium less than one-half length of dentes ..... **cognata** Folsom, 1937
27. Ocelli subequal in size ..... **thermophila** (Axelson, 1907)
Ocelli unequal in size (median ocelli distinctly smaller) ..... **constricta** Folsom, 1937
28. Eyes 5 and 5 ..... **similis** James, 1933
Eyes 4 and 4 ..... **hoffi** sp. nov.

Proisotoma aquae (Bacon, 1914)

New Mexico Records. Two Berlese samples of Gambel oak and walnut litter, 6,900 to 7,600 ft., Rio Arriba and Socorro Co., July–Sept., 1952–1954.

Distribution. Calif., N. M., Utah.

Proisotoma brevipenna (MacGillivray, 1896)

New Mexico Record. Field Berlese sample of rotten cottonwood stump, 4,100 ft., Dona Ana Co., 27–xi–1949.

Distribution. N. M., Ohio.

Proisotoma communa (MacGillivray, 1896)

New Mexico Record. Berlese sample of aspen-fir litter, 10,600 ft., Sandia Mts., Bernalillo Co., 22–ix–1951.

Distribution. N. M., Ohio.

Proisotoma constricta Folsom, 1937

New Mexico Record. Berlese sample of walnut litter, 6,900 ft., Water Canyon, Socorro Co., 10–vii–1954.

Distribution. Fla., N. M.

Proisotoma frisoni Folsom, 1937

Discussion. The New Mexico specimens have only 2 mucronal teeth. Folsom (1937, p. 55) specified "mucro tridentate." Since in all other respects the New Mexico specimens agree with Folsom's description, I am assigning them to this species.

New Mexico Record. Berlese sample of mixed aspen-fir litter, 9,700 ft., Rio Arriba Co., 13–viii–1953.

Distribution. Ga., Ill., N. M.

Proisotoma hoffi sp. nov. Figure 1

Type Locality. Holotype and nine paratypes from Nogal Canyon, near Nogal, Lincoln Co., New Mexico. The type specimens were taken from a Berlese sample of oak litter, 7,200 ft., date unknown. Specimens will be deposited with the Academy of Natural Sciences, Philadelphia, Pennsylvania.

Description. Body elongate, not subglobose; segmentation distinct, last 2 abdominal segments ankylosed, suture between Abd IV and V weak; integument smooth; light yellow with brown markings, intersegmental areas lighter; clothing of short setae, a few longer setae on abdomen; head prognathous; ratio of antenna to head 6:5; ratio of antennal segments 7:11:11:20; postantennal organs of the simple isotomine type; eyes 4 and 4, each ocellus with its own dark spot; mouthparts chewing; ratio of body segments 4:14:12/9:10:9:20; tibiotarsus with distal subsegment; claws not tunicate; ratio of unguiculus to unguis 3:7; tenent hairs absent; unguiculus and unguis without teeth; furcula without ankylosis; furcula reaching Abd III; ratio of manubrium to dens to mucro as 20:17:5; dental spines absent; dentes dorsally crenulate; mucro with 1 tooth, non-lamellate; anus ventro-terminal; anal spines absent; length 0.9 mm.

Discussion. The eye number, antennal ratios and body ratio clearly distinguish this species from all other members of the genus.

It is with great pleasure that I name this species for Dr. C.

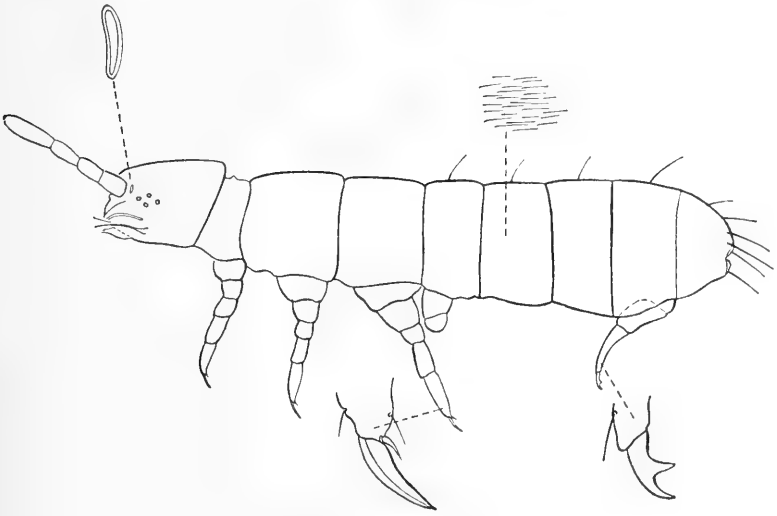


FIG. 1. *Proisotoma hoffi* sp. nov.

Clayton Hoff, Department of Biology, University of New Mexico, whose diligent collecting made this study possible.

DISTRIBUTION. N. M.

Proisotoma immersa (Folsom, 1924)

NEW MEXICO RECORDS. Two Berlese samples of oak litter, 7,600 to 8,700 ft., Bernalillo and Rio Arriba Co., Sept., 1952.

DISTRIBUTION. N. M., N. Y.

Proisotoma sepulcralis (Folsom, 1902)

NEW MEXICO RECORDS. Two Berlese samples of juniper-pinon and *Yucca glauca* litter, 5,700 to 7,000 ft., Sandoval and Bernalillo Co., Feb.–Sept., 1951–1952.

DISTRIBUTION. District of Columbia, N. M.

Proisotoma tenella (Reuter, 1895)

NEW MEXICO RECORD. Berlese sample of rotten fir log, 7,300 ft., Sandia Mts. Bernalillo Co., 23–vi–1951.

Discussion. This species has been reported attacking young tobacco plants, hot-house lettuce, and mushrooms. The possibility exists that it might some day become a minor agricultural pest in the area of the Sandia Mountains.

Distribution. N. M., Pa., Europe.

Genus **Isotomurus** Borner, 1903

Key to the Species of Nearctic Isotomurus

1. Mucro 3-toothed.....**bemakus** Wray, 1952
   Mucro 4-toothed.....2
2. Ventral margin of mucro broadened laterally.....
   .....**retardatus** Folsom, 1937
   Ventral margin of mucro not broadened laterally.....3
3. Short dorsal setae of abdomen ciliate.....
   .....**palustroides** Folsom, 1937
   Short dorsal setae of abdomen smooth.....
   .....**palustris** (Muller, 1776)

Isotomurus retardatus Folsom, 1937

New Mexico Record. Taken by W. P. Cockerell and T. D. A. Cockerell as Las Vegas Hot Springs, 6,500 ft., San Miguel Co., Feb. 16, sometime between 1893 and 1903. This is the type collection.

Distribution. N. M.

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Folsomia similis Bagnall, 1939 (Collembola, Isotomidae), Apparently New to North America

G. D. Sharma [1] and D. K. McE. Kevan [1]

So far as we are aware, *Folsomia similis* has not hitherto been recorded from North America, but only from England, Poland and Switzerland (Bagnall, 1939; Stach, 1947; Gisin, 1949; 1960). It has been found in garden soil, flower pots and in vineyard soil.

We are now able to report it from Macdonald College, Ste. Anne de Bellevue, Province of Quebec, where it was discovered the summer of 1960 in pot soil in a greenhouse and in mull soil under sugar maples (*Acer saccharum*) in the Morgan Arboretum. Specimens were kindly determined for us by Dr. H. Gisin of Geneva, Switzerland. For descriptions, see the papers by Bagnall (1939), Stach (1947), and Gisin (1960).

F. similis is about 1 mm long, or a little larger, when mature; it is whitish with scattered blackish spots and has only one pair of ocelli (black pigmented). The postantennal organ is elongate, about four eye-diameters in length; the claws are without denticles; the fifth abdominal segment is without sensory hairs. Further distinguishing features are that the manubrium bears

[1] Department of Entomology and Plant Pathology, McGill University, Macdonald College, P. Q., Canada.

about eight setae [2] on the ventral side, the dens has fifteen ventral setae and the macrochaetae of the sixth abdominal segment are only three times as long as the mucro. The post-antennal organ is divided into two halves in most specimens and has transverse serrations. A few observations on the biology of this species may be of interest.

At the time of hatching the body colour is almost pure white, but later it changes to a dirty white. Numerous small black spots first appear on the meso- and metanota, then on the head, and eventually on all the abdominal terga; those of the meso- and metanota are much darker than the others. On hatching the young measure 0.3 mm in length. When growth is regular they continue to grow fairly rapidly at room temperature (about 24° C) until, after 34 days, they attain approximately 0.95 mm in length, at which size they become mature and will oviposit after an interval of about three weeks. Increase in size usually continues very slowly thereafter. Mature specimens mostly measure between 0.95 and 1.3 mm, the greatest length recorded for our material being 1.45 mm in a specimen about one year old. This is the maximum size given by Gisin (1960).

The life history from egg to egg is completed in 67 to 73 days at 24° C, but under cooler conditions (22° C) only 49 to 51 days are required; eggs take 9 or 10 days to hatch at either temperature. In our material there were always six moults before egg-laying occurred, but during the course of 110 days the species has been observed to moult ten times and to oviposit thrice. Cultures were reared in small individual cells and fed on yeast in the manner described by Marshall and Kevan (*in press*).

We are indebted to the National Research Council of Canada for financial assistance in this and associated work.

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[2] Gisin (1960) mentions 3 + 3, or 4 + 4 setae. In our specimens the number is variable, usually being 8 or 9.

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Another Record for Percaroecus javalii (Anoplura)

William F. Rapp, Jr. and Dorlen S. Jones, Nebraska State Department of Health, Lincoln, Nebraska

In 1938 Babcock and Ewing (1938: 197) described *Percaroecus javalii* from the collared peccary (*Pecarii tojacu angulatus* (Cope)) collected in western Texas between the Juno and Pecos River on January 29, 1932. No records of this species appeared in the literature until 1951 when Menzies *et al.* (1951: 150) reported collecting 25 specimens from a collared peccary (*P. t. angulatus*) taken in Terrell County, Texas on June 15, 1949.

Recently we received a collection of ectoparasites from Mr. Herbert Tweedie of Phoenix, Arizona and among the specimens were twelve Anoplura which were identified as *Percaroecus javalii.* The specimens were from a collared peccary (*P. t. sonoriensis* (Mearns)) taken on Pusch Ridge, Santa Catalina Mountains, Pima County, Arizona, February 7, 1959. 7 males, 5 females.

It is interesting to note that very few specimens of this species have been taken and yet there appears to be, at the present time, a large amount of interest in hunting collared peccaries.

Specimens are in the ectoparasite collection of the Nebraska State Department of Health and at the U. S. National Museum.

Literature Cited

Babcock, O. G. and H. E. Ewing. 1938. A new genus and species of Anoplura from the peccary. Proc. Ent. Soc. Wash. 40: 197–201.

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Gervaisicus nom. nov. (Diplopoda)

Gervaisicus nom. nov. is here proposed to replace *Gervaisia* Waga 1858 (Diplopoda) which is preoccupied by *Gervaisia* Bonaparte 1854 (Aves).

R. V. Chamberlin

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.

Snodgrass Receives Leidy Award. Dr. Robert Evans Snodgrass, was awarded the Leidy Medal, given by the Academy of Natural Sciences, of Philadelphia, at a ceremony in the Academy on October 17th. The Medal is awarded every three years for the "best publication, exploration and discovery or research in the natural sciences." The committee that selected Dr. Snodgrass consisted of Herbert Friedmann, Los Angeles Co. Museum, Adriance S. Foster, Univ. of California, Berkeley, H. Bentley Glass, Johns Hopkins Univ., George W. Wharton, Univ. of Maryland, and H. Radcliffe Roberts, Academy of Natural Sciences. Among the thirteen recipients to date there have been two other entomologists, the late William Morton Wheeler, and Herbert B. Hungerford.

The American Entomological Society, of which he is a Corresponding Member, congratulates Dr. Snodgrass on this recognition. We may truly say that the entire present generation of entomologists is deeply indebted to him. His famous book, "Principles of Insect Morphology" (1935), has served as the

standard reference not only on all matters of morphology, both external and internal, but also on histology and development, and on physiology. In this book, as in the numerous books and papers published before and since (totalling over 6000 pages and over 2000 illustrations), Dr. Snodgrass not only supplies our informational needs but because of his broad biological approach also captures our interest, for every organ is considered in the light of its use in the living insect and in respect to its ontogeny and its evolution.

Insecta Japonica. This is a new serial publication of which the four parts of Series 1 have recently appeared (1961). Each part has a very full English summary that includes the keys as well as distributional and other data on the individual species. The illustrations, and especially the colored plates are excellent and the paper-bound books are in every respect of fine quality and handsomely executed. The page size is 7 × 10 inches.

Series 1, Part 1 is by Syoziro Asahina on Odonata: Libellulidae, with 90 pages, 7 col. pls. (107 figs.), 78 text figs. Part 2 is by Tamotsu Ishihara, on Hemiptera: Cicadidae, with 38 pages, 4 col. pls. (50 figs), 12 text figs. Part 3 is by Shoichi Miyamoto, on Hemiptera: Gerridae, with 41 pages, and 126 text figs. Part 4 is on Lepidoptera: Geometridae (1), with 108 pages, 7 col. pls. (168 figs.) and 193 text figs.

Published by Hokuryukan Publishing Co., No. 55, 1 Chome, Jinbo-cho, Kanda, Chiyoda-ku, Tokyo, Japan. Price, for each series, $8.00.

Burdick Collection. The University of Colorado Museum, Boulder, Colorado, has received a collection of over 20,000 North American butterflies from the estate of William Nelsen Burdick, of Los Angeles, California. Over 7,000 are identified and prepared so as to be useful for immediate consultation, while 12,000 are largely duplicates available for exchange. There are about 1000 specimens of other orders, with many Asilidae.

Notice. The December, 1961, issue of Entomological News was mailed at the Post Office at Lancaster, Pa., on December 8, 1961.

Entomologist's Market Place

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All insertions are continued from month to month, the new ones are added at the end of the column, and, when necessary, the older ones at the top are discontinued.

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

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

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

Cockroaches (Blattoidea) of Japan, Okinawa, Formosa (Taiwan), and the Philippines are being studied in cooperation with Dr. K. Princis. Loans of specimens from that area are desired. A. B. Gurney, U. S. National Museum, Washington 25, D. C.

Orthoptera. Gryllinae (except domestic sp.) and **Pyrgomorphinae** of the world wanted in any quantity for work in morphology, taxonomy, cytology, and experimental biology; dry, or in fluid, or living. Write D. K. Kevan and R. S. Bigelow, Dept. of Entomology, McGill University, Macdonald College, Quebec, Canada.

Beetles of the world wanted, all species in exchange for American beetles, moths and butterflies. James K. Lawton (age 18), 7118 Grand Parkway, Wauwatosa 13, Wisconsin.

Acanthomyops (Citronella ants) wanted for revisionary study. Will sort from yellow *Lasius*. M. W. Wing, State University College, Cortland, N. Y.

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CONTENTS

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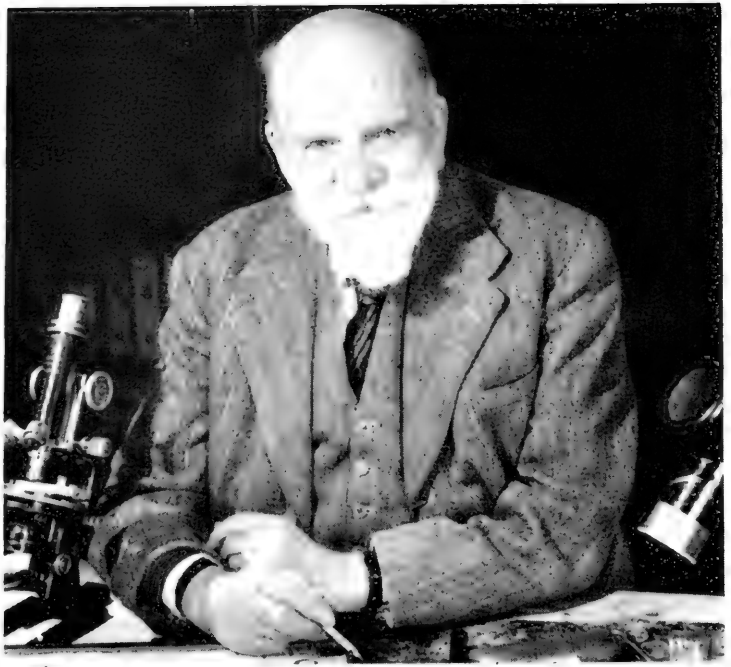

Kindest regards

Karl Jordan

ENTOMOLOGICAL NEWS

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Dr. Karl Jordan and the Stenoponia tripectinata Flea Complex of the Arab World

C. ANDRESEN HUBBARD, Tigard 23, Oregon

Dr. Karl Jordan, for more years than most men are granted to live, was dean and grand old man of the world flea students. Not only was he the greatest of world siphonapterists but he was an expert on beetles, moths, and butterflies and published also in many other fields of biology. Jordan was a German, trained in the thoroughness of that thorough people. He was born in Westphalia, in 1861, the son of a farmer. Ninty-seven years later he passed away in Tring, Herts, England, his adopted home and country. Jordan trained to be a school master, taught until he was 32 years old, then was called to Tring by the Rothschild brothers to become curator of the museum which they had established there as an avocation, a place to get away from the trials of running the huge banking house which bears their name. The doors of Tring Museum opened to Jordan in 1893 and closed to him only upon his passing 65 years later. During 26 of those 65 years, Jordan was intimately associated with N. Charles Rothschild, the two dubbed by the writer the "English Duo." Together they named 100 of the some 300 known American fleas.

FIGURES. On the left: Dr. Karl Jordan at 96 years of age working in his laboratory at Tring, England on the *Stenoponia tripectinata* complex. (Courtesy of The Sunday Times, by Douglas Glass.) On the right: Dr. Jordan at 95 years of age enters the door of the Zoological Museum, home of the British Museum's Rothschild Collection of fleas, at Tring.

Although the writer uncovered those huge aplodontian (mountain beaver) fleas as early as 1918 while dismantling one of their nests as part of a master's thesis at the University of Washington he did not become sufficiently interested in these insects to ever know N. Charles Rothschild who died in 1923. However, as he collected more and more fleas, somehow as the most naive of novices he came in touch with Dr. Jordan. During the next 25 years hundreds of letters, notes and illustrations came to the writer from the hand and the pen of the grand old man of siphonaptery who was never too busy to lay aside his work to give a helping hand to the beginner who needed it. The author began to make his mistakes, and has made them, only after he thought he knew the field well enough no longer to need the advice of the grand old man. Through the years Karl Jordan has become an ideal and an inspiration to the writer and to world flea men.

In 1952 the writer was asked by the Fulbright operations to study the fleas in Iraq. He had never been abroad, had always confined his interests to the fleas of the United States west of the Rocky Mountains. This offer seemed to be a climax in his life and provided the opportunity to visit and chat with the master of siphonaptery. And so the writer sat with the bearded, gentle old gentleman in his laboratory and his home during November of 1952 and August of 1953.

After these visits the author felt that he knew why Karl Jordan had become such a great man. He was writing to forget or remember the tragic loss of his true friend and associate, N. Charles Rothschild many years before (1923) and Karl Jordan could not hear a thing. One communicated with him through simple little penciled notes.

Even as early as these visits Dr. Jordan was working on "A Contribution to the Taxonomy of Stenoponia—" which was published by the British Museum as Entomology, Vol. 6, No. 7, London, February, 1958. Dr. Jordan's fullfilment seems to have been in this paper and it seems to the writer that the will to finish it had kept Karl Jordan alive, for upon its completion the grand old man faded away and became a memory within a year.

The *Stenoponia tripectinata* complex of fleas is a series of giants, heavily combed on gena, pronotum and abdomen, usually off gerbils (hopping mice) which are found in the sandy wastes from the Azores east through all north Africa and into and through Iraq, thus being found in all the Arab World. Karl Jordan did not describe the first one; this was done by Tiraboschi in 1902 from specimens taken in Sardinia. However, most of the known specimens were collected by Jordan in Algeria, May, 1912, and April, 1914. The last of the series of eleven was taken by the writer at Baghdad, Iraq, January 28, 1953, and presented to Dr. Jordan.

At the moment there are only the eleven subspecies offered by Jordan in the Complex from the Arab World, although he brings the total to thirteen with two additional ones from Israel. In this brilliantly executed paper on the Complex, there is not a comparative illustration. All are separate, isolated, for Jordan seemed never to have seen the need of comparative figures.

As early as 1956 the writer had forwarded to the Iraq Museum of Natural History at Baghdad the manuscript of "Fleas and Plague in Iraq and the Arab World." Part Two, the taxonomic portion, did not appear in print until November 1960; therefore, the pages and illustrations on the *Stenoponia tripectinata* Complex were obsolete before being published, for Dr. Jordan's billiant paper had appeared in 1958. Although the writer had forwarded the here presented comparative illustrations of the Complex and a review of Dr. Jordan's paper, portions of these became lost so are presented here for the first time.

After his years of study on the Complex, Jordan decided shape of head, arrangement of spines on genal comb, shape and armature of the IX sternite of the male, and to some extent the apical outline of the VII sternite of the female would separate these giant fleas one from the other.

The Members of the Complex

A. Above the point where the left and right oral margins meet there is a more or less distinct projecting angle.
   I. One genal spine on antennal fossa.

1. *Stenoponia tripectinata* **tripectinata** (Tiraboschi), 1902
ALGERIA: Khenchela, east end Aures Mts., 7 ♂♂, 3 ♀♀, May, 1912; Hamman Neskoutine, west of Guelma, 9 ♂♂, 10 ♀♀, off house mouse and spiny mouse by Karl Jordan.

II. Two genal spines on antennal fossa.

1. *Stenoponia tripectinata* **tenax** Jordan, 1958
ALGERIA: Guelt-es-Stel, 3 ♂♂, 1 ♀ off *Meriones shawi* (gerbil), April and May, 1912, by Karl Jordan.

2. *Stenoponia tripectinata* **megaera** Jordan, 1958
Labial palps longer than in *tenax,* as long as the oral margin. IX sternite male is dorsally more or less strongly convex, its apical margin slanting downwards and backwards, the most distal point being ventral or subventral.
ALGERIA: Djebel Mourdjadja (behind Port Oran), 5 ♂♂, 12 ♀♀ off *Dipodillus campestris* (gerbil), April, 1913, by Alan Ruddle.
MORROCO: Casablanca, 25 miles northeast, 5 ♂♂, 3 ♀♀ off *Dipodillus campestris* by J. Bruneau. No date.

3. *Stenoponia tripectinata* **barcana** Jordan, 1958
Forehead shorter than in preceding. Frontal tubercle not quite effaced. IX sternite male with apex rather strongly convex on upper side, apical margin rounded, without angle, most distal point below middle. The slanting upper margin of the lobe above the subventral sinus of VII sternite female somewhat abruptly incurved.
LIBYA: Barca peninsula, Cyrenaica, 2 pairs off *Spalax* (mole-rat), April, 1946, by W. Scott.

III. Three or four genal spines along antennal fossa.

1. *Stenoponia tripectinata* **tingitana** Jordan, 1958
Three genal spines on antennal fossa. Dorsal surface of dilated apical portion of IX sternite male extended farther distad than underside.
ALGERIA: Rabelais, 4 ♂♂, 1 ♀ off *Meriones shawi* (gerbil), January, 1930, by Heim de Balzac.

2. *Stenoponia tripectinata* **insperata** (Weiss), 1930
Three or four genal spines along antennal fossa. Dilated apex of IX sternite male is dorsally more convex than its ventral surface is concave.
ALGERIA: Biskra, a series off *Meriones shawi* (gerbil), March, 1908, by J. Steinback.
TUNISIA: Tunis (Carthage area), a series off *Gerbillus campestris* (gerbil); Bir Mellah, a series off *Meriones shawi* and *Gerbillus campestris,* 1933. No collector named.

3. *Stenoponia tripectinata* **irakana** Jordan, 1958
Three or four genal spines along antennal fossa. Apex IX sternite male almost symmetrical, proximally to the broadest point more incurved ventrally than dorsally.
IRAQ: Baghdad, 1 ♂ off house mouse, January, 1953; 1 ♀ off *Gerbillus lofthusi* (gerbil), February, 1953, by C. A. Hubbard. Falluja, 1 ♀ off *Jaculis j. lofthusi* (jerboa), December, 1954, by D. L. Harrison.
4. *Stenoponia tripectinata* **separata** Jordan, 1958
Three or four genal spines along antennal fossa. Particularly distinguished by the narrowness of the club of IX sternite male.
EGYPT: Mersa Matruh, 37 miles west, 1 ♂; Sidi Barrani, 19 miles east, 1 ♀, January, 1933, by H. Hoogstraal from burrows of undetermined rodents.

B. Head much more rounded than in the preceding, the frontal angle vestigial or effaced. Club of IX sternite male almost symmetrical.

I. Spines in genal comb 14 in both sexes. Abdominal tergum V in both sexes with one or two spinelets on at least one side.

1. *Stenoponia tripectinata* **blanda** Jordan, 1958
Three or four genal spines along antennal fossa. Club of IX sternite male (measured from the upper long apical bristle forward) is nearly equal to width of club and the concave ventral area extends to the first long ventral bristle of the apical row.
This subspecies is said to be morphologically intermediate between the preceding subspecies and the following ones.
EGYPT: Bir Bosslanga, 1 ♂, 3 ♀♀, October, 1953; Sidi Barrani, 1 ♂, off *Gerbillus gerbillus* (gerbil), April, 1954, by H. Hoogstraal.

II. Spines in genal comb 15 or 16. Spinelets on abdominal terga average 15 in males, 20 in females.

1. *Stenoponia tripectinata* **thinophila** Jordan, 1958
Three or four genal spines along antennal fossa. The convex dorsal surface of the club of the IX sternite male is longer than in the next subspecies, and the underside, from the long apical bristle forward, usually a little more distinctly convex.
ALGERIA: Ain-Sefra, 5 ♂♂, 6 ♀♀ off *Gerbillus p. hirtipes* (gerbil), May, 1913, by W. Rothschild and E. Hartert.

2. *Stenoponia tripectinata* **acmaea** Jordan, 1958
The number of spines in the genal comb varies in the male from 14 to 16, in the females from 14 to 17. The club of the IX sternite male is nearly as convex below as above, its outline approaching symmetry.
EGYPT: Giza Province. Large numbers of this flea have been taken throughout the Province during 1952 and 1953 off *Arvicanthus, Gerbillus* and *Jaculus,* collectors not named.

The twelfth and thirteenth subspecies of the Complex are from Israel. These follow *S. t. insperata* in this study and have three or four spines along the antennal fossa.

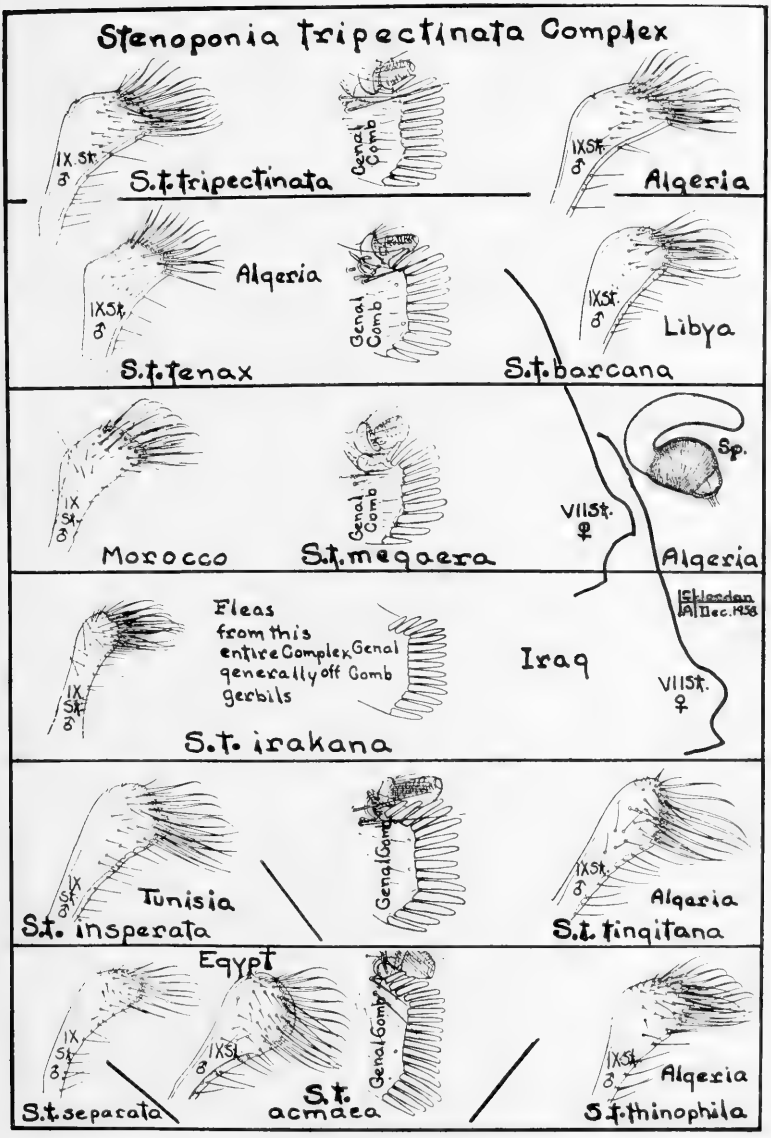
A.III.2a. *Stenoponia tripectinata* **medialis** Jordan, 1958
Club of IX sternite male dorsally convex as in *insperata* but variable.
ISRAEL: Rehoboth, near Jaffa, 6 ♂♂, 5 ♀♀ off *Meriones shawi* (gerbil), January, 1914, by J. Aharoni.

A.III.2b. *Stenoponia tripectinata* **spinellosa** Jordan, 1958
Club of IX sternite male a little more rounded convex distally, slightly approaching symmetry.
ISRAEL: Mt. Carmel, a series off *Meriones shawi* (gerbil), December, 1952. Collector not mentioned.

In glancing through this paper the reader will notice that there are no records from the Arab states of Soudan, Jordan, Syria, Lebanon, Saudi Arabia, Kuwait or Yemen. Little or no work has been done by the siphonapterist in these countries, so these areas should be a fertile field for the young Arab student who wishes to follow research in the field of fleas and public health.

It should be remembered, also, that Dr. Jordan's large paper on the Stenoponia covers the entire World distribution of this genus of fleas, while this paper is confined to that portion of it dealing with the *Stenoponia tripectinata* Complex of the Arab World.

This is the ninth paper written by the author under National Science Foundation grant G14023. At the present time he is at British East African Malaria Institute, Amani, Tanga, Tanganyika, Africa, where he is working the fleas of Tanganyika under Fulbright program and the National Science Foundation grants.


Stenoponia tripectinata Complex
IX St. ♂
S.t. tripectinata
Genal Comb
IXSt. ♂
Algeria
IXSt. ♂
Algeria
S.t. tenax
Genal Comb
IXSt. ♂
Libya
S.t. barcana
IX St. ♂
Morocco
Genal Comb
S.t. megaera
VIIISt. ♀
Sp.
Algeria
IX St. ♂
Fleas from this entire Complex generally off gerbils
Genal Comb
Iraq
VIIISt. ♀
S.t. irakana
IX St. ♂
Tunisia
S.t. insperata
Genal Comb
IXSt. ♂
Algeria
S.t. tingitana
Egypt
IX St. ♂
IXSt. ♂
Genal Comb
S.t. acmaea
IXSt. ♂
Algeria
S.t. thinophila
S.t. separata

An Interesting New Species of Emphoropsis from California (Hymenoptera, Anthophoridae) [1]

P. H. Timberlake, Department of Biological Control, University of California, Riverside

While collecting insects at Walker Pass, California, on September 26, 1957, Dr. E. I. Schlinger discovered a small cluster of bees in late afternoon but could capture only two as they dispersed. This bee proved to be a beautiful species of *Emphoropsis,* remarkable for the color pattern on the abdomen and for some of the male characters such as the swollen scape of the antennae and the swollen legs. Our other species fly in the spring and early summer instead of the fall.

Emphoropsis excellens n. sp.

Female.—Black, the apical joint of tarsi brown, the tibial spurs testaceous. Pubescence fulvous yellow becoming paler on the face and changing to white on cheeks and underside of thorax and abdomen. Hair on dorsum of thorax short, dense, erect and almost concealing the surface; that on face rather dense, becoming much longer on occiput, the ocellar region and on the outer margin of the mandibles, but the vertex with a nude area between ocelli and eyes. Abdomen above with fulvous yellow pubescence, becoming bright fulvous as well as longer and denser across the disk of tergite 5, and long and erect on basal half of tergite 1 but otherwise appressed; base of tergites 2 to 4 almost nude and appearing black, with the black area gradually expanding outward on each side and with a narrowly triangular extension in middle almost to the apical margin of the segments, and the yellow-haired area at apex with a broadly rounded submedian lobe on each side. Hair of legs whitish at base, very short on the coxae, middle and hind femora, but long on posterior side of front femora and more fulvous in tibiae and tarsi, with hair on inner side of middle and hind basitarsi bright

[1] Paper No. 1331, University of California Citrus Experiment Station, Riverside, California.

orange fulvous. Antennae black. Tegulae dark. Wings grayish dusky, the nervures blackish.

Head broader than long. Mandibles stout, curved, obtuse at apex and with a small inner tooth. Proboscis moderate in length. Venation normal for *Emphoropsis,* with the first recurrent nervure received near apex of second submarginal cell. Disk of wing beyond venation rather densely papillate. Pygidium much longer than wide and narrowed to apex with the disk convex from side to side. Head and thorax with fine dense punctures, those of clypeus very dense, but the nude area on each side of vertex shining and inpunctate. Abdomen slightly dullish and microscopically rugulose. Disk of pygidium with dense minute striae in transversely arcuate rows. Antennae moderately short, the first joint of flagellum about three times longer than thick at apex and nearly as long as the next three joints together. Length, about 14 mm, anterior wing, 11 mm.

Male.—Black, with a large mark on mandibles, face below level of antennae and scape of antennae broadly beneath pale yellow. Clypeus with an oblique dark spot on each side above; supraclypeal mark concave below, and almost rectangular above; lateral face marks extending on orbits at first broadly, then narrowly, almost to level of anterior ocellus. Antennae otherwise black. Legs black, the four apical joints of tarsi, underside of hind basitarsi and nearly the basal half of claws ferruginous. Pubescence ochraceous, less dense than in female, the face below antennae nearly bare and hair on middle of mesoscutum thin, with the surface well exposed, but hair on cheeks very dense, long and white. Basal half of tergite 2 nearly bare and black, with a quadrate extension in middle almost to the apical margin; following segments similar but the black basal area not much exposed on tergites 4 to 6; apex of tergites with a band of long, appressed, whitish hair, somewhat dilated on each side of the nearly complete median interruption, but only feebly lobate in comparison with the pattern of the female. Tergite 7 with dense ochraceous hair on each side of a rather narrow median bare area. Venter with long white hair. Hair of legs whitish, very long on posterior side of front femora and middle tibiae, and

dense and fulvous on outer side of hind basitarsi. Wings as in the female.

Head somewhat broader than long, the eyes large, with inner orbits diverging above middle of face. Mandibles rather small, with a small obtuse inner tooth. Labrum large, about twice as broad as long, and very convex but with a large flat median area. Clypeus large, evenly convex, with dorsal margin evenly rounded from close to the inner base of mandibles across the summit. Scape of antennae greatly swollen, hardly more than twice as long as thick, with the pedicel concealed in the apex; flagellum stout, the joints about as long as thick, flattened above and crenulate on outer margin, with the first joint a little longer than the second. All the femora and middle and hind tibiae of legs much swollen, but the hind tibiae contracted at apex; middle basitarsi foveate on posterior margin at base and with a rather long conical spur on posterior side of apex; small joints of middle tarsi bluntly spurred behind, with a comb of long stiff hairs on posterior margin of the spurs. Hind basitarsi broadly and thickly dilated on apical half of inner margin, with the dilation ferruginous and somewhat bilobed. Claws of middle and hind tarsi very large, with a short tooth at middle of inner margin. Bare area of tergite 7 slightly bilobed at apex. Seventh and eighth ventral segments and genitalia similar to same parts in our other species; eighth segment with apical plate much broader than long and only slightly rounded across the apex; apical process beneath parameral lobes (gonostyli) of genitalia broad and rounded on a little more than basal half of inner margin and produced into a short fingerlike lobe on outer margin (in other species quadrate or broadly oval in shape); parameral lobes slender at base, somewhat dilated on apical half and thinly hairy. Length, 13 mm; anterior wing, 11 mm.

One female and one male (holotype female and allotype), Walker Pass, Kern Co., CALIFORNIA, September 26, 1957 (E. I. Schlinger), in collection of the Citrus Experiment Station, Riverside.

A New Photurid Firefly, Photuris missouriensis sp. nov. (Coleoptera; Lampyridae, Photurinae.)

Frank A. McDermott, Wilmington, Delaware

Twenty specimens of a *Photuris* recently sent to me by Mr. J. W. Green do not conform to any of Barber's (1951) species, and I am therefore describing it below as *Photuris missouriensis,* sp. nov. Nineteen of the specimens were males and one a female.

Type locality, Roaring River State Park, Missouri; collected on June 15, 1954, by J. W. Green.

Habitat Conditions: "In grassy field, with few trees near river, some swampy ground." (J. W. Green)

Holotype male in collection of the California Academy of Sciences.

Dimensions 12.7 mm long by 4.2 mm wide at elytral midlength.

Pronotum 2.5 mm long by 2.8 mm wide; semi-elliptical but margins slightly curved inward in basal fourth. Disk convex, limits of convexity roughly parallel to the external edges; coarsely punctate; long and rather sparse, pale, diffuse villosity; color dark orange, with a short, narrow, longitudinal black vitta from the base to *ca.* one third length, and an indefinite brown mark at forward end of the orange area, extending narrowly to apex. Sides obliquely upturned from margins of disk; apical third nearly flat; transparent pale yellow mottled with irregular opaque ivory-colored flecks and bordered by a narrow transparent margin which is broadened somewhat apically. Angles rounded; a rather deep transverse submarginal groove between them along the base. There is a fringe of long hairs at the base of the disk extending over the base of the scutellum.

Scutellum narrowly rounded at apex; translucent yellow; scattered short pale hairs. Mesonotal plates dull opaque yellow.

Elytra 10.2 mm long, each 1.7 mm wide just back of base, then slightly constricted, then widening to 2.1 mm at midlength

and tapering to separately rounded but rather acute apices; no explanate margins. Sutural bead pronounced and pale from scutellum to midlength. Villosity fairly dense, pale, oblique. Ground color a translucent light brown, becoming darker and more opaque in the basal fourth, and appearing much darker over wings. Lateral border paler to apical fourth, and a pale vitta beginning at humerus, slightly approaching the suture, and becoming indistinguishable at about midlength. Epipleura short, merging with the elytral edge at about basal fourth. Surface rugose, with a very fine dotted appearance between the coarser rugosity; at least some of the hairs arise from these coarser particles.

Head: Frons and most of vertex yellow, somewhat brown under edge of pronotum. Eyes large, globular, black; 2.3 mm across and 0.6 mm between them at antennal sockets. Distal edge of clypeus tridentate, nearly black. Mandibles large and stout, *ca.* 0.76 mm across in closed position. Last article of maxillary palpus a dull brown, slightly curved conoid, flattened on the inner side; labial palpi dark yellow, the terminal article mitten-shaped or asymmetrically crescentic.

Antennae 7.5 mm long; 6th article the longest, 0.84 mm; becoming more slender from the 3d; very dark brown, bases of articles paler. Sockets small and pale.

Pro- and mesosterna dark yellow; metasternum brown.

Ventral abdominal segments 2 to 5 mostly dark brown, posterior edge of 5 yellow; 6 and 7 luminous, about one third longer than 5, and broadly emarginate; 8th small, with a median posterior point. Villosity long, dense, and appressed on thoracic sterna; short on abdominal segments, and very dense on 8th.

Coxae all yellow; legs partly yellow, but distal portions of femora and tibiae infuscate. Posterior tarsi 3.3 mm long.

Aedeagus of the usual *Photuris* form.

Flashing Conduct: "Flying low just at top of vegetation; flash single, repeated continuously while flying at two or three second intervals." (J. W. Green)

The female allotype is generally similar; 11.7 mm long by 4.3 mm wide; pronotum without distinct transparent border.

Elytra with no trace of oblique vittae, but distinct, almost white, transparent lateral borders extending to apices; suture also pale to apices. Eyes smaller, 2.05 mm across and 0.7 mm between them. Antennae 6.35 mm long. Ventral abdominal segments 2 to 4 reddish brown; 5 brown in anterior two thirds, yellow in posterior third; 6 barely longer than 5, and feebly emarginate, with a long-elliptical luminous area and broad lateral and narrower posterior and anterior non-luminous borders; 7 somewhat longer than 6, much narrower, slightly emarginate, and with a similar but smaller luminous area.

The specimens varied from 11.25 to 13.7 mm long, averaging 12.6 by 4.2 mm. In 12 the black basal pronotal vitta was short, reaching only the midlength of the pronotum or slightly more, with a more or less indefinite median infuscation in the apical fourth; in the other 8 it was complete, or practically so, from the base to apical fourth, usually linear or narrow in the middle but in three specimens broadened so as to suggest a reduced form of the vitta in *P. versicolor*. Five specimens had no trace of a pale oblique vitta on the elytron, and in seven others this vitta was pale and short, becoming indistinguishable at about elytral midlength; in the remaining eight it was traceable to the apical third or more of the elytra. The pro- and mesosterna were yellow, while the metasternum varied from yellowish to reddish to dark brown. Ventral abdominal segments 2 to 4 were mostly dark brown, but in the males, the 5th varied from nearly entirely brown to mainly yellow with irregular brown patches.

Of the 18 specimens other than the holotype and allotype, 13 have been returned to the California Academy of Sciences as paratypes, and four deposited in the U. S. National Museum, one being retained in my collection.

It is almost impossible to find distinct and constant structural differences between the various species of North American *Photuris* of the *versicolor* group. The principal differences other than in flashing conduct, are in size, pronotal pigmentation, the elytral coloration sometimes, and in some cases the season of prevalence. The aedeagi of all species so far examined—both North American and those from habitats further south—are

almost identical in form and structure, though varying in size. As mentioned below, there are some differences in the distribution of the luminous tissue in some females. The superficial coloration varies intraspecifically to such an extent that physiologically different species overlap in this regard, and unless the flashing conduct is known, it is extremely difficult to distinguish them. The idea naturally arises as to whether some of these are valid species, or should be considered as subspecies, or even varieties. Aside from the *versicolor* group, *P. divisa, P. frontalis, P. congener,* and the subtropical immigrant *P. brunnipennis,* are undoubtedly valid species, recognizable as such in spite of the absence of definite data on their flashing conduct. In *P. versicolor* the courtship signals and eventual mating have been witnessed by the writer quite frequently in pure colonies, and at least once when *P. hebes* was also in flight nearby; and exchange of signals and approach have been seen in a pure colony of *P. lucicrescens.* (This latter colony, near a bridge south of Newark, Del., has been in existence for at least 12 years; there are occasional *P. versicolor* invaders from the nearby fields, but the breeding population appears to remain constant.) Around Wilmington, *P. versicolor* appears first, around May 25–27, followed in a few days by *P. hebes,* and a week or ten days later *P. lucicrescens* appears and except for stray females of *versicolor,* persists later. *P. versicolor* var. *quadrifulgens* appears to be a true variety, and has been noted as an occasional form in several localities around Wilmington where the normal *versicolor* was in flight.

As I have recorded, Barber (1951, p. iv) could easily distinguish some of the species prevalent around Wilmington, and when specimens of these species were arranged together, there was a definite difference in appearance (McDermott, 1958, p. 28). In some cases the distribution of the luminous tissue in the female furnishes at least some clue to the species. In the female allotype of *P. missouriensis,* the luminous tissue is restricted to elliptical areas. The same is true of *P. versicolor* ♀, but the proportion of the ventral surface of the segment which is luminous is distinctly larger in the latter case. On the other

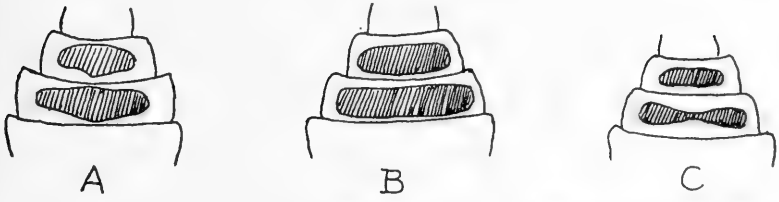


FIG. 1. Sterna of abdominal segments 6 and 7 of females, with luminous portions shaded. A. *Photuris missouriensis* sp. n. B. *Photuris versicolor* Fabr. C. *Photuris bethaniensis* McD.

hand, in the small *P. bethaniensis* (McDermott, 1953, p. 37) the luminous area on the 6th ventral is narrowed medially, leaving an elongated dumbbell shaped area for the luminous portion. The colors of the luminous and non-luminous portions of these segments are insufficiently distinct to photograph clearly, and the accompanying drawing, Figure 1, shows in A the appearance in *Photuris missouriensis,* in B that of *P. versicolor,* and in C, *P. bethaniensis,* the luminous portions being shaded.

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Headstand Mechanism in Telamona unicolor Fitch (Homoptera, Membracidae)

Clifford J. Dennis, East Central State College, Ada, Oklahoma

When placed on their sides several species of *Telamona* with a high pronotal crest have been noted to execute a rapid headstand from which they abruptly fly away. The action is difficult to follow with the naked eye. This note describes the mechanism discerned in a male *Telamona unicolor* Fitch collected from bitternut hickory, *Carya cordiformis* (Wang.) K. Koch, on May 11, 1961, at Ada, Oklahoma. This specimen was somewhat pale in color and seemed to be well-formed; but, despite vigorous beating of its wings, it was unable to fly. Since this was the case the headstand action was observed many times during the course of about 45 minutes.

This insect could come to the headstand from either side. This description applies when he started on his right side. Upon being placed on his side on the palm of my hand he began a vigorous kicking. The left front leg reached across his face to secure a grip on the hand; this leg was then used to help pull him up onto the metopidium. At the same time the tibia and tarsus of the right rear leg were pressed down on the hand to help push his body upright. None of the other legs were seen to be engaged. When the insect attained the headstand he usually rapidly beat his wings, but to no avail. He made no effort to use his legs as he beat his wings. When his hind legs were removed he was unable to bring about the headstand, despite efforts to use his middle leg closest to the surface. The front leg alone could not pull him to the headstand.

The Collembola of New Mexico. VII. Isotominae: Metisotoma, Isotoma [1, 2]

HAROLD GEORGE SCOTT [3]

Sixteen species of springtail insects are recorded in this part. None of these have been reported previously from New Mexico. Specimens will be deposited with the Academy of Natural Sciences, Philadelphia, Pennsylvania.

Genus **METISOTOMA** Maynard, 1951

KEY TO WORLD SPECIES OF METISOTOMA

NOTE. Both known species of Metisotoma are Nearctic.

Legs and body with some spinate setae—**spiniseta** Maynard, 1951
Legs and body without spinate setae...**capitona** Maynard, 1951

Metisotoma spiniseta Maynard, 1951.

NEW MEXICO RECORD. Berlese sample of Gambel oak litter, 7,200 ft, E of Santa Fe, Santa Fe Co., 20–vii–1953.
DISTRIBUTION. N. M., N. Y.

Genus **ISOTOMA** Bourlet, 1839

KEY TO THE SPECIES OF NEARCTIC ISOTOMA

1. Tenent hairs present.....2
   Tenent hairs absent.....6
2. Tenent hairs 1.....3
   Tenent hairs 2–3.....4
3. Unguis with 3 teeth.....**monochaeta** (Kos, 1942)
   Unguis with 1 tooth.....**persea,** Wray, 1952
4. Mucronal teeth 3.....**sensibilis** (Tullberg, 1876)
   Mucronal teeth 4.....5

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

[2] Part VI appeared in ENT. NEWS, 73(1): 17–23.

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

5. Furcula reaching or almost reaching collophore.....
.....**arborea** (Linnaeus, 1758)
Furcula reaching only to Abd II...**cinerea** (Nicolet, 1841)
6. Ant II and IV subequal.....7
Ant IV much longer than II.....9
7. Unguis with 2 inner teeth.....**viridis** Bourlet, 1839
Unguis with 1 inner tooth.....8
Unguis without inner teeth.....**louisiana** Scott, 1962
8. Abd V and VI essentially ankylosed...**gelida** Folsom, 1937
Abd V and VI clearly not ankylosed.....
.....**subaequalis** Folsom, 1937
9. Eyes and eyespots absent.....10
Eyespots present, eyes present or absent.....13
10. Mucro with 4 teeth.....**brucealla** Wray, 1953 a and b
Mucro with 3 teeth.....11
11. Abd V and VI essentially ankylosed..**minor** Schaffer, 1896
Abd V and VI clearly not ankylosed.....12
12. Sides of unguiculus nearly parallel.....
.....**spatulata** Chamberlain, 1943
Sides of unguiculus convergent.....**tariva** Wray, 1953a
13. Eyespots present, eyes absent...**finitima** Scherbakov, 1899
Eyespots present, eyes present.....14
14. Eyes 2 and 2.....**acrea** Wray, 1953c
Eyes 3 and 3.....**andrei** Mills, 1934
Eyes 4 and 4.....**notabilis** Schaffer, 1896
Eyes 8 and 8.....15
15. Abd V and VI essentially ankylosed.....16
Abd V and VI clearly not ankylosed.....17
16. Pinkish-red to purple body color.....
.....**lucama** and **sandersoni** Wray, 1952
Blackish purple body color.....
.....**arborea nigra** MacGillivray, 1896
17. Furcula reaching Abd II.....18
Furcula reaching or almost reaching collophore.....19
18. Head much less than one-third body length.....
.....**albella** Packard, 1873
Head about one-third body length..**grandiceps** Reuter, 1891
19. Adult mucro 3-toothed.....20
Adult mucro 4-toothed.....25
20. Unguis without teeth (adults).....21
Unguis with teeth (adults).....23
21. Manubrium with 1 pair of ventral setae.....
.....**vestita** Brown, 1923
Manubrium with many ventral setae.....22

22. Outer proximal mucronal tooth thorn-like.....
.....**marissa** Folsom, 1937
Outer proximal mucronal tooth not thorn-like.....
.....**trispinata** MacGillivray, 1896
23. Unguis with 1 inner tooth.....24
Unguis with 2 inner teeth.....**subviridis** Folsom, 1937
24. Unguis with conspicuous outer tooth.....
.....**tridentata** MacGillivray, 1896
Unguis without outer tooth.....**difficilis** Folsom, 1937
25. Mucro about ¾ length of hind unguiculus.....26
Mucro subequal to or longer than hind unguiculus.....27
26. Eyes subequal.....**olivacea** Tullberg, 1871
Eyes unequal.....**arborea nigra** MacGillivray, 1896
27. Mucro subequal to hind unguiculus in length.....
.....**violacea** Tullberg, 1876
Mucro longer than hind unguiculus.....
.....**nigrifrons** Folsom, 1937

Isotoma arborea (Linnaeus, 1758).

New Mexico Records. Nine Berlese samples of clumps of vegetation, sod, coniferous logs and litter from aspen, fir, spruce, pine, and bristlecone pine; and hand picking from beneath rocks, rodent midden heap of fir cone scales, beneath tight bark of yellow pine log and on mud along irrigation ditch; 5,300 to 12,200 ft, Santa Fe, Mora, Bernalillo, Taos, Torrance, and Sandoval Co., June–Nov., 1950–1954.

Distribution. Ill., Iowa, Maine, Mass., N. M., N. Y., Europe.

Isotoma cinerea (Nicolet, 1841).

New Mexico Records. Two Berlese samples of spruce litter and rodent midden heap in spruce-fir area, 11,200 to 11,900 ft, Santa Fe and Taos Co., July–Aug., 1953.

Distribution. Ill., Iowa, Maine, Mass., Mo., N. M., N. Y., N. C., Ohio, Ontario (Canada), Europe, Asia.

Isotoma difficilis Folsom, 1937.

New Mexico Record. Berlese sample of aspen-fir litter, 10,600 ft, near Sandia Crest, Sandia Mts., Bernalillo Co., 22–ix–1951.

Distribution. Ill., N. M.

Isotoma finitima Scherbakov, 1899.

NEW MEXICO RECORD. Berlese sample of clumps of vegetation, 12,400 ft, Alpine Zone, Santa Fe Baldy, Santa Fe Co., 17–vii–1954.

DISTRIBUTION. N. M., Greenland, Europe.

Isotoma gelida Folsom, 1937.

NEW MEXICO RECORDS. Three Berlese samples of aspen soil and litter, rotten fir log, and alder litter, 7,000 to 10,000 ft, Santa Fe, Bernalillo and Socorro Co., July–Nov., 1950–1954.

DISTRIBUTION. Ill., N. M.

Isotoma marissa Folsom, 1937.

NEW MEXICO RECORD. Berlese sample of alder litter in canyon, 7,000 ft, Water Canyon, W of Socorro, Socorro Co., 10–vii–1954.

DISTRIBUTION. Ala., Ill., Kan., N. M.

Isotoma monochaeta (Kos, 1942).

NEW MEXICO RECORD. Berlese sample of sparse spruce litter, 8,100 ft, Calaveras Camp Ground, 5 mi N of Fenton, Jemez Mts., Sandoval Co., 24–viii–1953.

DISTRIBUTION. N. M., Europe.

Isotoma notabilis Schaffer, 1896.

DISCUSSION. In the nomenclature of this species, I am following Stach (1947, p. 384) in considering *Isotoma eunotabilis* Folsom, 1937, synonymous with the European *notabilis*. My specimens, however, represent the form described by Folsom, differing from the European form in a slightly different ocular distribution and a slightly different ratio between Abd III and IV. Folsom's specimens are only 0.7 mm long, the European 1.0 mm. My largest specimen is 0.9 mm in length.

NEW MEXICO RECORDS. Seven Berlese samples of rotten log

in aspen fir-area, coniferous stump in yellow pine-spruce fir area, litter (aspen, spruce, fir, alder, Gambel oak, oak), and sweeping grasses, 7,400 to 8,600 ft, Taos, San Miguel, Rio Arriba, Colfax, Bernalillo, and Sandoval Co., May–Sept., 1951–1954.

DISTRIBUTION. Ill., Iowa, N. M., N. Y., Wis., Ontario (Canada), Europe, Australasia, Asia.

Isotoma olivacea Tullberg, 1871.

NEW MEXICO RECORDS. Thirteen Berlese samples of spruce, aspen, fir, yellow pine, alder, red birch, and oak litter or stumps; 7,400 to 12,300 ft, Santa Fe, Rio Arriba, Taos, San Miguel, and Torrance Co.; May–Aug., 1951–1954.

DISTRIBUTION. Ill., Iowa, N. M., N. Y., Ontario (Canada), Greenland.

Isotoma sensibilis (Tullberg, 1876).

NEW MEXICO RECORD. Berlese sample of spruce litter, 11,900 ft, Lake Peak, Northeast of Santa Fe, Santa Fe Co., 29–vii–1953.

DISTRIBUTION. Fla., Ill., La., Mass., N. M., N. Y., N. C., Ohio, Minn., Ontario (Canada), Europe.

Isotoma subviridis Folsom, 1937.

NEW MEXICO RECORDS. Nine Berlese samples of grass and herb clumps and aspen, spruce, fir, alder and cottonwood litter; 5,000 to 11,900 ft; Mora Valencia, Taos, San Miguel, Santa Fe, Sandoval and Bernalillo Co.; May–Sept., 1953–1954; and on damp soil near river, 5,300 ft, northwest of Pena Blanca, near Rio Grande, Sandoval Co., 3–vii–1954.

DISTRIBUTION. N. M., N. Y., Wash., Ontario (Canada).

Isotoma trispinata MacGillivray, 1896.

NEW MEXICO RECORDS. Two Berlese samples of aspen-fir and alder litter, 7,000 and 10,600 ft, Bernalillo and Socorro Co., July–Sept., 1951–1954.

DISTRIBUTION. Ill., Iowa, La., Mass., N. M., N. Y., N. C., Ohio.

Isotoma vestita Brown, 1923.

NEW MEXICO RECORD. Berlese sample of aspen litter, 8,700 ft, Sandia Mts., Bernalillo Co., date unknown.

DISTRIBUTION. N. M., England.

Isotoma violacea Tullberg, 1876.

NEW MEXICO RECORDS. From Berlese samples of fir, spruce, aspen, willow, Mountain cottonwood litter; 8,700 to 11,200 ft, Valencia, Taos, Mora, and Bernalillo Co.; July–Sept., 1951–1953.

DISTRIBUTION. Alaska, Idaho, Minn., N. M., N. Y., Wis., Ontario (Canada), Greenland, Europe.

Isotoma viridis Bourlet, 1839.

NEW MEXICO RECORDS. Beneath rocks in Alpine Zone; and ten Berlese samples of aspen, fir, alder, spruce, birch and oak litter; 7,800 to 12,200 ft; Santa Fe, Bernalillo, San Miguel, Sandoval, Taos, and McKinley Co.; June–Sept., 1950–1954.

DISTRIBUTION. Alaska, Calif., Colo., District of Columbia, Ill., Ind., Iowa, La., Maine, Mass., Minn., Miss., Mo., N. H., N. M., N. Y., N. C., Ohio, Okla., Ore., Tenn., Texas, Utah, Va., Wash., Mexico; Ontario, NW Territories and Nova Scotia (Canada); Europe, Asia, Arctica.

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——. 1953*c*. Bull. Brooklyn Ent. Soc. 48: 82–83.

Liriomyza archboldi, a New Species (Dipt., Agromyzidae) *

S. W. Frost, Pennsylvania State University

Male

Head: Front, face, cheeks, proboscis, palpi and antennae entirely yellow; ocellar triangle shiny black and continuous with the black of the occiput; yellow of checks not extending completely back of the eye but intercepted near the vertex by the black of the occiput; epistoma narrowly shiny black; four fronto-orbital bristles, all upward turned, upper three equal in size and equally spaced, lower pair smaller and slightly approximated in their rows; orbital hairs minute, sparse and upward pointing; third antennal segment small, rounded and scarcely or only minutely pubescent; arista black, about three times as long as third segment; cheeks about one half eye height; oral vibrissae small and scarcely longer than accompanying setae along the lower margin of the cheek; inner verticle bristle arising from the yellow color of the head, outer verticle bristle arising from the edge of the black color of the occiput.

* Authorized for publication, November 24, 1961, as paper No. 2621 in the Journal Series of the Pennsylvania Agricultural Experiment Station.

Thorax: Mesonotum shiny black, yellow of pleurae slightly indenting the same at the transverse suture; anterior humeral callosities yellow with a small elongate black spot; humeral bristle arising from the yellow color; presutural bristle arising from the edge of the black color of the mesonotum; outer posterior angles of the mesonotum narrowly yellow; pleurae chiefly yellow; sternopleura (katepisternum) with a large black triangle leaving a yellow band above, its strong bristle arising from the yellow color; mesopleura (anepisternum) chiefly yellow, narrowly darkened on the lower margin, upper three quarters yellow, all setae arising from the yellow color; hypopleura with a distinct trapezoidal black spot; scutellum chiefly yellow, with darkened triangles at the sides of the base; the scutellar bristles arising from the yellow color; postscutellum shiny black; four pairs of dorsocentral bristles, about equally spaced, the anterior pair slightly weaker; four irregular rows of acrostichals reaching nearly to the scutellum; one strong sternopleural bristle accompanied by two minute setae; one strong mesopleural bristle accompanied by several minute setae; humeral, notopleural, supra-alar and post-alar bristles arising from the yellow color of the pleurae.

Abdomen: Dark brown above, incisures narrowly yellow; under surface chiefly yellow extending to some extent onto the sides of the abdomen at the base; genitalia concolorous with the dorsal surface of the abdomen.

Legs: Largely pale, coxae and femurs yellow, tibia and tarsi slightly darkened; no distinct bristles.

Wings: Distinctly infumed; third and fourth veins slightly diverging; fourth vein slightly curved; costa reaching to the fourth vein; divisions of costa between second and third veins about the same as those between the third and fourth; last section of the fifth vein about two and a half times that of the preceding section; anterior cross-vein located at or slightly beyond the middle of the discal cell and about one half as long as the posterior cross-vein; margin of calypteres and fringe brown.

Size: Length 1.5 mm.

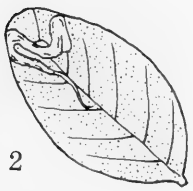

Fig. 1. Mesopleura and sternopleura of *Liriomyza archboldi* n. sp.
Fig. 2. Mine on leaflet of *Pisum sativum.*
Fig. 3. A mine enlarged showing arrangement of frass and slit through which larva escaped.

Female

Similar to male but ovipositor shiny black and fifth abdominal, yellow incisure distinctly broader than others.

Holotype: Male, taken November 9 at a light trap at the Archbold Biological Station, Highlands County, Florida. *Paratypes:* twelve males and eight females also taken at light traps at The Archbold Biological Station during November, December, January, February and March, five specimens reared from linear mines on *Pisum sativum* February 31 and two specimens collected on the host February 16.

This species runs close to *Liriomyza trifolii* (Burgess) but differs in the possession of four irregular rows of acrostichals, four pairs of orbitals and distinctly infumed wings. The black portion of the mesopleura is always reduced and in some paratypes is represented by a narrow bar.

Mines: Liriomyza archboldi make serpentine mines on the upper surface of the leaves of *Pisum sativum.* They often cross the mid rib and seem to mine regardless of other veins. They twist and turn and sometimes form what appears to be a blotch. The first third of the mine is always narrow and the latter portion is distinctly broader. The frass, from the beginning to the end of the mine, is arranged in two delicate, irregular lines, one on each side. The larva emerges through a semicircular slit at the end of the mine, on the upper surface.

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 needed.

Glaciers and Winter Stoneflies. Dr. H. H. Ross and Dr. W. E. RICKER are studying the relationships and distribution of adult winter stoneflies in an effort to deduce what were the living conditions south of the advancing and retreating glaciers in eastern North America. A complete knowledge of the ranges of these insects is necessary to obtain reliable deductions. Adult winter stoneflies are small ($\frac{1}{3}$ inch long or less), black, and frequently have short or vestigial wings; they live in small brooklets to rivers. Because the adults of most species occur only during two winter months (February and March, and sometimes early April), it is impossible for one collector to accumulate many collections in one year. The investigators would be most grateful if fisheries people and others, who may be in the field in late winter and early spring, would carry a few vials of alcohol for collecting and preserving adult stoneflies that often abound on bridges at this season. Data required are name of stream, locality, date, and collector. Please send material to H. H. Ross, Illinois Natural History Survey, Urbana, Illinois.

Nomenclature Notice. All comments relating to the following should be marked with the Commission's File Number and be sent in duplicate, before May 17th, to the Secretary, International Commission on Zoological Nomenclature, c/o British Museum (Natural History), Cromwell Road, London, S.W. 7, England.

Validation of the generic name **Naucoris** Geoffroy, 1762 (Insecta, Hemiptera). Z.N.(S.) 608.

Suppression of certain unidentifiable specific name in the family Tetrigidae (Insecta, Orthoptera). Z.N.(S.) 673.

Validation of the generic name **Ceratosolen** Mayr, 1885 (Insecta, Hymenoptera). Z.N.(S.) 1479.

For details see Bull. Zool. Nomencl. Vol. 18, Part 6.

The Future of Entomological News

ENTOMOLOGICAL NEWS has for years hoped to attain a degree of financial stability that would permit it to increase its services to entomology, and perhaps even improve its outward appearance. Instead it faces each year a financial crisis since its only income is from subscriptions. With ever increasing publication and distribution costs, temporary solutions are getting harder to find. Therefore, if we are to realize our aims of a better NEWS that is at the same time financially secure we must turn to our subscribers and friends for help.

We have proposed a classification of membership open to companies and to individuals known as "Patrons of the American Entomological Society." These Patrons will be listed in each issue of ENTOMOLOGICAL NEWS. Dues will be $50.00 annually and will include a subscription to ENTOMOLOGICAL NEWS.

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All insertions are continued from month to month, the new ones are added at the end of the column, and, when necessary, the older ones at the top are discontinued.

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

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

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

Cockroaches (Blattoidea) of Japan, Okinawa, Formosa (Taiwan), and the Philippines are being studied in cooperation with Dr. K. Princis. Loans of specimens from that area are desired. A. B. Gurney, U. S. National Museum, Washington 25, D. C.

Orthoptera. Gryllinae (except domestic sp.) and **Pyrgomorphinae** of the world wanted in any quantity for work in morphology, taxonomy, cytology, and experimental biology; dry, or in fluid, or living. Write D. K. Kevan and R. S. Bigelow, Dept. of Entomology, McGill University, Macdonald College, Quebec, Canada.

Beetles of the world wanted, all species in exchange for American beetles, moths and butterflies. James K. Lawton (age 18), 7118 Grand Parkway, Wauwatosa 13, Wisconsin.

Acanthomyops (Citronella ants) wanted for revisionary study. Will sort from yellow *Lasius*. M. W. Wing, State University College, Cortland, N. Y.

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CONTENTS

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ENTOMOLOGICAL NEWS

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Myrmecophily in Plebejus (Icaricia) icarioides (Lepid.: Lycaenidae)

JOHN C. DOWNEY

The symbiotic relationships of certain species of ants and larvae of the Lepidoptera, particularly in the famly Lycaenidae, have received comparatively little attention in this country. No doubt part of the explanation of this neglect is the assumed facultative nature of the symbiosis in our region. This is based on the fact that the majority of the Lycaenidae in which the association with ants is known to be obligatory, *viz.,* the carnivorous and phyto-predacious species, are exotic and have no near relatives in North America. The only reported carnivorous lycaenid in North America is *Feniseca tarquinius* Fabr., which feeds on aphids and whose larvae are sometimes killed by ants associated with the aphids. Hinton (1951) thought that "most" of the Lycaenidae are associated with ants, and that more myrmecophiles will be found in this family than in any other group, except perhaps the Staphylinidae. Approximately 150 species of Lycaenidae (*sensu lato,* including Riodinidae *auct.*) occur in the United States and Canada, but I have found less than a dozen species mentioned in the literature as being associated with ants. In most of these instances the ants are not identified.

The purpose of this paper is to report instances of associations of know species of ants and larvae of the butterfly, *Plebejus* (*Icaricia*) *icarioides* (Bdv.). Except for one observation made at Twin Peaks, San Francisco, California, during March, 1955, the study is based on data collected by Dr. Richard E. Blackwelder and the writer while on an extended collecting trip to western North America during June and July, 1960.

P. icarioides comprises a polytypic array of numerous discontinuous populations inhabiting most of the continent of North America west of the central Great Plains Region. Within this area the scattered distribution of the butterfly is partly explained by the local and spotty distribution of the plant genus *Lupinus* on which the larvae feed.

Certain observations previously reported are of interest to the myrmecophily discussed here. Newcomer (1911) first described the complete life cycle of *P. icarioides* under the name *Lycaena fulla* Edw. Among other things pertinent to its biology, he mentioned that the larvae are attended "by a small black ant." As had been observed in the case of many lycaenid butterfly larvae, Newcomer noted the presence of an exudate gland on the tenth body segment of the larva, from which the ants obtained a liquid secretion. One of a pair of eversible sacs occurring on the eleventh segment was also figured (*op. cit.*, p. 86), and Newcomer (1912) subsequently described the extension and retraction of these "sacs" (or tentacle-like tubes) under laboratory conditions when the larvae were being attended by ants. Newcomer disputes Scudder who followed Edwards (1878a) in the opinion that the expanded tentacles "indicate to the ant" that the exudate gland is ready to function. The writer concurs with Newcomer in his conclusion that the tentacles, when erect with terminal bristles rotating, serve to irritate the ants or at least act as a deterrent to them. Recent observations in South Africa (Clark & Dickson, 1956) also lead us to conclude that the sacs are repellant devices utilized when the larvae are "irritated" or the glands "overworked."

Edwards (1878) notes an ichneumonid parasite being driven away from one lycaenid larvae by an ant in attendance. He also claimed that the mature larvae and their subsequent pupal stages were less subject to parasitism than were the same stages in other Lepidoptera which were not attended by ants. Thus it has been assumed that the larvae derive some benefit from their association with ants.

Newcomer (*loc. cit.*) noted the presence of eggs of Tachinidae and larvae of Braconidae on the larval stages of *P. icarioides*.

During my studies, only one field-taken larvae was observed to be parasitized. Eight braconid parasites, *Apanteles theclae* Riley, emerged from a third instar larvae collected at Chautauqua Mesa, Boulder County, Colorado. Thus we know that dipterous and hymenopterous parasites do attack the larvae of this butterfly, but the low incidence of parasitism may reflect protection by ants as Edwards suggests.

Comstock and Dammers (1935) have also described the life cycle of southern California representatives of the butterfly (= *Plebejus icarioides evius* (Bdv.). The reader is referred to this work and to Newcomer (*loc. cit.*) for detailed descriptions of the egg, the larval stages, and the pupa of this species.

In Table 1 are listed all the ant species found in association with larvae of *P. icarioides,* together with the localities in which the observations were made and the host plants on which the insects were found. With but one exception all of the ants were actively tending the larvae, crawling over them, feeding on the secretion of the tenth body segment, or otherwise indicating to the observer a more than incidental interest in the larvae. The exception to this association was the small thief ant, *Solenopsis molesta validiuscula* Em., at Maybell, Colorado, mentioned below. At this locality the mature larvae were located in groups of two to five just below the soil surface at the bases of the plant stems. Inasmuch as the larvae were easily exposed by bending the stem of the plant and were never in immediate contact with the soil, it appears that the ants may have removed some of the subsoil from around the plant either for access to the resting larvae or as a diurnal resting place for the larvae, or both. The position of the plant being thus disturbed, the ants, primarily *Formica perpilosa* Whlr. and *F. oreas* Whlr. at this locality, became very agitated and poured forth from the base of the plant with much the same aggressive attitude one observes in the ants after their nest is disturbed. Usually from 5 to 30 or more ants would be found in this situation at the base of the plant and usually they were of one species. In one observation at Maybell, Colorado, having taken a sample of the ants which were tending five larvae, and after removing the

larvae carefully in order to keep them alive in vials, the writer noticed several very small *Solenopsis* at the same location on the stem from which the larvae were removed. As three individual ants were involved, it seems unlikely that they could have crawled unobserved onto the plant; they must have been already present in association with the larvae. For this reason this species is included in the list. *Solenopsis richteri* has been reported (Bruch, 1926, via Hinton) tending *Hamearis epulus signatus* Stich., a riodinid from Argentina.

The mature butterfly larvae were also located on the lupine flower stalks, but detection is made more difficult by their concealing color and color pattern. However, ants were readily seen on the flowers and if they exhibited any degree of excitement or agitation after detecting the presence of the observer, it was a certain sign that they were attending larvae. The reaction of the ants could even be described as belligerent. They would attack small twigs or tweezers placed near the larvae and, particularly *Formica fusca* L., would frequently rise on their legs and pull the abdomen forward between the legs as though they were bringing a sting into operation. Relatively few mature larvae were discovered on the flowers, compared to the numbers located at the bases of the stems, and it is assumed that the majority of mature larvae in this species are nocturnal feeders.

Newcomer (1912) observed that the honey gland of *P. icarioides* becomes functional in the third instar and numerous authors have stated that the honey gland is functional in other species only in later instars. This writer has noted that the first instar larvae possess the gland, at least internally, but the seeming lack of attendance by the ants during the early instars would suggest that the gland is not functional until the third and fourth instars. Occasionally an ant or two would be observed in proximity to first instar larvae, but ants were never noticed astride the larvae, or assuming any of the behavior patterns common to the ants with the more mature larvae.

Of possible significance in our observations of this symbiotic relationship was the fact that the eggs and first instar larvae

TABLE 1. Ants associated with *Plebejus* (*Icaricia*) *icarioides* (Bvd.)

Ant species	Host plants involved	Locality	Elev.
Formica integra haemorrhoidalis Em.	*Lupinus rubricaulis* Greene	Chautauqua Mesa, Boulder Co., Colo.	5,800′
F. neogagates Em.	*Lupinus rubricaulis* Greene		
Formica sp.?	*Lupinus rubricaulis* Greene		
Tapinoma sessile (Say)	*Lupinus rubricaulis* Greene		
Formica fusca L.	*L. rubricaulis* Green	Flagstaff Mtn., Boulder, Colo.	6,300′
Formica fusca L.	*L. alpestris* A. Nels.	Lefthand Canyon, Boulder Co., Colo.	6,400′
Lasius niger (L.)	*L. alpestris* A. Nels.		
Formica integroides Em.	*L. argenteus argenteus* Pursh	Maybell, Moffat Co., Colo.	6,250′
F. oreas Whlr.	*L. argenteus argenteus* Pursh		
F. perpilosa Whlr.	*L. argenteus argenteus* Pursh		
Dorymyrmex pyramicus (Rog.)	*L. argenteus argenteus* Pursh		
Solenopsis molesta validiuscula Em.	*L. argenteus argenteus* Pursh		
Formica fusca L.	*L. caudatus* Kell.	Big Cottonwood Cyn., Salt Lake Co., Utah	5,100′
Formic oreas comptula Whlr.	*L. sericeus* Pursh	Emigration Cyn., Salt Lake Co., Utah	5,850′
Lasius sp.?	*L. sericeus* Pursh		
Formica lasioides Em.	*L. albifrons* var. *collinus* Greene	Twin Peaks, San Francisco, Calif.	700′

at Maybell, Colorado, were all found on *Lupinus caudatus* Kell., while the mature larvae were invariably associated at that locality with *Lupinus argenteus argenteus* Pursh. Eggs and first instar larve would be progeny of the adults of 1960, but the mature larvae would be from adults of 1959, the second instar larvae having overwintered in the diapause state. Several factors could account for this difference in host plants. For instance, *L. argenteus* might initiate growth earlier in the springtime, and thus be available to the overwintering larvae at an earlier date. Downey (1961) has shown evidence that the adults oviposit on the most hirsute lupine in a given area, even though the larvae can utilize any species of lupine as a food source. *L. caudatus* is more hirsute than *L. argenteus* and would be selected for oviposition when when both are available. Thus the early stages of the 1960 brood would be on the hairiest plant, and the 1959 brood would be on the earliest plant. Lacking information on the phenological attributes of the lupine species involved, we can only suggest that there may be an additional factor, transpor-

tation of the larvae by the ants. Many lycaenid species are carried by the ants from one situation to another, *viz.,* from plant to plant, plant to ant nest, and nest to plant. If the ants moved the first instar larvae indiscriminatly, we should have found some of them on both host plants, which was not the case. However, it is possible that larvae in or near diapause are carried to the ant nest or at least to a sheltered spot away from the plant. I have strained numerous ant nests in many localities, and examined the bases and root stalks of hundreds of lupines but have never discovered where the diapausing larvae spend the summer and winter months. Since ants tend many lycaenids during periods of the year adverse to the larvae, it is likely that they are associated with the diapausing larvae of *P. icarioides.* The ants may transport the larvae back to the food plant when this becomes available in the spring, and it may be the ants rather than the larvae that select *Lupinus argenteus* in this locality. As a corollary of the assumption that ants transport the young larvae, we would have to attribute some "foresight" to the ants. Presumably they derive no benefit from the early instar larvae and any care the ants provide could only be in anticipation of future use. This situation prevails also in the symbiosis of other ants and lycaenid larvae.

Selection of the lupine by the ant may involve many factors. It may depend simply on which lupine first appears in the spring, as mentioned above, but it also could depend on the proximity of one species of lupine to the ant nest as based on edaphic factors. *L. argenteus* occurred in the recently disturbed area along the roadside in well-drained situations where the soil, although somewhat sandy, tended to be more densely packed. *L. caudatus,* on the other hand, was found growing in an adjacent area, beyond the disturbed zone, that was characterized by the predominance of *Artemisia tridentata* Nutt. (sagebrush). The soil in this undisturbed area consisted mostly of sand, presumably windblown or wind sorted, so that it was very loosely arranged. These distinct soil types may be a factor in the construction of the diurnal resting chambers of the larvae at the bases of the plant stems as described above.

A physiological factor could account for the presence of the larvae on *L. argenteus.* Edwards (1878, p. 5) suggested that the secretions of the larvae of *Celastrina argiolus pseudargiolus* (Bdv. & Lec.) (= *Lycaena pseudargiolus* of Edwards) feeding on *Actinomeris* in the fall of the year were less attractive to ants than the exudations of the summer larvae feeding on *Cimicifuga.* Perhaps the ants at Maybell, Colorado, preferred the taste of the secretions they obtained from larvae that fed on *L. argenteus.* Other factors may be involved, but from the observations noted above it would seem desirable that lepidopterists working on the association of ants and butterfly larvae should also accumulate data on the host plants involved, the soil type in the area, the proximity of the utilized plants to the ant nests, etc.

The laboratory reared pupae of *P. icarioides* contain a "scar" of the exudate gland on the seventh abdominal segment. Pupae have never been discovered in the field and thus nothing is known of any possible association of this stage with ants. The only record of a pupa-ant association in North America known to the writer is the report by Tilden (1947) of a *Glaucopsyche lygdamus behrii* (Edw.) pupa in the nest of an unidentified ant. Present studies indicate that pupation of *P. icarioides* takes place in the spring and this may explain the absence of pupae in ant nests in the winter. In the laboratory the average duration of pupal development is 22 days.

Numbers of this butterfly have been successfully reared in the laboratory, where ants were not available, and it is assumed that the association with ants is not obligatory. We cannot safely make this assumption about all completely phytophagous lycaenids however. Various workers have mentioned that if the larvae are not attended by ants, and thus the secretions from the abdominal gland are not removed, a mold will grow on the secretions and eventually kill the larvae. This phenomenon is not geographically unique but has been indicated for *Aricia agestis* (Schiff.) in Europe, *Hypolycaena erylus* Godt. in Java and *Spindasis nyassae* Butl. and *Aphnaeus hutchinsoni drucei* Neave in Africa. Since some phytophagous butterflies have

become dependent on ants for reasons other than as a source of food and protection, the symbiotic relationship of ants and butterflies in our North American fauna should be studied further.

Of the 833 species of Lycaenidae for which I have obtained some record or indication of individual life history from the literature, 245 species have been reported in association with ants. This survey is probably not complete, but certain facts are indicated. In 137 species the attendant ants have been identified (in 31 instances only to genus); the ants have not been identified in 108 of these associations. Forty-five species of Lycaenidae have more than one ant species reported in symbiosis; only five lycaenid species have been associated with four or more ants, and *Lysandra coridon* Poda has the greatest number of species of attendant ants, six. Only three species of Lycaenidae occurring in North America have hitherto been known to associate with more than one species of ant: the Holarctic *Lycaeides argyrognomon* (Bgstr.) with three species in Europe, the Holarctic *Celastrina argiolus* (Linn.) with four unidentified species in the U. S., and the Nearctic *Scolitantides piasus* (Bdv.) with four species. Five-hundred and eighty-nine species of lycaenids whose life histories are at least partially known, have not been reported as myrmecophiles, yet many of these are known to have exudate glands in the larval stages.

Eighty species of ants belonging to 25 genera have been associated with the Lycaenidae. None of the species listed in Table 1, except *Lasius niger* (L.), *Tapinoma sessile* (Say) and *Formica fusca* L., has been previously known to attend lycaenids. In addition, the genus *Dorymyrmex* is new to the list. The number of lycaenid species associated with the principal ant genera involved is: 30 species with *Camponotus sp.,* 58 with *Cremastogaster,* 9 with *Formica,* 11 with *Lasius* and 19 with *Oecophylla.*

The fact that *P. icarioides* is associated with 11 or more species of ants is essentially a measure of the ant-attractive powers of the larval secretions. I would expect that many of the ants herein reported are attracted to any sweet source and would be strictly opportunists in using secretions from larvae of blue

butterflies. Eventually, as records accumulate, it may develop that many of these same ants would be found associated with other North American species of lycaenids possessing exudate glands.

Summary and Conclusions

1. Eleven species of ants were found in association with larvae of *Plebejus* (*Icaricia*) *icarioides* (Bdv.), and in four of seven localities more than a single species of ant was involved. Hence there is not the specificity in this symbiotic relationship that can be noted in the phyto-predacious (= predacious in last larval instar only) or carnivorous Lycaenidae.

2. Since the butterfly can be reared without ants, the relationship is classified as facultative.

3. A braconid parasite, *Apanteles theclae* Riley, emerged from one larva. The very low incidence of larval parasitism, plus the "belligerent" behavor of attendant ants when larvae are threatened, substantiates the opinion that the larvae derive benefit from the association.

4. In one population, ants appear to have selected a different host plant for the larvae than did the ovipositing butterflies. Other ecological factors bearing on the myrmecophily may include differences in larval secretions depending on the particular food plant, edaphic factors such as soil particle size, and proximity of plants to the ant nest.

5. A general summary of ants associated with Lycaenidae is presented, including several new records.

Acknowledgments

Grateful acknowledgment is hereby made to the National Science Foundation (grant no. G9024) which is supporting a major project of which this study is a part. My thanks also to Dr. Marion R. Smith for identification of the ants herein reported, to Dr. C. F. W. Muesebeck for identification of a braconid parasite, and to Dr. R. E. Blackwelder for assistance in the collections upon which this report is based, and to Dr.

Blackwelder and Dr. H. I. Fisher for suggestions and criticism of the manuscript.

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The Conflict between the Tribal and Family Names Mirini (Hymenoptera) and Miridae (Hemiptera)

The hymenopterous genus *Mira* was established by Schellenberg in 1803, and Ashmead using this genus as the type proposed the tribe Mirini in the family Encyrtidae in 1900. The name *Mira* is derived from the Latin adjective *mirus* meaning wonderful; hence the tribal name Mirini is correctly formed and valid if not preoccupied by the hemipterous name Miridae.

Fabricius proposed the genus *Miris* in 1794, but the derivation of the word is uncertain. The establishment of a group name based on *Miris* was by Hahn in 1831, who called the group Mirides and this was later changed to Merinae and Miridae. Although the name *Miris* possibly was formed arbitrarily its structure suggests the Latin third declension, and Hahn's name Mirides is evidently in the plural nominative case. The stem of *Miris,* therefore, is *mirid* and the hemipterous family name should become Mirididae.—P. H. Timberlake, Citrus Experiment Station, Riverside, California.

Collembola from Louisiana

Harold George Scott [1]

The two species of springtail insects recorded in this paper have not been reported previously from Louisiana. Collections were made by Dr. J. H. Esslinger, Department of Tropical Medicine and Public Health, Tulane University. Specimens will be deposited with the Academy of Natural Sciences, Philadelphia, Pennsylvania.

Podura aquatica Linnaeus, 1758. Figure 1

Louisiana Record. From temporary flood waters, approximately 15 feet above mean sea level, Norco, St. Charles Parish, 29–iii–1960.

Distribution. Alaska, Colo., Ill., Ind., Iowa, Kans., La., Mass., Minn., Mo., Ohio, Tenn., Texas, Utah, Wash., Wisc.; Ontario (Canada) Europe, Siberia (U.S.S.R.).

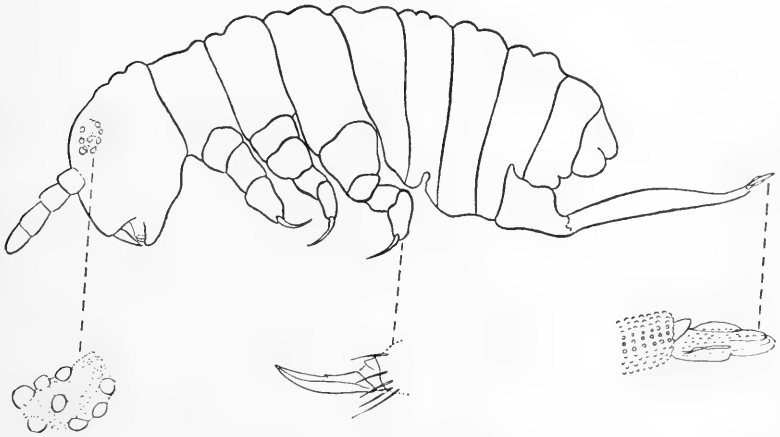


Fig. 1. *Podura aquatica.*

[1] Training Branch, Communicable Disease Center, Public Health Service, U. S. Department of Health, Education, and Welfare, Atlanta 22, Georgia.

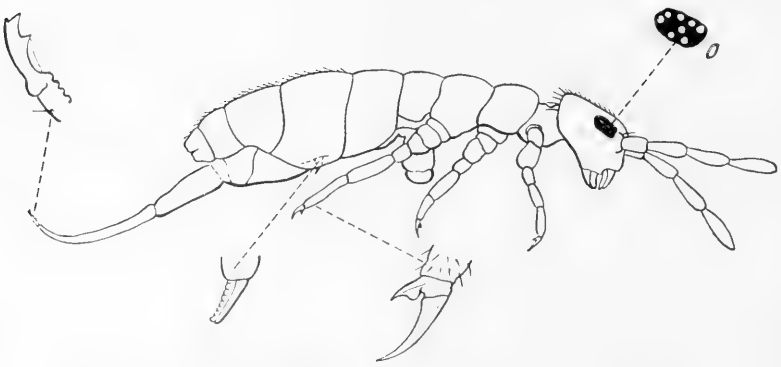


FIG. 2. *Isotoma louisiana* sp. nov., lateral view of holotype.

Isotoma louisiana sp. nov. Figure 2

TYPE LOCALITY. *Holotype* and 43 *paratypes* on water, shore of Lake Pontchartrain, approximately 15 feet above mean sea level, Norco, St. Charles Parish, LOUISIANA, 29–iii–1960. Specimens will be deposited with the Academy of Natural Sciences, Philadelphia, Pennsylvania.

DESCRIPTION. Body elongate, segmented; without segmental ankylosis; scales absent, setae present; yellow with bluish purple markings on mid-dorsum and on sternum of Th II—Abd VI; legs and antennae light purple; collophore and furcula bright yellow; Ant III and IV not subsegmented; Ant II and IV subequal; postantennal organ of simple isotomine type, about twice as long as wide; eyes 8 and 8 on black eyepatch, mouthparts chewing; prothorax reduced, membranous, non-setaceous; tenent hairs absent; unguis non-tunicate, without inner teeth; unguiculus with large basal tooth; fringed bothriotricha absent; Abd III to IV as 4:3; tenaculum prominent; furcula present; mucro with 2 teeth; dens without spines; anal spines absent; anus terminal; length approximately 2 mm.

DISCUSSION. This species may be distinguished from all other members of the genus by (1) the absence of tenent hairs, (2) the subequal length of Ant II and IV, and (3) the lack of inner teeth on the unguis.

Roleta coracina gen. nov., sp. nov. (Coleoptera; Lampyridae, Pleotomini)

Frank A. McDermott, Wilmington, Delaware

Among specimens of Lampyridae received from Sr. F. H. Walz, Buenos Ayres, was one which was found to represent a new genus in the tribe Pleotomini. For the genus I propose the name *Roleta,* a feminine form of an anagram of the type locality, Loreto, and for the species *coracina,* "black as a crow," because of the general black color of the insect. The peculiar pronotal and elytral outlines are shown in the accompanying photograph. I wish to thank Mr. J. W. Green for calling my attention to the relationship of this species.

ROLETA gen. nov.

This genus has the usual characters of the Pleotomini—modified mandibles, ventral abdominal spiracles, and biramose antennae. It differs particularly from other pleotomid genera in the narrow form, the unusual shape of the pronotum, the apparently thick antennae with broad, closely folded rami, and the markedly narrowed elytra.

The new genus may be correlated with the other genera of the Pleotomini by the following modification of the key to the American Pleotomini given by Green (*Coleopt. Bull.* 1959, XV, p. 91):

2 Antennae with 13 or 14 segments, the branches short and stout.....**Pleotomus** LeConte
Antennae with 11 segments.....3
3 Branches of antennae long and slender 4
Branches of antennae short and broad.....5
4 Legs long and slender, femora extending beyond sides of body. Elytra dehiscent.....**Calyptocephalus** Gray
Legs short, femora extending only to sides of body. Elytra not dehiscent.....**Phaenolis** Gorham
5 Fore and middle legs short, posterior pair relatively long. Elytra dehiscent.....**Roleta** gen. nov.

The type species of *Roleta* is described below as *Roleta coracina* sp. nov. As will be seen from the foregoing key, this species has not only the general characters of the Pleotomini, but combines some of the generic characters of the species of *Pleotomus, Calyptocephalus,* and *Phaenolis.* So far as I am aware, no other lampyrid species exhibits this combination of characters, and it thus appears not to be closely related to any other species.

Roleta coracina sp. nov.

Type locality Loreto, Misiones, ARGENTINA. Collected in September, 1955.

Dimensions: 10.9 mm long from apex of pronotum to tip of pygidium, by 5.1 mm broad at humeri.

Outline generally parallel, but middle abdominal segments somewhat widened.

Pronotum *ca.* 2.6 mm long by 2.5 mm broad. Lateral edges parallel from apical 4th to basal angles, and reflexed; anterior 4th angulate, apex rounded and reflexed. Base nearly straight as seen from above but sinuate in vertical plane. Angles much rounded, *ca.* 90°. Disk papillate-rugose, angularly convex, with a longitudinal median carina particularly evident at base and apex. Plane and reflexed areas around disk coarsely but not confusedly punctate; no visible pubescence. A basal line of deep punctures and a line of similar punctures on each side of disk. Entirely a somewhat dull black except for a U-shaped dark orange mark on the disk, the bottom curvature nearly reaching the base.

Scutellum black, rather narrow, apex truncate; mesonotal plates dull black.

Elytra 6.8 mm long, shorter than the abdomen, reaching only to about middle of tergite 6; 2.55 mm wide at humeri; much narrowed from basal 4th to about 0.55 mm, the narrowed portions arcuately dehiscent, the apices approaching somewhat; apices rounded. Sutural edges not raised; no explanate margins; two indistinct costae; epipleura basally broad and deflexed, short, ending about where the narrowing begins. Uniform

black, rather densely rugose, and with a very short, dense pubescence. Wings greyish, not completely folded under elytra.

Head small, deeply set in prothorax, the front limited to the narrow spaces above and below the contiguous antennal sockets; vertex black, somewhat rugose. Gula apparently membranous. Maxillary and labial palpi of the usual lampyrid form. Eyes mediocre, 1.2 mm across in frontal view, and 0.64 mm between them; interocular margins straight and vertical in frontal view. Mandibles of the modified type, the distal portions very slender and sharp; reddish brown. Clypeus pale, distal edge straight.

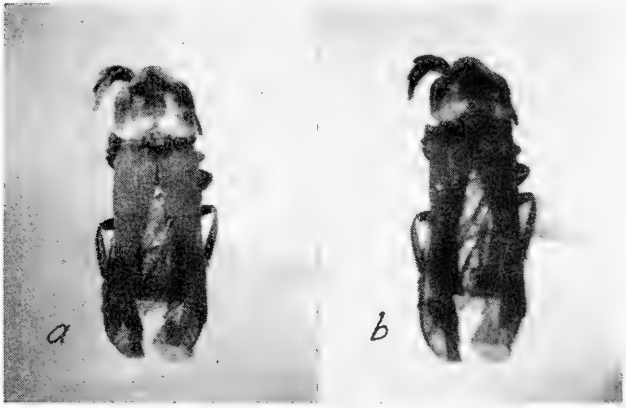


FIG. 1. *Roleta coracina* sp. nov. In the specimen the pronotum is at an angle to the elytra. View *a* is taken at right angle to the pronotum; view *b* at right angle to the elytra.

Antennae short, *ca.* 2.6 mm long, biramose, 11-articulate, and apparently thick owing to the mostly closely folded rami; the latter nearly flat, most of them somewhat curved, 0.25 to 0.3 mm broad by 0.9 to 1.0 mm long, apices rounded; clothed with a very short black pubescence. 11th article similar to a ramus. Sockets large, pale, contiguous.

Prosternum ventrally black, pale orange laterally; anterior edge broadly emarginate, with a median intumnescence. Meso-

and metasterna black, the latter somewhat bulbous. Sterna papillate-rugose, slightly shining, and with a short appressed pubescence.

Tergites all black, with large pointed lobes, each about one-third of total width; 4th to 7th wider than the distance across the external edges of the elytra. All granular-rugose, somewhat shining. Pygidium black, rugose, trilobed, the median lobe smaller and more acute than the laterals.

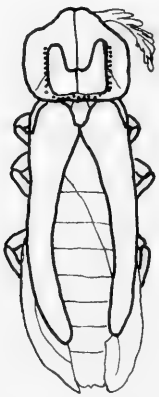


FIG. 2. *Roleta coracina* sp. nov. This drawing shows the peculiar outlines of the pronotum and elytra, and the arrangement of the wings.

Ventral abdominal segments black, granular-rugose, somewhat shining, and with small pointed lobes; 4th to 7th not emarginate; 8th with a truncate apex, medially incised and with lateral flecks representing the larval luminous organs; 9th (genital) small, paler, and medially incised.

Abdominal spiracles near middle of margins of the lateral lobes, visible in ventral aspect.

Legs black, claws simple. Fore and middle tarsi not markedly long; posterior tarsi nearly as long as femora and about $\frac{2}{3}$ as long as tibiae; 1st article as long as 5th, 2nd shorter than 1st, and 3rd shorter than 2nd; 4th very small, hidden, and bilobed.

No corresponding female is known.

The type specimen is being deposited in the U. S. National Museum.

In Fig. 1, photographs *a* and *b* were taken with the specimen in different positions, because the pronotum was at an angle to the elytra; *a* emphasizes the pronotum, and *b* the elytra. The sketch, Fig. 2, shows the outlines of the insect more distinctly than does the photograph.

A Pictorial Review of the North American Chipmunk Fleas. Part III, Monopsyllus fornacis, M. eutamiadis, and M. Polumus [1]

C. Andresen Hubbard, Tigard 23, Oregon

The three remaining western Chipmunk fleas have been described from southern California and northwestern Mexico. The first of these to appear in print was

Monopsyllus fornacis Jordan 1937

1937 *Monopsyllus fornacis* Jordan, *Nov. Zool.* 40: 263. Female described.

1940 *Monopsyllus fornacis* Jordan, Jellison, *P.H.R.* 55: 491. Male described.

Although siphonapterists have constantly likened this flea and the two which follow to *Monopsyllus eumolpi* (Roths.) it has always seemed to the writer that they are much more closely related to one another than to *M. eumolpi.* It seems likely that when someone has the courage to attack and revise that portion of the genus taken off chipmunks and pine squirrels *M. eutamiadis* and *M. polumus* may become subspecies of *M. fornacis,* or *M. polumus* may become a subspecies of *M. eumolpi.*

It should be noted that the writer has never collected in the area where these three fleas are found, and that his only experience with them has been through mounted specimens or from the original papers.

[1] Part I of this series dealt with *Monopsyllus eumolpi* (Roths.) (Entom. News 60: 253–261), and Part II with *M. ciliatus* (Baker) (*Ibid.* 73: 7–16). Reprints are available.

This is the flea which Glenn Kohls took off a silver gray squirrel at Seven Oaks, California, and sent to Dr. Jordan at Tring and the flea which was sent to William Jellison in greater numbers from Hunter Ligget Military Reservation at Jamesburg, Monterey County, California.

Regardless of what the affinities of these fleas may be there are differences in the

Modified Segments: Male. Jellison states that the finger is narrower than in *M. eumolpi,* the spines shorter, heavier and straight. Sternite VIII is broader, shorter and has fewer ventral bristles and bears a pair of posteriorly projecting filamentous plumes. The process is longer and broader than that of *M. eumolpi.* The writer feels that the finger lays down the pattern for *fornacis* and at least that of *eutamiadis* also, that is, a finger which is scythe-blade shaped, which of course the finger in *M. eumolpi* is not and for that matter neither is that of *M. polumus.* The armature consists of three black spiniforms on the posterior border, much shortened in comparison with those of *M. eumolpi,* straight and appearing stubby, the spiniforms being equidistant along the margin and the usual series of fine and medium bristles over the face of the finger. The process P is long and broad, apically dome-shaped.

Female. Jordan writing on the VII sternite says "this sternum is truncate, with the upper angle rounded-projecting, the ventral margin of this short nose not forming an angle with the apical margin of the segment. The writer, after examining a series of females prefers to say that the margin is evenly slanted with a small nose-like projection midway along it. Of the bursa, Jordan says "duct much shorter (than in *M. eumolpi*), not rolled up, broadly margined with glandular tissue on the anterior side, the bursa itself rounded." The spermatheca is barrel-shaped, its tail finger-shaped and crooked.

Length: Males and females about 3.00 mm.

Range: Coastal belt of California south of Monterey Bay and in the south to the east into and perhaps through San Bernardino County.

Deposits: The types, which were before the writer at the time of this study, are in the collection of the Rocky Mountain Laboratory, Hamilton, Montana.

Specimens Examined: The entire series in the collection of the Rocky Mountain Laboratory was loaned to the writer for this study. The specimens consist of the holotype female taken off silver gray squirrel (*S. g. griseus*), by Glenn Kohls, May 1936 at Seven Oaks, San Bernardino County, California, a second female with same data and 24 females and the holotype male and 4 other males from Jamesburg, Monterey County, California, from 12 chipmunks (*E. merriami*) by Holdenried during April, June and July of 1939.

Preferred Host: There is little doubt that the normal host of this flea is the chipmunk.

Monopsyllus eutamiadis Augustson 1941

1941 *Monopsyllus eutamiadis* Augustson, *Bull. S. Calif. Acad. Sci.* 40: 141.

Working high in the Sierra Nevada Mountains in Cascade Valley, Fresno County, California, Rutherford and Augustson took a series of fleas off the Inyo chipmunk (*E. s. inyoensis*) August 27, 1941. In this flea the finger is scythe-blade shaped, as in the preceding, and the VII sternite female has a nose-like projection as an upper lobe.

Modified Segments: Male. The finger F is slightly longer and slightly broader than in *M. fornacis*. It is still scythe-blade shaped. The three black spiniforms are two above, short and slightly bent, and a long one below, straight or slightly bent, the three high on the border, the two lower ones closer together. There are the usual small bristles on the face. The process P is incurved below the apex on the posterior border. The process is long, broad and apically rounded.

Female. Apical outline of the VII sternite suggests a high but shallow lower lobe, then a not too deep or wide sinus and an upper lobe suggestive of a long pointed nose, extending out beyond the lower lobe. The whole sternite, again, looks like the side view of the head of the stone men of Easter Island.

The spermatheca is barrel-shaped, with tail finger-shaped and crooked. The bursa is less prominent than in *fornacis,* more so than in *polumus.*

Length: Male and females about 3.00 mm long.

Range: This flea is probably limited in range to the southern portion of the Sierra Nevada Mountains of California.

Deposits: The type slides are in the Los Angeles County Museum.

Specimens Examined: Only the types were in the hands of the writer at the time of this study. These were off Inyo chipmunk, eastern Fresno County, California, taken by Rutherford and Augustson August 27, 1941.

Preferred Host: This flea probably prefers the chipmunks of the high Sierra Nevada of central and southern California for its hosts.

Monopsyllus polumus Traub and Johnson 1952

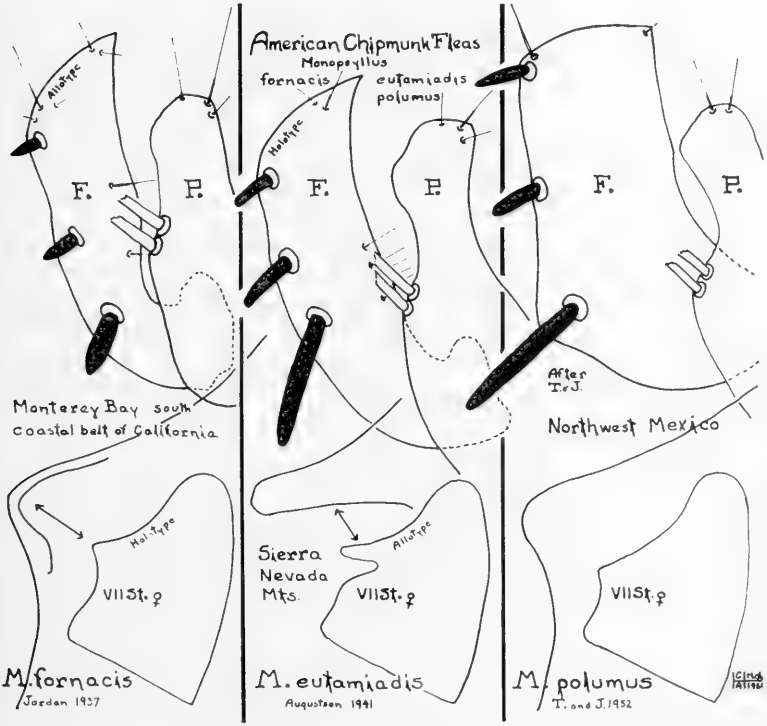
1952 *Monopsyllus polumus* Traub and Johnson, Amer. Mus. Nov. 1598: 17.

This, the most recent of the North American chipmunk fleas to be described, was collected in northwest Mexico 5 miles west of El Salto, Durango, San Juan, off "a sciurid" and a Eutamias by Betty S. Davis, July 3, 1951. Dr. Traub secured the fleas from Dr. E. W. Jameson, University of California.

To us who can describe a flea in 6 lines or less the descriptions put out by Dr. Robert Traub are the marvel of the siphonapteran world. Every young aspiring siphonapterist should read them all. Traub's descriptions are the way they should be done. There are only about half a dozen papers that the writer knows about. Now holding high office in the Army Medical Research Division, Washington, D. C., Traub, whom the writer has known by correspondence for some years, complains that paper and desk work takes all his time, the fleas must wait. But finally we all come to the point where we have waited too long. The writer as he has watched Traub grow feels that in Traub Americans have a British Jordan, a great in the flea field. Traub has built up the finest flea collection in

North America. In his descriptions there are the most meticulous details of head, thorax, abdomen, legs, modified segments, copulating apparatus.

The description of *M. polumus* covers 10 pages and includes 4 pages of the most precise drawings by Dr. Phyllis Johnson now working in Panama.



Monopsyllus fornacis Jordan, *M. eutamiadis* Augustson, and *M. polumus* Traub and Johnson.

Amongst other things Traub says differing from the previous two "by the absence of several long thin dorsal bristles on the first two segments of the mid-tarsus in the male, in the female

by the shape of the posterior margin of the seventh sternum, which is shallowly sinuate and lacks a distinct dorsal lobe. In that the bursa copulatrix is short, not very long and coiled."

Modified Segments: Male. The writer is inclined to feel that the finger of *polumus* is of a pattern of its own. It is neither scythe-blade shaped as in *fornacis* and *eutamiadis* nor ham-shaped as in *eumolpi*. It seems to the writer that it is rectangular. Of the three black spiniforms on the posterior border the two above are short, the lower one slightly curved, the third and lower is long, apparently straight. The three are equidistant, the upper and lower ones being at the angles. Apex of finger square. The process P, while apically rounded, is decidedly undercut on the posterior border.

Female. VII sternite without lower lobe, but a slight spur about one third up the posterior border. Spermatheca barrel-shaped, the appendix finger-shaped and crooked. The bursa is short, not very long and coiled.

Length: No length was included in the description of this flea.

Range: This flea is known only from the type locality.

Deposits: The type specimens are in the collection of the American Museum of Natural History.

Specimens Examined: The writer has seen no specimens of this flea.

Preferred Host: This is probably a northwest Mexican chipmunk flea.

Key to the Southwest Chipmunk Fleas by Range

1. Coastal belt of California south of Monterey Bay....*fornacis*
2. Southern part Sierra Nevada Mountains of California.....
.....*eutamiadis*
3. Northwest Mexico.....*polumus*

Studies of the Byron Bog in Southwestern Ontario. XIII. Seasonal Distribution of Wasps (Hymenoptera: Vespidae)

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

The operation of a baited trap in the Byron Bog as well as the bog itself have been described earlier (Judd, 1956, 1957). During the period May 15 to November 15, 1956, this trap was emptied daily, and the insects recorded. Some species have already been reported upon, including the wood gnat *Silvicola marginata* (1958*a*), Tabanidae (1958*b*), and filth flies (1958*c*).

The Vespidae taken numbered 126 specimens. They were identified by S. M. Clark of the Canada Department of Agriculture, Ottawa, and are deposited in the Department of Zoology, University of Western Ontario. The seasonal distribution of the species is shown in Fig. 1. The castes were sorted out according to their color pattern (Miller, 1961), except in the case of *Polistes* in which the female castes are not surely distinguishable (Bequaert, 1940).

Account of Species Collected

Polistes fuscatus (Fabr.)—2 males, October 16, 19; 16 females, May 22–November 6, maximum July 26 (3 wasps) (Fig. 1). In his letter of identification Mr. Clark pointed out that this population is intermediate between typical *P. f. fuscatus* (Fab.) and *P. f. pallipes* Lepeletier.

Vespula maculata (L.)—2 males, October 2, 13; 4 females, June 17–26; 11 workers, July 17–September 23 (Fig. 1).

Vespula maculifrons (Buysson)—3 males, October 17, 21, 23; 6 females, June 20–July 17; 69 workers, August 4–November 6, maximum August 25 (6 wasps) (Fig. 1).

Vespula vulgaris (L.)—9 workers, August 9–October 30 (Fig. 1).

Vespula vidua (Saussure)—3 workers, September 9, 24, 29 (Fig. 1).

Vespula arenaria (Fabr.)—1 female, August 6.

Discussion of Collections

For three species, *P. fuscatus, V. maculata* and *V. maculifrons,* the first insects trapped were females. Males turned up at the end of the season and workers were prevalent mainly during the summer months.

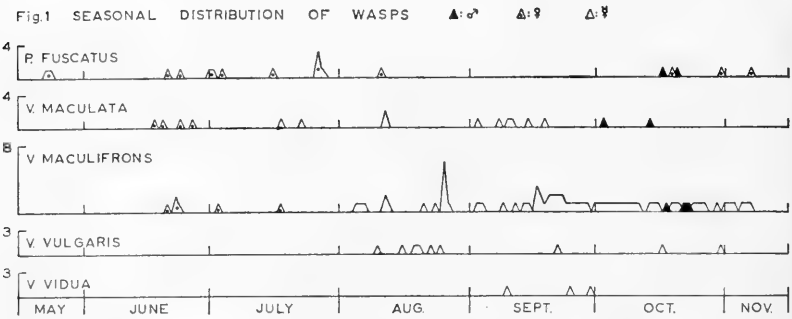


Fig. 1. Seasonal distribution of wasps (males, females and workers) in the Byron Bog in 1956.

The Byron Bog (Judd, 1957) lies at or near the northern border of the Carolinian Zone in Ontario and thus affords an opportunity to investigate the insects occurring in an ecological unit characteristic of the more northern coniferous forest, but here situated at the edge of the Beech-Maple Forest Region. It is evident from an examination of the numbers of the various species of wasps found in the bog and their known geographic distribution that the wasps in the bog are predominantly those of the Carolinian or Austral Region. The distribution of *P. fuscatus* (both *f. fuscatus* and *f. pallipes*) is "southeastern" in Canada (Muesebeck *et al.,* 1951) and the commonest species in the bog, *V. maculifrons,* is restricted to the Austral Region (Miller, 1961). *V. vidua* is distributed in the Transition and Upper Austral Region while *V. maculata* and *V. vulgaris* are

widespread Nearctic species and *V. arenaria,* represented by only one specimen in the collection from the Byron Bog, is found in the more northern Boreal Region (Miller, 1961).

Acknowledgment

This project was supported by funds from the Government of Ontario granted through the Ontario Research Foundation and was carried out while the writer held a Summer Research Associateship from the National Research Council of Canada during 1956 and 1957.

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Review

Butterflies of the American Tropics. The Genus Anaea (Lepidoptera, Nymphalidae). This is a study of the species heretofore included in the genera *Anaea, Coenophlebia, Hypna, Polygrapha, Protogonius, Siderone,* and *Zaretis.* By William Phillips Comstock, Research Associate of the Department of Insects and Spiders of the American Museum of Natural History. Sponsored by Frank Johnson, Patron of the American Museum. Published by The American Museum of Natural History, New York. Price: $20.00.

William Phillips Comstock began his work on this volume

about twenty years ago and the manuscript was completed in 1949. The author died in 1956 and the sponsor in 1949 so that neither of the two men primarily responsible for the work lived to see it published. The reproduction of the color plates was financed in part by the National Science Foundation and additional assistance was given by Dr. David Rockefeller. To Frederick H. Rindge, Associate Curator of the Department of Insects and Spiders of the American Museum of Natural History, a great debt is owed because he critically edited the paper from a scientific standpoint and read all the proofs. All entries in the large bibliography that bear dates later than 1949 were added by Dr. Rindge.

Before writing this review of a monograph complete in every scientific detail, logically arranged, with every needed bit of information easy of access, with perfectly designed exact color reproductions, and with clear genitalia drawings, I wrote to Dr. Rindge to find out whether this book on the Butterflies of Tropical America is the first of a planned series on the various butterfly genera, and learned that because of the great expense it is unlikely that there will be another book in this series in the foreseeable future. Hence, while the edition lasts, this unique book should be purchased by all museums for their entomological libraries. Certainly this book, in every detail, will stand as the ideal monograph on a single genus of Lepidoptera, to be followed, it is hoped, by other books of a similar kind.

The book covers the following topics, all of which are superbly indexed: Distribution and Origin of Anaea, Knowledge of Ranges of Species, Fossil Butterflies, Regional Tabulation, Checklist, Bibliography, Plates. There are line drawings of all the wing shapes, with a careful systematic account of each section of the genus and subgenera. Then follow the genitalia drawings and descriptions of the immature stages. There is surprisingly little to be found in the literature concerning the eggs, larvae, and pupae: a few colored figures appear in the works of Stoll and Sepp, there are some excellent drawings by Müller. Edwards illustrated the life history of *Paphia glycerium* (= *andrea*), Matteson showed photographs of larvae of

Anaea portis (= *floridalis*), and a few others have been described and illustrated.

There follow some detailed maps of the recorded distribution of species, a discussion on climate and population density, and maps showing species common to different regions that will be of great importance to all collectors. An illustration of the accuracy of the places named for the occurrence of certain species is the recent (Nov., 1961) experience of the Entomological Expedition of the Carnegie Museum to Baja California. This expedition divided into two sections at first, three flying to La Paz and three driving the travelall to Mazatlan on the West Coast Mexican Highway, and taking the ferry to La Paz. Those driving to Mazatlan were informed by letter of the occurrence, as recorded in this monograph, of *Anaea callidryas* in that region, and were successful in netting this butterfly during their short stay in its locality.

Following a most careful and helpful Index to Generic Names come the plates of which there are thirty, each illustrating about eight species or subspecies. The underwings of *Anaea* call for special skill of portrayal because these are mottled and spotted in exquisite detail, and colored to perfection. All lepidopterists owe a debt of gratitude to the artists that I can find no adequate words to express. If this magnificent book is too expensive to be privately owned then visits should be paid to the libraries of museums where it can be found. It will, I believe, stand for all time as a model for illustrated scientific monographs. Sufficient gratitude cannot be expressed for the tireless work of the author and for all those who contributed so ably to the making of this book.

Margaret M. Cary

Entomologist's Market Place

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

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

Cockroaches (Blattoidea) of Japan, Okinawa, Formosa (Taiwan), and the Philippines are being studied in cooperation with Dr. K. Princis. Loans of specimens from that area are desired. A. B. Gurney, U. S. National Museum, Washington 25, D. C.

Orthoptera. Gryllinae (except domestic sp.) and **Pyrgomorphinae** of the world wanted in any quantity for work in morphology, taxonomy, cytology, and experimental biology; dry, or in fluid, or living. Write D. K. Kevan and R. S. Bigelow, Dept. of Entomology, McGill University, Macdonald College, Quebec, Canada.

Beetles of the world wanted, all species in exchange for American beetles, moths and butterflies. James K. Lawton (age 18), 7118 Grand Parkway, Wauwatosa 13, Wisconsin.

Acanthomyops (Citronella ants) wanted for revisionary study. Will sort from yellow *Lasius*. M. W. Wing, State University College, Cortland, N. Y.

Cicindelidae of the World wanted in exchange for North American Coleoptera or in purchase. Carl Farr Moxey, 414 Woodland Ave., Wayne, Pennsylvania.

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APRIL 1962

Vol. LXXIII No. 4

CONTENTS

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ENTOMOLOGICAL NEWS

VOL. LXXIII APRIL, 1962 No. 4

A New Hesperia from Arizona (Lepid.: Hesperiidae)

LEE D. MILLER, Section of Insects and Spiders, Carnegie Museum, Pittsburgh 13, Pa.

The author and his wife spent three weeks collecting in Arizona during September, 1960, including several days in the well-known White Mountains of the eastern part of the state. Among other butterflies collected was a small, rather dark *Hesperia* which was especially abundant at Horseshoe Cienega, about five miles southeast of McNary. This skipper is apparently undescribed; the only comparable specimens seen were from the Barnes collection at the U. S. National Museum in a group of unidentified *Hesperia*—from the White Mountains, Arizona. This species most nearly resembles *H. manitoba* Scudder, both superficially and genitalically, though it is not far from *H. colorado* Scudder.

Hesperia susanae n. sp.

Male.—Head, thorax, and *abdomen* dark brownish-black on the dorsal surface, the hairs of the abdomen and patagia only slightly greenish; the ventral surface is light grayish-tan. The *eyes* are black; the *palpi* are light gray; the *antennae* are tan with the clubs dark brown; the legs are tan, slightly greenish along the femora.

WINGS. *Upper surface* (Fig. 1): *Susanae* has the appearance of a small, light, bright *manitoba,* but the fuscous borders are not so extensive and appear slightly washed with fulvous, the fulvous ground color intermediate between that of *manitoba*

and *colorado*. The fulvous markings of the hind wings are in diffuse patches with brighter points corresponding to the spot-band of the under surface, rather than only in spots as in *manitoba*. The veins are strongly darkened, especially basad, contrasting more with the ground color than in either of the other species.

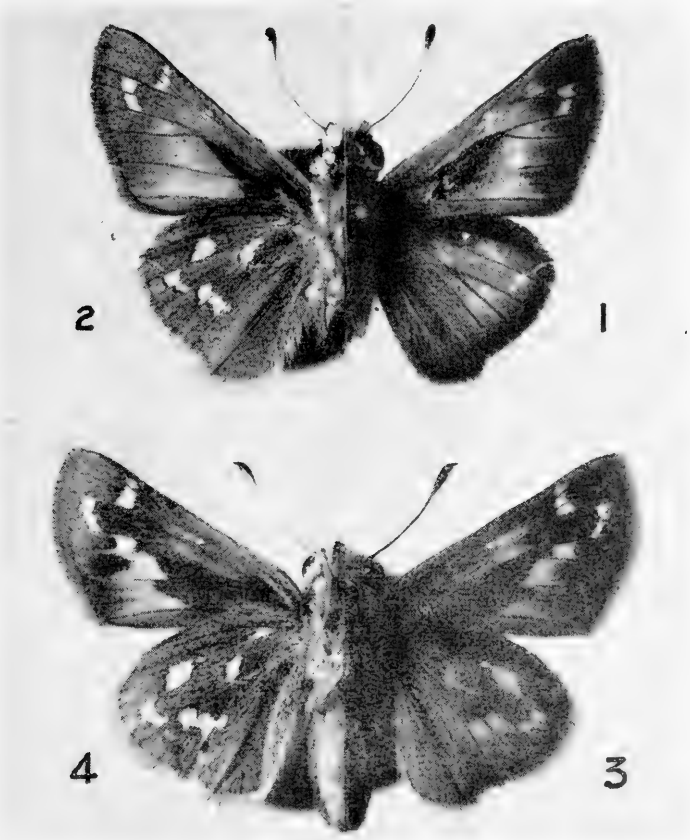
Under surface (Fig. 2): *Susanae* resembles a pale specimen of *manitoba* with the olive-brown ground color of the hind wings of that species replaced by olive-green. The spots of the hind wings are smaller than in either *manitoba* or *colorado* and are occasionally discontinuous and well-separated, whereas the spots of the other two species are generally contiguous and band-like. The anterior two spots and those posteriad of vein Cu_2 always are reduced, and occasionally one or more may be absent; in the other two species these spots are present, though sometimes reduced. The spots are not edged in black, as is usual in *manitoba*. The length of the fore wing from base to end of costa varies in the series from 11.5 to 13 mm, averaging 12.16 mm; that of the holotype is 12 mm.

The ♂ *genitalia* (Fig. 5) most closely resemble those of *manitoba*, differing in the following respects: (1) the proximal tooth of the valva more nearly the same size as the distal one and not so incurved, often straight; (2) the dorsal margin of the sacculus more definitely "humped" medially; (3) the saccus much longer and with a more bulbous end; (4) the coecum penis strongly bulbous; and (5) the ventral surface of the penis relatively straight, not kinked in the vicinity of the ductus ejaculatorius.

Female.—Head, thorax, abdomen, and *appendages* as in male.

Wings. *Upper surface* (Fig. 3): Closely resembles a pale *manitoba*, but the fuscous is less extensive and washed with fulvous. In paratypes Nos. 40 and 59, and to a lesser degree in Nos. 37, 42, and 63, the discal fuscous markings are almost extinct, leaving fuscous only marginad, and the fulvous areas are more tawny, resulting in very pale specimens.

Under surface (Fig. 4): Also resembles a pale *manitoba*. The spots of the hind wing are either not or only slightly out-



FIGS. 1–4. *Hesperia susanae* n. sp.
Holotype ♂: 1. Upper surface. 2. Under surface.
Alltotype ♀: 3. Upper surface. 4. Under surface.

lined with dark scales, unlike *manitoba* in which they are strongly outlined; the spots posteriad of vein Cu_2 and the anterior pair are reduced, occasionally absent. All the spots of *susanae* are smaller than those of *manitoba,* but unlike the male always arranged in a band. The length of the fore wing from base to end of costa varies in the series from 12 to 14.5 mm, averaging 13.62 mm; that of the allotype is 14 mm.

TYPE MATERIAL.—36 ♂♂ and 29 ♀♀, from the White Mountains, ARIZONA, all but six taken by the author and his wife. HOLOTYPE ♂: Horseshoe Cienega, White Mts., Apache Co., Ariz.; 8000 ft, in dry meadow; 3–ix–1960; Susan M. Miller; ♂ genitalic slide No. 8. ALLOTYPE ♀: Same data as holotype; Lee D. Miller.

PARATYPES 35 ♂♂: Nos. 1–11: same locality as holotype; 2–ix–1960; Lee D. or Susan M. Miller. Nos. 12–29: same data as holotype; Lee D. or Susan M. Miller. Nos. 30 and 31: Ditch Camp, White Mts., Apache Co., Ariz.; 8000 ft, along stream bed; 3–ix–1960; Lee D. Miller. No. 32: vic. Greer, Ariz., Apache Co.; 9000 ft, dry meadow; 3–ix–1960; Lee D. Miller. Nos. 33–35: White Mts., Ariz., no date; Barnes collection. In the following ♂ paratypes the genitalia have been examined: Nos. 1, 2, 11, 12, 13, 14, 20, and 33; the corresponding slides are Nos. 7, 12, 19, 10, 11, 5, and 20 of Lee D. Miller and 5 of McDunnough in the U. S. National Museum collection. 28 ♀♀: Nos. 36–44: same data as Nos. 1–11. Nos. 45–59: same data as holotype. No. 60: same data as Nos. 30 and 31. Nos. 61–63: same data as Nos. 33–35. Paratypes Nos. 29 and 45 were taken *in copula* by the author.

The holotype, allotype, and paratypes Nos. 6, 7, 10, 15, 18, 36, 37, 38, 40, and 46 will be deposited in Carnegie Museum. Paratypes Nos. 4 and 39 will be deposited in the U. S. National Museum, and the Barnes collection specimens, paratypes Nos. 33, 34, 35, 61, 62, and 63, will be returned to that institution. Paratypes Nos. 21 and 53 will be deposited in the American Museum of Natural History. Paratypes Nos. 19 and 43 will be deposited in the Canadian National Collection. Paratypes Nos. 5 and 41 will be deposited in the Los Angeles County Museum. Paratypes Nos. 3 and 44 will be deposited in the collection of Dr. C. Don MacNeill. Paratypes Nos. 24 and 54 will be deposited in the collection of Dr. J. W. Tilden. Paratypes Nos. 9 and 58 will be deposited in the collection of Mr. F. Martin Brown. Paratypes Nos. 17 and 50 will be deposited in the collection of Mr. H. A. Freeman. Paratypes Nos. 22 and 51 may be deposited in the collection of Mr. Kilian Roever.

Hesperia susanae is named for the author's wife, always an amiable and competent companion, who collected the greater part of the type series.

This species, while showing a close resemblance to *manitoba,* differs superficially by its smaller size, generally more fulvous coloration, and the weaker spot-band of the hind wings beneath, with the spots much reduced, occasionally strongly non-contiguous. The ♂ genitalia differ especially along the valvae, the saccus, and the penis. This species is apparently referred to in the literature as *manitoba* from Arizona. The author feels that all the high-altitude records of *manitoba* from that state may refer to *susanae,* not just those from the White Mountains.

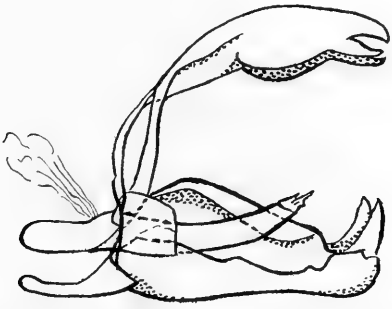


FIG. 5. *Hesperia susanae* n. sp. ♂ genitalia, left lateral aspect with left valva removed.

The author is deeply indebted to Dr. Richard M. Fox and Mr. Harry K. Clench for reading the manuscript and making suggestions on its preparation. Further thanks are due Dr. Fox for taking the photographs of the types. The author also wishes to thank the entire entomological staffs of the U. S. National and Carnegie Museums for placing their collections of *Hesperia* at his disposal for comparison.

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A Parasitic Earwig from a Swahili Giant Rat (Dermaptera)

C. Andresen Hubbard, Tigard 23, Oregon

The Swahili giant rat is a big fellow, as big as a small cat, measuring a good foot long in body with 14 inches of tail. I am told that at night when one comes across them they can be petted without danger. I still hesitate to thrust my hand in a live trap to get them out. They look like an overgrown vicious Norwegian rat. These rats are *Cricetomys gambianus osgoodi* Heller and are common here in the Usambara Mountains of northeast Tanganyika where I am studying the fleas of the area. A dozen specimens have produced no fleas but they always carry a parasitic earwig. I have collected many of the parasitic beetles of Aplodontia and had a large supply of Castor parasitic beetles come in from Norway, but these are small. This earwig is up to three quarters of an inch long and today I took 65 of them off a single rat. I note that this earwig belongs to the suborder Hemimerina, Family Hemimeridae, which has but the single genus *Hemimerus*. I am told this particular earwig is *H. vosseleri,* a strict parasite of Cricetomys. Any investigator wishing specimens is welcome to them. My address is Amani, Tanga, Tanganyika, c/o Malaria Institute.

New Species of Microlepidoptera from Japan

J. F. Gates Clarke, Smithsonian Institution,
Washington 25, D. C.

Through the kindness of Dr. S. Issiki, Entomological Laboratory, University of Osaka Prefecture, Sakai, Osaka, Honsyû, Japan, I have been privileged to study a small collection of reared Japanese microlepidoptera. Included in this interesting lot of specimens were the species described below as new to science.

The drawings for this paper (except figure 8) were made by Mrs. Caroline B. Lutz, illustrator on the staff of the Department of Zoology, U. S. National Museum, Smithsonian Institution. Plant names were checked by Dr. John J. Wurdack, Department of Botany, Smithsonian Institution.

Oecophoridae

Psorosticha melanocrepida, new species

Alar expanse 16–18 mm.

Labial palpus light buff irrorate with fuscous; a fuscous spot laterally, at apex of second segment; third segment with ill-defined basal and median fuscous bands. Antenna light clay color annulated and suffused with grayish-fuscous; scape with a fuscous spot at base and another at apex. Head mixed clay color and fuscous; face pale buff. Thorax blackish-fuscous with a few clay color scales mixed; base of tegula with brownish colored scales. Forewing clay color; base of forewing, a spot at mid-costa and an oblique bar from costa slightly before apex, directed toward base, blackish-fuscous; in cell, at about middle of wing, an ill-defined oblique, blackish-fuscous streak with spot of raised scales at outer end; at basal third a series of minute blackish-fuscous spots arranged in an outwardly curved arc; around termen, at base of cilia, a series of 4 or 5 small blackish-fuscous spots; remainder of forewing marked with scattered blackish-fuscous scales; cilia clay color shading to grayish-fuscous, the scales narrowly tipped with buff. Hind wing grayish

basally shading to fuscous at margins; veins indicated by fuscous; cilia grayish-fuscous with darker subbasal band. Legs buff, variously suffused and irrorate with fuscous; foreleg heavily overlaid with fuscous on outerside and foretarsi exhibiting some red-brown scaling. Abdomen fuscous above, pale clay color beneath; laterally a longitudinal row of black spots; ventrally a pair of longitudinal rows of ill-defined blackish spots.

Male genitalia: See figures (Slide No. 10729, Type). Harpe rather narrow, as long as vinculum, tegumen and uncus combined; cucullus bluntly pointed; clasper slender, straight, heavily sclerotized and reaching at least to costa of harpe. Anellus subquadrate with median posterior indentation. Aedeagus slightly bent, moderately slender and of nearly equal thickness throughout; vesica unarmed but folded and somewhat thickened for part of its length. Gnathos a spined knob. Socii small, flattened, fleshy lobes clothed with fine setae. Uncus a small blunt process.

Female genitalia: See figures (Slide No. 10738, paratype). Ostium a transverse slit. Ductus bursae membranous; inception of ductus seminalis a short distance before ostium. Signum a small, elongate, dentate plate.

Type: U. S. N. M. No. 65828.

Type locality: Kyûsyû, Ôita.

Food plant: Citrus unshiu Marcovitch. ("Larva in folded leaf.")

Remarks: Described from the type male and one female paratype with identical data. (3. VI. 1957 Em. K. Yasumatsu). Paratype ♀ in USNM.

In general aspect *melanocrepida* is similar to the Indian *P. zizyphi* (Stainton) but is a much larger insect. The blackish preapical oblique bar of the forewing of *melanocrepida* is absent in *zizyphi* and the latter species is more roughly scaled than the former. The male genitalia of all species of the genus possess a very heavily sclerotized clasper, appearing almost black in slide mounted examples, and there is little to distinguish between them; the slight differences are qualitative rather than

quantitative. The females, however, show substantial points of distinction, and all that is needed to distinguish these two species is to compare the signa of *zizyphi,* which consists of a long line of small more or less joined dentate plates in the anterior two-thirds of the bursa with that of *melanocrepida,* which has only a small dentate plate in the anterior third of bursa.

Agonopterix chaetosoma, new species

Alar expanse, 25–26 mm.

Labial palpus pale brownish-buff; second segment irregularly sprinkled with fuscous, particularly on outer side; third segment with a fuscous spot at base on inner side and a broad, subapical fuscous annulus, less distinct on outer than on inner side. Antenna grayish-fuscous except basally where there is considerable brownish-buff scaling. Head and face pale brownish-buff with some admixture of fuscous above. Thorax fuscous, roughened with numerous hair-like scales anteriorly; tegula and paired posterior thoracic crest brownish-buff suffused with light brown. Forewing ground color pale brownish-buff irregularly and lightly blotched with brownish suffusion; extreme base of costa and a series of 15 or 16 spots on costa and around termen, fuscous; slightly beyond base a transverse blackish bar; in cell, from basal third to about middle of wing, a blackish crescentic dash; nearly entire surface of wing roughened by hairlike scales; cilia brownish-buff suffused grayish. Hind wing shining light grayish-fuscous; cilia brownish-buff with grayish subbasal band. Legs pale brownish-buff irregularly irrorate and banded with fuscous. Abdomen pale brownish-buff strongly infuscated above; ventrally with four longitudinal rows of black spots; five posterior segments edged laterally with long hairlike scales.

Male genitalia: See figures (Slide No. 10724, Type). Harpe ample, weakly sclerotized; cucullus bluntly pointed; clasper somewhat curved, reaching four-fifths across harpe, roughened and slightly twisted apically. Vinculum evenly rounded. Anellus slightly broader than long, with small cleft on posterior edge; anellar lobes small, moderately sclerotized. Aedeagus

slender, slightly curved, unarmed, pointed. Transtilla a narrow band; lobes of transtilla small, fleshy. Gnathos an elongate-oval spined knob. Socii large, fleshy flaps, clothed with hairlike setae. Uncus small, pointed.

Female genitalia: See figures (Slide No. 10740, Paratype). Genital plate wide with slight indentation on anterior edge. Ostium small, round, opening on posterior edge of genital plate. Inception of ductus seminalis slightly anterior to ostium. Ductus bursae long, membranous. Bursa copulatrix small, oval; signum an oval, spined plate situated at anterior end of bursa copulatrix.

Type: U.S.N.M. No. 65829.

Type locality: Honsyû, Kii, Nati.

Food plant: Fagara schinifolia (Sieb. & Zucc.) Engler. ("Larva in cylinder of tied leaves. . . .")

Remarks: Described from the type male and one female paratype with identical data (Em. 21.VI.1957. T. Kodama).

This species is similar to *A. l-nigrum* (Matsumura) but is a much larger insect. In *l-nigrum* the crescentic mark of the forewing is nearer the center than in *chaetosoma* and the latter species lacks the strongly marked costa and contrasting light colored base of the former. Also in *l-nigrum* the long hairlike scales and dark subapical patch of forewing are absent.

The raised scales of *chaetosoma* remind one of the *latipalpella-scabella* species group of *Agonopterix* found in North America.

EXPLANATIONS OF FIGURES

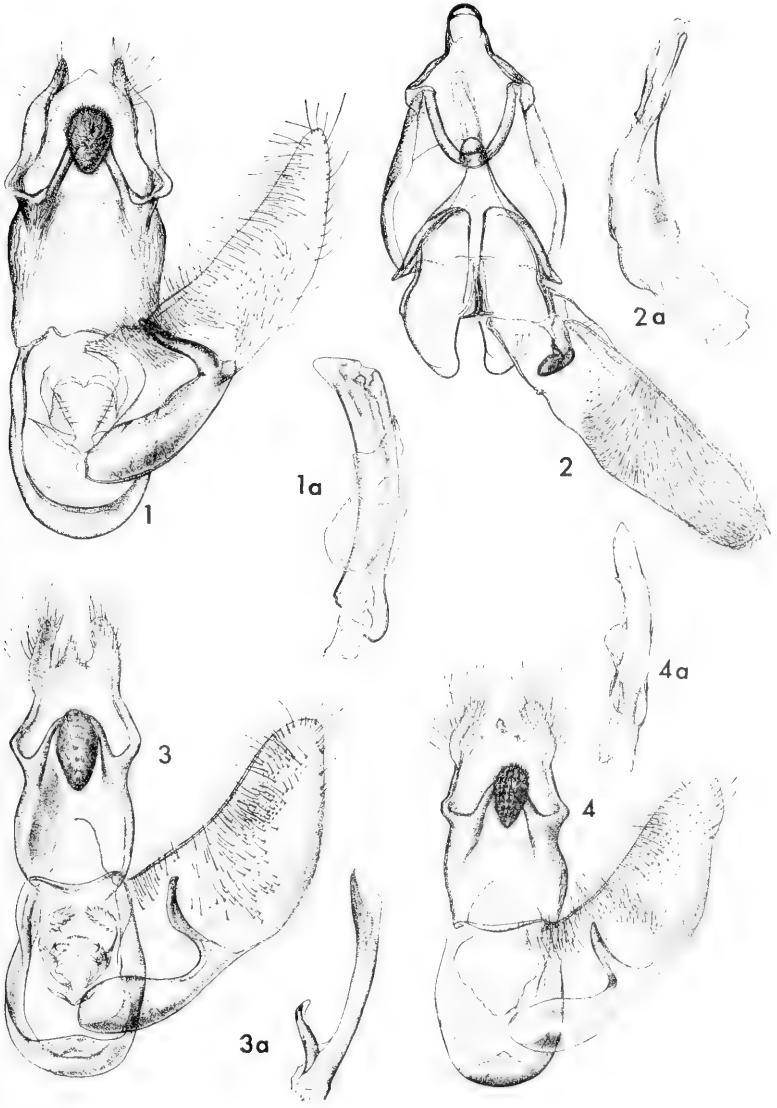
FIGS. 1–1a, 5–5a. *Psorosticha melanocrepida,* new species. 1. Ventral view of male genitalia with left harpe and aedeagus removed. 1a, Aedeagus. 5. Ventral view of female genitalia. 5a, Signum, enlarged.

FIGS. 2–2a, 6–6a. *Brachmia deodora,* new species. 2. Ventral view of male genitalia with left harpe and aedeagus removed. 2a, Aedeagus. 6. Ventral view of female genitalia. 6a, Signum, enlarged.

FIGS. 3–3a, 10–10a. *Agonopterix chaetosoma,* new species. 3. Ventral view of male genitalia with left harpe and aedeagus removed. 3a, Aedeagus. 10. Ventral view of female genitalia. 10a, Ventral view of signum, enlarged.

FIGS. 4–4a, 9–9a. *Agonopterix issikii,* new species. 4. Ventral view of male genitalia with left harpe and aedeagus removed. 4a, Aedeagus. 9. Ventral view of female genitalia. 9a, Signum, enlarged.

FIGS. 7–7a, 8. *Gnorimoschema pervada,* new species. 7. Lateral aspect of male genitalia with aedeagus removed. 7a, Lateral aspect of aedeagus. 8. Signum.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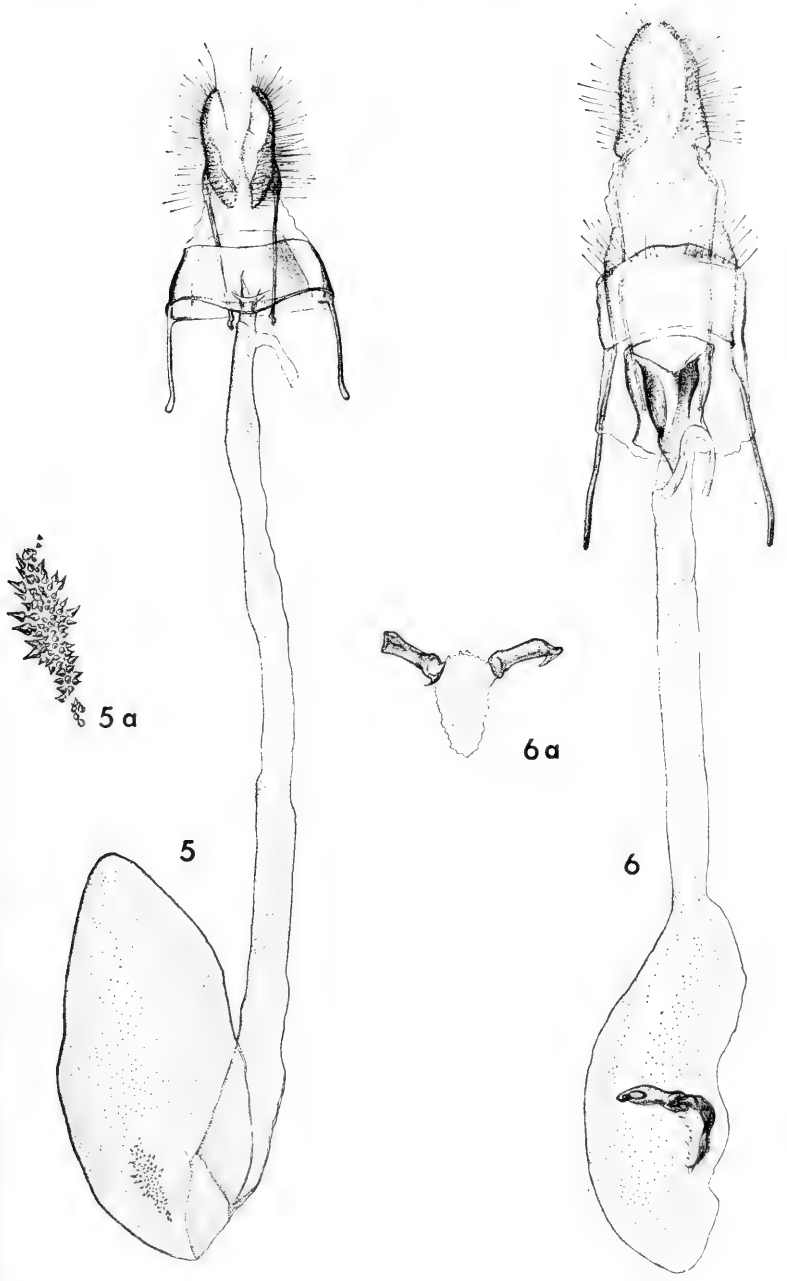
Agonopterix issikii, new species

Alar expanse 18–19 mm.

Labial palpus buff; outer surface of second segment irrorate with fuscous and with a fuscous blotch at base; third segment almost wholly overlaid with fuscous in male but in female showing a narrow basal and broad, subapical fuscous annuli. Antennal scape fuscous with buff apical spot ventrally; remainder of antenna grayish-fuscous. Head buff, strongly suffused brownish, especially laterally; face buff. Thorax and ground color of forewing brown, suffused with fuscous; apex of tegula and thoracic tufts paler than ground color; extreme base of forewing pale brownish-buff, this pale area containing a short, black, transverse bar and, costad, bordered by a black spot; outside the pale basal area a fuscous suffusion; in cell, three black spots, the outer two of which form the basal corners of a rectangular fuscous blotch extending to costa; between this blotch and apex three short, transverse, fuscous spots; around termen a narrow, broken fuscous line; cilia slightly lighter than ground color and suffused with gray. Hindwing bronzy-gray darkening to fuscous apically; cilia grayish with darker subbasal band. Legs light brownish-buff overlaid and suffused grayish-fuscous; spurs of hind tibia grayish-fuscous. Abdomen fuscous above, light brownish-buff beneath; on each side, ventrally, a fuscous longitudinal line; between these two lines two longitudinal rows of fuscous spots.

Male genitalia: See figures (Slide No. 10725, Type). Harpe about three times as long as broad; cucullus narrowly rounded; clasper rather stout, slightly curved, gently tapered to a point. Vinculum evenly rounded. Anellus a broadly oval plate; anellar lobes small, weak. Aedeagus a little less than two-thirds the length of harpe, simple, unarmed, slightly curved. Transtilla a narrow band; transtillar lobes weak, small, fleshy. Gnathos a spined, egg-shaped knob. Socii large, fleshy flaps, clothed with hairlike setae. Uncus very much reduced, pointed.

Female genitalia: See figures (Slide No. 10741, Paratype). Genital plate about twice as broad as long. Ostium opening about middle of genital plate. Inception of ductus seminalis


5 a
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6

well before ostium. Ductus bursae membranous. Bursa copulatrix oval; signum a small, sclerotized, dentate plate about middle of bursa copulatrix.

Type: U.S.N.M. No. 65830.

Type locality: Honsyû, Sinano Tabirá.

Food plant: Orixa japonica Thunb. ("Bred from larva in spun leaves. . . .")

Remarks: Described from the type male, one male and one female paratypes. All specimens bear identical data (Em. 21. VI.54. T. Kodama). Paratypes in U.S.N.M.

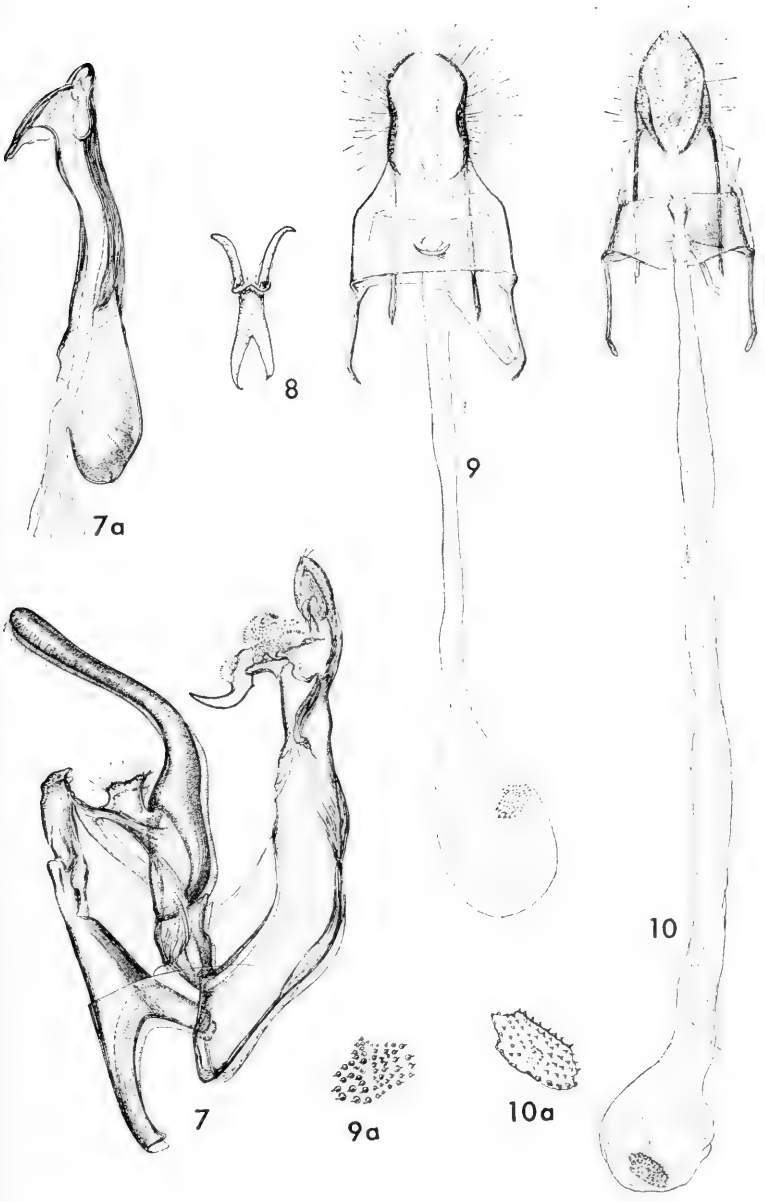
Apparently there is no described species of *Agonopterix* with which *issikii* can be readily compared but this species reminds one somewhat of the North American *A. pteleae* Barnes and *Busck*. The dark costal spot of the forewing of *issikii,* however, is smaller and less conspicuous than that of *pteleae,* and *issikii* is a smaller insect.

GELECHIIDAE

Brachmia deodora, new species

Alar expanse, 17–19 mm.

Labial palpus ocherous-white; second segment heavily irrorate with grayish-fuscous on outer surface; third segment with fuscous basal band and conspicuous single, fuscous scales scattered over outer and inner surfaces. Antenna, scape fuscous with sparse paler scaling ventrally; remainder of antenna grayish-buff with narrow darker annulations. Head clothed with buff-tipped grayish-fuscous scales; face grayish-buff with a dark spot on each side ventrad. Thorax and ground color of forewing grayish-buff, the scales tipped grayish-fuscous; extreme base of costa fuscous; discal stigmata three, fuscous, one at two-fifths on fold; one costad of this and another at end of cell (all discal spots obsolete in some specimens); on tornus a diffused fuscous spot; around termen an ill-defined series of 4 to 5 fuscous dots; cilia alternating bands of grayish-buff and grayish-fuscous. Hindwing light shining grayish-fuscous; cilia with extreme base buff, then alternating bands of grayish-buff and grayish-fuscous.


7a
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10a

Legs grayish-buff banded and suffused with grayish-fuscous. Abdomen grayish above, buff beneath; on each side a longitudinal, fuscous line.

Male genitalia: See figures (Slide No. 10726, Type). Harpe slender, about four times as long as wide; cucullus rounded; clasper arising near base of costa, stout, recurved ventrad. Vinculum broad, triangular; saccus long, produced (in illustration vinculum and saccus bent behind tegumen). Anellus an "I"-shaped plate. Aedeagus stout, tapered to a point distally; cornutus a sclerotized bar. Gnathos curved ventrad, terminating in a blunt point. Uncus short and moderately broad.

Female genitalia: See figures (Slides No. 10727, 10742, Paratypes). Genital plate rather broad, short. Ostium with "V"-shaped posteroventral edge. Inception of ductus seminalis at junction of sclerotized and membranous portions of ductus bursae. Bursa copulatrix elongate-oval. Signum a subtriangular plate with strongly sclerotized, recurved processes from each of the two basal angles.

Type: U.S.N.M. No. 65831.

Type locality: Honsyû, Kinki, Sakai.

Food plant: Cedrus deodora (Roxb.) Loud. ("Larva in spun dead leaves on bark. . . .")

Remarks: Described from the type male, one male and two female paratypes with identical data except date. The type male is dated "Em 6.VII.1957"; the remainder are dated "Em 2.VII.1957." All were collected by T. Kodama.

Probably the nearest species to *deodora* is *B. opaca* Meyrick from China. The two are strikingly similar but *opaca* lacks the conspicuous dark irroration of the third segment of the labial pulpus and exhibits a distinct line of fuscous spots from apical fourth of costa around termen to tornus, which is absent in *deodora*. The males can perhaps be most easily separated by the long, slender aedeagus and short, triangular clasper of *opaca* compared with the short, stout aedeagus and long, recurved clasper of *deodora*. I do not have a female of *opaca* for comparison.

Gnorimoschema pervada, new species

Alar expanse, 10–14 mm.

Labial palpus very pale buff; outer surface of second segment overlaid with buff-tipped dark gray scales; third segment with broad, dark gray, basal and subapical annuli. Antenna gray with narrow dark annulations. Head and thorax light grayish-fuscous, the scales tipped narrowly with pale buff; face pale buff; thorax lightly streaked with ochraceous-tawny. Forewing grayish-fuscous, the scales narrowly tipped with pale buff, and strongly streaked longitudinally with ochraceous-tawny; in fold two very small black spots and in center of wing, arranged obliquely from near basal two fifths of costa to end of cell, four very small black spots edged with ochraceous-tawny; at apex a small black spot; cilia gray, paler at tornus, with a few scattered buff and dark gray specks. Hind wing grayish-fuscous; cilia gray with pale brownish suffusion; base of cilia somewhat paler than remainder. Legs pale buff irrorate and banded with grayish-fuscous; foreleg almost wholly grayish-fuscous. Abdomen grayish-fuscous above; ventrally pale buff and some specimens with a broad, longitudinal, grayish-fuscous band laterad.

Male genitalia: See figures (Slide No. 10616, Type). Dorsal arm of harpe bent about middle, terminal half nearly straight; ventral arm short, truncate. Vinculum slightly curved, produced. Gnathos a small hook. Uncus narrow, about one-third the length of tegumen. Aedeagus stout, with prominent barb distally.

Female genitalia: See figures (Slide No. 10743, Paratype). Ostium very small, opening at about center of genital plate. Ductus bursae sclerotized for very short distance before ostium; inception of ductus seminalis at junction of sclerotized and membranous portions of ductus bursae. Signum divided into two anterior and two posterior arms.

Type: U.S.N.M. No. 65832.

Type locality: Kyûsyû, Usuki, Ôita (Br. by Someya, Em. 28. VIII.56).

Food plant: Solanum lyratum Thunb. ("Leaf miner on *Solanum lyratum*")

Remarks: Described from the type male, three male and two female paratypes as follows: 2 ♂♂ and 2 ♀♀, Honsyû, Bingo, Kônosima. 24.XI and 6.XII.1957. A. Mutuura; one ♂, Kyûsyû, Nagasaki; from plant inspector, Em. 5.XII.56. Paratypes in U.S.N.M. There are two other specimens before me, not included in the type series but which I believe are this species, from "Okayama, Okayama, 26.IX.56" and "2.X.56, Kenji Kiozumi," reared from *Solanum lyratum.*

There are several species of gelechiids which feed on solanaceous plants, all are similar in appearance and can easily be confused. These are *G. absoluta* (Meyrick), *G. gudmannella* (Wlshm.), *Keiferia glochinella* (Zeller) and *K. lycopersicella* (Busck). In addition, *G. chenopodiella* Busck must be considered here because of its striking similarity in color and pattern. Actually, because of individual variation in each species, there is no absolute criterion of color by which one can be distinguished from the other. The genitalia, however, offer many points of distinction. In the females *pervada* can be distinguished from all the described species in this group by the divided signum. Both the males of *pervada* and *absoluta* have similar aedeagi, with a long terminal barb, but the vinculum of *absoluta* is twice the length of that of *pervada* and is not truncated as in the latter species. Although the aedeagus of *gudmannella* possesses a terminal barb it is much less pronounced than in *pervada.* Moreover, the distal end of the dorsal arm of the harpe of *gudmannella* is broadly expanded but that of *pervada* is bluntly pointed. Despite the similarity of appearance of *glochinella* and *lycopersicella* they are easily separated from *pervada* by the undivided signum, absence of the gnathos and the unique, slender uncus.

A New Species of Campsomeris from the Solomon Islands (Hymenoptera, Scoliidae)

Karl V. Krombein, Entomology Research Division, Agricultural Research Service, U. S. Department of Agriculture, Washington, D. C.

I am describing the present species in advance of my revisionary study of the Scoliidae of New Guinea, Bismarck Archipelago, and Solomon Islands, so that the specific name will be available for use in a subgeneric reclassification of the Indo-australian *Campsomeris* on which Dr. J. G. Betrem, Vice-Director, Rijks Hogere School voor Tropische Culteren, Deventer, The Netherlands, is presently engaged. Dr. Betrem intends to propose a new subgenus for this single unique species from Rennell Island in the Solomons.

This anomalous species, known only in the female sex, appears to have no close relatives. Of the species known to me it is most like some members of Group I of the subgenus *Dielis,* such as *palauensis* (Turner) from the Palaus and *ovalauensis* (Saussure) from Fiji. Although it differs at once from these species in lacking yellow maculations on the head, thorax, and abdomen, its affinities to *palauensis* and *ovalauensis* are suggested by the lack of a carina above on the upper metapleural plate, the shininess and punctation of the abdomen, the similarity in tubercle of the median plate of propodeal dorsum, the lack of an oblique furrow on scapulae, and the presence of a well-developed carina separating the lateral and dorsal surfaces of propodeum. Females of the subgenera *Laevicampsomeris* and *Trielis* have similarly shiny and punctate abdomens, but differ in many of the other characters cited above, and it does not seem feasible to refer *inopinata* to either of those subgenera.

Campsomeris inopinata, new species

Type.—♀; Kungana Bay, Rennell Island, Solomons; June 16, 1933 (M. Willows, Jr.; Templeton Crocker Exped.) [California Academy of Sciences].

Female.—Length 18 mm, forewing 15 mm. Black, the abdomen with faint blue reflections. Vestiture as follows: Long, erect or suberect hairs of front, vertex, dorsum of thorax, and second to sixth abdominal segments medium to dark brown; on head beneath, sides of thorax, legs, and first tergite, white; apical fringes of first to third tergites and second to fourth sternites white, of succeeding segments brown; appressed sericeous pubescence of thorax sparse, silvery. Wings hyaline, moderately infumated with brown, the anterior margin of forewing darker, forewing with some bluish reflections.

Head shining; clypeus impunctate except laterally; area frontalis and spatium frontale closely punctate, the latter with well-defined fissura frontalis, the punctures on front extending to eyes on lower half and upward along inner eye margin to a point opposite ocelli; vertex with a space adjacent to ocelli largely impunctate, elsewhere with scattered large punctures.

Thorax shining, the erect hairs on scapulae not forming a conspicuous ruff, scapulae closely punctate, without an oblique furrow; scutum with large close punctures anteriorly, becoming sparser on sides, a median impunctate space on posterior half about one-third the width of sclerite; scutellum with large punctures except for a fairly broad, median impunctate strip; postscutellum similarly punctate but the punctures smaller; metapleuron without a carina above separating the lateral and more or less dorsal aspects of the upper plate; propodeum rather short, the length of median horizontal area not much over one-third its basal width, the hind margin distinctly angulate in middle because of the well-developed tubercle similar in shape to that of *manokwariensis* (Cam.); the median horizontal area with large close punctures except a small crescentic area at base; lateral horizontal area with large close punctures on anterior two-thirds, densely micropunctate on posterior third; posterior surface densely micropunctate; a strong carina separating the lateral declivous surface from the lateral horizontal surface.

Abdomen shining; tergal fringes normal, that is, one set of fringes at apices of second to fifth tergites, and a preapical fringe a short distance basad of each apical fringe; area basad of pre-

apical fringes with the punctures larger and denser than in most *Campsomeris* though still quite scattered.

Longer spur of hind tibia slender, curved, spatulate at tip, extending three-fourths of distance to apex of hind basitarsus.

Second recurrent vein of forewing complete.

Male.—Unknown.

Paratype.—♀; same data, but June 14, 1933 [CAS]. Deposited in U. S. National Museum. This specimen does not differ from the foregoing description of the type.

On the Status of Clematodes vanduzeei Hebard (Orthoptera; Acrididae; Cyrtacanthacridinae)

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

In a recent paper [1] Rehn and Eades presented a study of the forms of the genus *Clematodes* as found in the United States and Mexico. Unfortunately by a *lapsus calami* they had neglected to consider *Clematodes vanduzeei* Hebard, described in 1923 from San Pedro Bay, Gulf of California.[2] The omission was due to a failure to check a long-maintained personal card catalogue, and was noted too late to stop the production of the 1961 paper. The type is the property of the California Academy of Sciences, and by the courtesy of that institution it, and other relevant material, is now before me.

The type of *C. vanduzeei,* as noted by the describer, is a female in the instar preceding maturity. The position of the type locality (San Pedro Bay) as given in the chart accompanying the report on the work of the expedition which secured the specimen, and in the accompanying list of localities,[3] is on the

[1] "The North American and Mexican Tribe Clematodini (Orthoptera; Acrididae; Cyrtacanthacridinae)." Proc. Acad. Nat. Sci. Phila., 113, pp. 135–156, 20 text-figures, 2 plates and 1 map. October 31, 1961.

[2] Proc. California Acad. Sciences, (4) XII, p. 327, figs. 1 and 2.

[3] Proc. California Acad. Sciences, (4) XII, p. 71 and map facing page 72 (1923).

Sonora side of the Gulf of California a limited number of miles northwest of the well-known port of Guaymas, the bay also being known as Ensenada Grande.

From the type and other material here recorded it is evident *Clematodes vanduzeei* is very near to *C. papago,*[4] of central southern Arizona and adjacent interior Sonora, rather than to the type of the genus, *C. larreae* Scudder, of the more eastern Chihuahuan Desert. From *C. papago* the older *vanduzeei* can be distinguished in external features by the very evident broader expansion of the antennae distad of the second article, this involving all the articles distad of the second; the male cerci are somewhat more acutely conical; the distad projecting lamellations laterad at the genicular extremity of the caudal femora are more pronounced as seen in profile, but in outline these are more lanceolate and less trigonal than in typical *papago.* In size there is no noteworthy difference in adults from *papago,* as a comparison of the original measurements given for the latter and those presented beyond demonstrate, and coloration shows nothing noteworthy.

The key to the forms of the genus presented by Rehn and Eades serves to separate *papago,* and also *vanduzeei,* from the type species *C. larreae.* The characters given above will prove of service in distinguishing *papago* and *vanduzeei.* My conclusion is that these two are subspecies of the same species, and hence we will have *C. vanduzeei vanduzeei* Hebard and *C. vanduzeei papago* Rehn and Eades.

Material of *C. v. vanduzeei* now before me, on loan from the California Academy of Sciences, several from localities not previously reported, are as follows:

San Pablo Bay, Sonora, Mexico; VII, 7, 1921; (E. P. Van Duzee); 1 ♀ (*type*) in instar preceding maturity.

San Carlos Bay [near Guaymas], Sonora, Mexico; VIII, 10, 1960; (D. C. Rentz); 3 ♂, 3 ♀, 1 ♀ in instar preceding maturity.

[4] Rehn and Eades, Proc. Acad. Nat. Sci. Phila., 113, pp. 138, 149, text-figs. 2, 5, 6, 9, 10, 14, 17, 18, 20, pl. A, figs. 3 and 4, B, figs. 7 and 8 (1961). [Near Batamote Well, Valley of the Ajo, 6 ms. N. of Ajo, Pima Co., Arizona (type locality); Ajo, Little Ajo Mts., Pima Co., Arizona; Altar, Sonora, Mexico.]

18 ms. E. of El Puerto, Sonora, Mexico; VIII, 7, 1960; (D. C. Rentz); 1 ♀.

The measurements of adult representative material here listed is as follows (in millimeters):

	Length of body	Length of antenna	Median length of pronotal disk	Length of tegmen	Length of caudal femur
♂, San Carlos Bay, Sonora	21.0	8.3	3.4	3.7	12.9
♂, San Carlos Bay, Sonora	25.2	8.8	3.6	4.8	13.5
♀, San Carlos Bay, Sonora	33.0	8.0	5.5	4.5	17.3
♀, San Carlos Bay, Sonora	34.0[5]	9.7	5.3	4.5	17.3
♀, 18 ms. E. of El Puerto, Sonora	33.3	10.2	5.2	4.7	15.9

[5] Abdomen somewhat overextended.

The specimen from Altar, Sonora, a more interior locality, which was regarded by Rehn and Eades as representing *C. v. papago,* is found, on reexamination, to be fully representative of that subspecies. It is possible that *C. v. vanduzeei* may be limited in distribution to the coastal section of Sonora.

A Pictorial Review of the North American Chipmunk Fleas. Part IV. Fleas of Eastern Chipmunks of the Genus Tamias

C. Andresen Hubbard, Tigard 23, Oregon

The writer has had no experience with these fleas or these chipmunks. The data and drawings here offered are compiled from: *Fleas of Eastern United States,* 1940, by Fox, pages 69, 100, 165, 179; and *Fleas of Canada,* 1949, by Holland, pages 88, 159, 241, 285.

In this part the writer offers a list of the stray fleas taken off western chipmunks from his own records, and the records of other investigators.

Tamiophila grandis (Rothschild) 1902
1902 *Typhlopsylla grandis* Rothschild, Ent. Rec. and Jour. Var. 14: 62.

This is the first of the North American chipmunk fleas to be described. It was collected by Dippie on September 20, 1899, at Branchtown, Ontario, Canada, off the chipmunk *Tamias striata*. Rothschild released the description during 1902. Holland in 1949 states that this is a very large flea from 4 to 5 mm in length with the underside of basal abdominal sternum hairy. It is easily separated from other fleas by the presence of 2 genal teeth and the differences in the

Modified Segments: Male. Fox says process of the clasper tongue-shaped with numerous setae on the margins. Finger more or less boot-shaped with the apex truncate, its ventro-distal margin compressed carniform and clothed with setae. Manubrium long and slender, curved distally. Sternite IX boomerang-shaped, bearing numerous setae of various sizes ventrally, the more apical ones spiniform. Holland 1949 relies on illustrations (and wisely so) rather than descriptions so adds nothing to the words of Fox.

Female. Again Fox says head of the receptaculum seminis broad and long, more or less oval in shape. Sternite VII without a sinus, the posterior margin truncate.

Length: Large fleas from 4 to 5 mm long.

Range: Eastern part of the United States and Canada where eastern chipmunks are found.

Deposits: The types are located in the British Museum.

Records: Holland records this flea off *Tamias striata* at Buckshot Lake, Ottawa, Pancake Bay all in Ontario, Canada; Fox from Massachusetts, New York, Michigan.

Preferred Host: The eastern chipmunk *Tamias striata* is the favored host of this flea.

Accidental Occurrence. Fox records the following strays: cottontail rabbit, red squirrel, weasel; Holland, cottontail rabbit.

Megabothris acerbus (Jordan) 1925

1925 *Ceratophyllus acerbus* Jordan, *Nov. Zool.* 32: 111. Female described.

1929 *Ceratophyllus acerbus* Jordan, *Nov. Zool.* 35: 170. Male described.

Holland says that this species is restricted to eastern North America, where it occurs on the eastern chipmunk, *Tamias striatus* spp. Fox says of the

Modified Segments: Male. Process of the clasper broad and short, truncate, its apex with three weak bristles. Finger about three times as long as broad with the anterior margin produced into an angle at about the middle. Apex rounded, with four or five weak bristles and two small heavily pigmented spiniforms. Posterior margin armed with a long bristle.

Female: Sternite VII divided by a deep sinus into two more or less triangular lobes. Spermatheca barrel-shaped in body with crooked finger-like tail.

Length: This flea is medium sized, measuring from 2.50 to 3.00 mm.

Range: Eastern North America where there are chipmunks.

Deposits: The types are in the British Museum.

Records: Holland reports this flea off chipmunk from Algoma, Brule Lake, Buckshot Lake, Simcoe, Smoky Falls, Ontario, Canada: Fox from Massachusetts, Michigan, and New York.

Preferred Hosts: The eastern chipmunk seems to be the true host.

At this writing (March 1, 1961) neither the eastern chipmunk nor its fleas have been associated with plague.

The Strays of Western Chipmunks

Nosey little animals that they are, chipmunks explore every burrow, crevice, opening that they can get into, climb every shrub, bush and tree in their environment. Naturally they drop

their fleas far and wide, and pick up the fleas of many of the animals about. These pick ups, not their own, are usually called strays or accidental occurrences. Also there is a series of fleas which seem to show no host preference. These are called vicariating fleas. Amongst the strays and vicariating fleas are those which are thought to be vectors of plague. Notice of these will be made in passing.

Oregon:

Catallagia charlottensis (Baker) 1898, a deer mouse flea
Monopsyllus w. wagneri (Baker) 1904, a deer mouse flea
Orchopeas nepos (Rothschild), 1905, a tree squirrel flea
Opisodasys keeni (Baker) 1896, a deer mouse flea
Megabothris abantis (Rothschild), 1905, a Meadow mouse flea: possible vector

California:

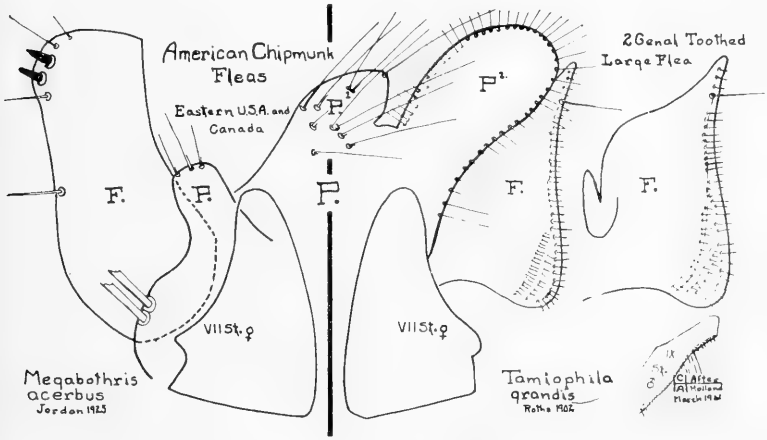
Diamanus montanus (Baker) 1895, a ground squirrel flea: suspected vector
Oropsylla idahoensis (Baker) 1904, a ground squirrel flea: suspected vector
Monopsyllus w. wagneri (Baker) 1904, a deer mouse flea
Callistopsyllas deuteras Jordan 1937, a deer mouse flea

Montana:

Orchopeas caedens caedens (Jordan) 1925, a tree squirrel flea
Thrassis h. utahensis Wagner 1936, a marmot flea; possible vector
Thrassis petiolatus (Baker) 1904, a ground squirrel flea: possible vector
Thrassis pandorae Jellison 1937, a ground squirrel flea: possible vector
Opisocrostis labis (J. & R.) 1922, a ground squirrel flea: possible vector
Oropsylla idahoensis (Baker) 1904, a ground squirrel flea: suspected vector
Megabothris abantis (Rothschild) 1905, a meadow mouse flea: suspected vector
Catallagia decipiens (Rothschild) 1915, a deer mouse flea
Hystrichopsylla g. dippiei Rothschild 1902, vicariating flea: vector

Conclusions: It is well known that after white rats, white mice and hamsters, chipmunks are next in popularity as little boy's pets. Many of them are seen in pet shops for sale, or the youngsters may trap the little animals out in nature as adventure.

As early as 1936 chipmunks and their fleas were found plague positive in the Sierra Nevada Mountains of California. A human case or two followed. By 1940 similar cases had become known in State of Washington. In 1958 Stark reports two cases from Utah (squirrel and coyote handling) in which the plague did not prove fatal to the human.



Megabothris acerbus (Jordan) and *Tamiophila grandis* (Rothschild).

Chipmunks should be watched carefully for plague and although only two of their 14 fleas are considered possible vectors, others may come under suspicion. The ground squirrel fleas they occasionally carry as strays also complicate the situation. It seems likely, that as more study is given to the fleas of the chipmunks more variations will be found in their fleas and new forms recognized.

Eastern chipmunks and their fleas have not as yet been involved in plague.

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

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

Cockroaches (Blattoidea) of Japan, Okinawa, Formosa (Taiwan), and the Philippines are being studied in cooperation with Dr. K. Princis. Loans of specimens from that area are desired. A. B. Gurney, U. S. National Museum, Washington 25, D. C.

Orthoptera. Gryllinae (except domestic sp.) and **Pyrgomorphinae** of the world wanted in any quantity for work in morphology, taxonomy, cytology, and experimental biology; dry, or in fluid, or living. Write D. K. Kevan and R. S. Bigelow, Dept. of Entomology, McGill University, Macdonald College, Quebec, Canada.

Beetles of the world wanted, all species in exchange for American beetles, moths and butterflies. James K. Lawton (age 18), 7118 Grand Parkway, Wauwatosa 13, Wisconsin.

Acanthomyops (Citronella ants) wanted for revisionary study. Will sort from yellow *Lasius*. M. W. Wing, State University College, Cortland, N. Y.

Cicindelidae of the World wanted in exchange for North American Coleoptera or in purchase. Carl Farr Moxey, 414 Woodland Ave., Wayne, Pennsylvania.

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Philip P. Calvert

(*ca.* 1934)

ENTOMOLOGICAL NEWS

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Philip Powell Calvert (1871–1961)

Most scientists can recall, from their memories of past years, some few men who were largely responsible for the nurturing and development of their interest, the encouragement of their studies, and the broadening of what was to become their lifetime activity. These teachers, formal or informal, fanned the spark which made a dedicated investigator of a casual observer. These memories are treasured parts of our lives, and my personal ones were of three men, all now passed on, whose help and example were to me of priceless value. One of these was the kindly, scholarly, yet always unassuming, subject of this sketch. Many others revered him as a teacher and official advisor; to me, who was not a student under him, he was a counselor, a friend, and a colleague of some sixty-odd years.

Philip Powell Calvert was born in Philadelphia, January 29, 1871, at a home within sight of the great university where his teaching years were later spent. He was the son of a Philadelphia lawyer, Graham Calvert; his mother was Mary Sophia Powell Calvert. His ancestral racial stocks were English, Welsh, and Irish. His early education was in Friends' and Public Schools, with graduation from Philadelphia's famous old Central High School in 1888. He entered the University of Pennsylvania in the latter year, received his certificate in biology in 1892, and the degree of Ph.D. in 1895. There he had the inspiration of the master minds of Leidy and Cope. In postdoctoral study he spent the winter semester of 1895–1896 at the University of Berlin, and the summer semester of 1896 at the University of Jena. At the two latter institutions he studied under the great German zoologists of that day, among them Haeckel, Verworn, Schultze, and Hertwig. At Berlin he made

the acquaintance of Dr. Ferdinand Karsch, the Odonatologist and Orthopterologist.

Dr. Calvert began his teaching career at the University of Pennsylvania as an Assistant Instructor in Zoology in 1907, Professor of Zoology in 1912, and in 1939, upon retiring, became Emeritus Professor of Zoology. Also during two years, 1928–29, 1933–34, and in the Spring of 1939 he served as temporary chairman of the Department of Zoology.

For a number of years, about the turn of the century, he took an active part in the lectures of the Ludwick Institute, which were given in the auditorium of the Academy of Natural Sciences of Philadelphia, which has for many years worked intimately with the Ludwick Institute. These lectures covered various aspects of natural history, such as the distribution of animals, their defense mechanism, adaptations, and the comparative development of certain organs in different groups.

As a teacher he was outstanding in sparing neither time nor effort to give his best to both undergraduates and graduates in his lectures and in his more personal contacts with students in their work and problems. His students were fellow-workers, and his attitude toward them was that of a fellow-scientist. This encouraged the development of originality and responsibility on the part of the student, tempered, as the teacher's suggestions always were, with the utmost consideration for the student and the latter's comprehension of his immediate problem. This, combined with the teacher's personal interest, and his kindly and gentle sense of humor, endeared him to a host of students in his years of teaching, many of whom recall the value to them of the help of this kindly scholar. One distinguished former student writes: "I developed not only a profound respect for his competence as a scientist, but also a great love for him as a man." Another former student, a Lepidopterist of note, has said, "we all miss him who remember his unique humor, his unfailing courtesy and his boundless knowledge . . . he has left behind him a bottomless treasury of devoted love and sincere admiration."

The particular research interest of Dr. Calvert was in the Odonata, and in the development of our knowledge of the insects

of this order he was clearly one of our greatest scholars, not only in North America, but in the world, as his studies covered global aspects of the dragon-flies. As one of his contemporaries, himself one of the outstanding scholars in the odonate field, has written; "His scientific integrity combined with his complete humility made him the unquestioned leader in his field in the New World." His original contributions to our knowledge of the order, aside from hundreds of reviews, editorials and obituaries in "Entomological News," totalled 317, these extending over a period from 1889, when records of Odonata taken in Maine, New York, and Illinois were noted, to 1961, when, but a relatively few days before his death, his last contribution, "Adult Odonata of the Catherwood Peruvian Expedition," in which two previously unknown species were described, appeared in the Proceedings of the Academy of Natural Sciences of Philadelphia.

It is not possible, in a sketch of this character, to do more than mention Dr. Calvert's more comprehensive studies, which it must be noted were almost all prepared in the occasional intervals of a very busy teaching schedule. The first of these more noteworthy studies was, and still is, a classic in its field, and has long been regarded as a pattern for a regional insect study, i.e., "Catalogue of the Odonata (Dragonflies) of the vicinity of Philadelphia, with an Introduction to the Study of this Group of Insects." This was published in 1893, covered 120 pages with numerous illustrations, and was contained in the twentieth volume of the Transactions of the American Entomological Society. An 1895 study of "The Odonata of Baja California," published in the Proceedings of the California Academy of Sciences, inaugurated his long series of contributions to our knowledge of the Neotropical Odonata, and was followed in 1899 by a similar one in the same serial on "Odonata from Tepic, Mexico, with supplementary notes on those from Baja California."

Dr. Calvert's volume on the Odonata of the Biologia Centrali-Americana was one of the great achievements of his life, and like all other sections of this great work appeared in signatures over periods between 1901 and 1908, covered 433 pages,

illustrated by nine plates with 416 individual figures and one map. In this work he treated 250 species, of which 77 were described as new. But few other Americans were invited to take part in the preparation of the great "Biologia" series, and those of us who knew him over those years realize how fully Dr. Calvert appreciated and met the obligation associated with the preparation of his volume. In 1909 appeared his important "Contribution to a Knowledge of the Odonata of the Neotropical Region, exclusive of Mexico and Central America," a work of over 200 pages, which was contained in volume six of the Annals of the Carnegie Museum of Pittsburgh.

While on sabbatical leave in 1909 and 1910, with Mrs. Calvert he spent a year in Costa Rica, which enabled him to increase further our knowledge of Central American Odonata, thus adding to previous field experience he had had in parts of Mexico. From the Costa Rican sojourn came one of the most important semi-popular volumes we have on the natural history of Central America, i.e., "A Year of Costa Rican Natural History," by Amelia Smith Calvert and Philip Powell Calvert. This volume, published in 1917, contained 596 pages and 142 illustrations, as well as a map of Costa Rica after Pittier. It also contained important appendices, one with references to many studies in which material secured had been reported, and another a list of selected literature relating to the natural history of Costa Rica. The volume is a treasury of observations of varied character, and in virtually all cases the determinations of the species cited had been made by scholars of eminence in their respective fields. The year's work added to our knowledge much concerning the early stages of a number of species of Odonata, and the saga of the transformations of the very elongate bromeliadicolous members of the genus *Mecistogaster* is one of the high lights of this most interesting volume. In Cartago the authors went through the earthquake which on April 15, 1910, destroyed a large part of the city. They fortunately escaped injury, although their friends in Philadelphia were without news of them for some days. They reached New York safely two weeks after their harrowing experience.

Dr. Calvert's field studies in Costa Rica in 1909 and 1910

continued for some years to produce a number of small but exceedingly important studies on the Odonata of that country which were particularly important because of the wealth of information they presented on life histories and transformations. They were largely published in ENTOMOLOGICAL NEWS or in the Transactions of the American Entomological Society between 1910 and 1923. In 1944 appeared an important study, "The Rates of Growth, Larval Development and Seasonal Distribution of the Genus Anax" in the 73rd volume of the Proceedings of the American Philosophical Society. This study of 70 pages and two plates not only presented much new information on the growth and character of the early stages, but also analyzed the pertinent information contained in previous literature.

The last contribution of monographic character from Dr. Calvert's pen appeared in 1956, when he was in his 86th year. It was "The Neotropical Species of the Subgenus Aeschna Sensu Selysii 1883 (Odonata)," which formed number 15 of the Monograph series of the American Entomological Society. It contains 256 pages of text, 47 plates with 614 individual figures, 17 pages of tables of measurements, and seven maps. In this memoir 68 species are treated, with descriptions and figures of the early stages where known, and finally masterly discussions of the following aspects of the subject: "Relationships of the Neotropical Aeshnas to the North American Fossils," "Relations of the South American Aeshnas to Palearctic and Australian Species," "The Geological Age and Geographic Distribution of the Ancestors of the Odonata and of the Mammalia," "Relations of the Neotropical Aeshnas to Each Other," and "The Seasonal Distribution of the Neotropical Species of Aeshna."

Aside from the major titles here mentioned there came from Dr. Calvert's pen many score of other studies on the North American odonate fauna, with observations on the transformations and early stages of the same as well as on the anatomy, distributional patterns and paleontology of the order, not only in North America, but in other parts of the world. One paper of particular interest to all biologists, because of the application of much of the information there assembled was his 1909 essay

on "The Composition and Ecological Relations of the Odonate Fauna of Mexico and Central America," published in volume 60 of the Proceedings of the Academy of Natural Sciences of Philadelphia. The temperature map accompanying this paper was prepared only after a careful analysis of all weather data for the area covered, and it is still of fundamental importance. His occasional papers on insects other than the Odonata fully reflect his broad acquaintance with insects as a whole, as well as the many comments in editorials in ENTOMOLOGICAL NEWS.

In addition to the major studies already mentioned Dr. Calvert published others dealings with Mexican Odonata as early as 1899, on Guatemalan species in 1919, British Guianan ones in 1948, Paraguayan species in 1899, Lesser Antillean forms in 1928, and Jamaican ones in 1891. Nor were his contributions limited to the New World fauna, as seven studies dealing with African Odonata appeared between 1892 and 1930, and one on Indian species in 1898. It may be said in passing that the Calvert series of studies embraced the world odonate fauna.

Dr. Calvert's association with the American Entomological Society, the oldest entomological society in the United States, started in 1893, when he became a member. He served as its Corresponding Secretary in 1895, as its Vice-President from 1894 to 1898, and as its President from 1901 to 1915. He became a member of its Publication Committee in the nineties, and served in that capacity until a few years before his death. He was also a member, and for years Chairman, of its Finance Committee. To all the activities of the Society he gave his best efforts for over a half century and his advice and judgment were of incalculable value to the organization.

He became Associate Editor of ENTOMOLOGICAL NEWS in 1893 and Editor in 1911, remaining in that post until 1943, when he became Editor Emeritus. His work as Editor of this journal was that to which a very large part of what is generally called "leisure time" was devoted. Often his labors on the NEWS carried his day's work into the wee hours of the next morning. During his tenure and later he prepared 296 reviews and editorials and 209 obituaries. In 1951 a bibliography of his writings issued between 1889 and 1950 was prepared by Dr. Rudolf

G. Schmieder, the present Editor of ENTOMOLOGICAL NEWS, who was Dr. Calvert's colleague at the University of Pennsylvania, and Mr. Maurice E. Phillips, a member of its Editorial Board, and this was published in volume LXII of this journal. Dr. Calvert's contributions published since that listing number ten, among which was his monumental study of the Neotropical species of *Aeshna* already mentioned.

To the Academy of Natural Sciences of Philadelphia, the pioneer organization in its field in America, of which he was a member for over sixty years, he, in his usual quiet and thoughtful way, also gave much of his time and interest, as well as active physical work, and served the Academy in many capacities, on standing committees, on special ones, and as its delegate to scientific gatherings at home and abroad. For nearly sixty years he was a member of its Council until failing health compelled him to restrict his travel from his home in western Delaware County, Pennsylvania into Philadelphia. Dr. Calvert many years ago placed his private collection of Odonata in the Academy, and there it will remain as a monument to his memory. During the last illness of Dr. Edward J. Nolan, Recording Secretary of the Academy, in 1920, Dr. Calvert temporarily took over some of the responsibilities of that post, which embraced the Secretaryship of the Council, until a successor was elected very shortly before Dr. Nolan's death in early 1921. Dr. Calvert also served as a member of the Publication Committee of the Academy for well over fifty years, or from 1900 until failing health compelled him to refrain from attending committee meetings. It seems but fair to mention that all of the numerous activities for the American Entomological Society, his work on ENTOMOLOGICAL NEWS, and for the Academy were given entirely without compensation of any sort, in fact he at times contributed personal funds to be used in the name of one or the other of these organizations.

He was a founder member and a Fellow of the Entomological Society of America, the original formative meeting for which was held in the rooms of the Entomological Department of the Academy, and he was that Society's President in 1914. He was a member of the American Philosophical Society, the American

Society of Naturalists, the American Society of Zoologists, the Ecological Society of America, the American Society of Tropical Medicine, the Limnological Society of America, the American Association for the Advancement of Science, the Society of the Sigma Xi, and the Lenape Club.

Dr. and Mrs. Calvert were married in 1901. She was Amelia Catherine Smith, received her B.S. in Biology from the University of Pennsylvania in 1899, and was a Fellow at Bryn Mawr College 1899–1901. Their home life was one of those congenial ones of highly cultured people, fully alive to the world about them, its people and its problems. A visit to their delightful modernized old Pennsylvania farm-house home was always something one long remembered, not only for the setting but for the brilliant and kindly pair who made it their home. Mrs. Calvert is still with us, we who know her well are glad to say, at eighty-six.

Shortly after his retirement from teaching work Dr. Calvert suffered a serious stroke, with loss of speech and partial paralysis. From this he recovered almost completely, and for a number of years, when in his seventies and early eighties, he appeared in the Academy's Department of Insects usually several days a week, and continued his studies there, as well as in his delightfully sunny work-room at his home. It was during these years that he brought to completion his great *Aeshna* study. Failing eye-sight, a corollary of a systemic condition, hampered his work in his last few years, and he passed away August 23, 1961.

As one who knew Dr. Calvert for nearly sixty-five years, and served with him on a number of boards and committees, and who shared with him also many days in the laboratory, my personal feeling may be regarded as overdrawn by those who knew him less intimately. However, with a fair personal acquaintance with the masters of American entomology for the last sixty years, I feel we have lost one of our greatest figures of that period, one who was not only a great entomologist but a broadly informed zoologist, whose mind and interest covered the whole range of animal life. With this fund of knowledge and experience went a gentle and kindly nature, a touch of whimsy, and an utter lack of self-laudation which made Philip Calvert beloved by all who knew him well.

I am indebted to Mrs. Philip P. Calvert for some of the information here contained, such as certain dates, Dr. Calvert's university posts, and the references to his work in letters that she had received from former students and colleagues.

JAMES A. G. REHN

Additions to the Bibliography of Philip P. Calvert, Subsequent to 1950

Compiled by RUDOLF G. SCHMIEDER

The Bibliography of Philip P. Calvert, compiled by Schmieder and Phillips, appeared in the January issue of the CALVERT ANNIVERSARY VOLUME of ENTOMOLOGICAL NEWS, in 1951 (*Ent. News* 62: 3–40). This bibliography contains 753 entries and covers the period 1889 to 1950. The following ten additional titles, published after 1950, will complete the bibliography.

1952 New taxonomic entities in Neotropical Aeshnas, I. (Odonata: Aeshnidae). Ent. News 63: 253–264.

1953a New taxonomic entities in Neotropical Aeshnas, II. (Odonata: Aeshnidae). Ent. News 64: 205–207.

——**b** (With James A. G. Rehn) Samuel Nicholson Rhoads [obituary]. Ent. News 64: 125.

1954a [The Odonata of Canada and Alaska, by Edmund M. Walker, Vol. I, Parts I, II (review).] Ent. News 65: 109–110.

——**b** A book on German dragonflies [by Hans Schiemenz]. (review). Ent. News 65: 270–271.

——**c** [Insect metamorphosis; The dragonfly larva, by R. E. Snodgrass. (review).] Ent. News 65: 271–272.

1956a The Neotropical species of the "subgenus Aeschna" sensu Selysii 1883 (Odonata). Philadelphia. Memoirs Amer. Ent. Soc. No. 15. v + 251 + iv pp., 47 pls., 9 figs., 7 maps.

——**b** Dr. Charles Christopher Adams [obituary]. Ent. News 67: 169–171.

1959 [The Odonata of Canada and Alaska, by Edmund M. Walker. Vol. II, Part III (review).] Ent. News 70: 194–195.

1961 Adult Odonata of the Catherwood Peruvian-Amazon Expedition. Proc. Acad. Nat. Sci. Phila. 113 (1): 1–20.

New Exotic Crane-Flies (Tipulidae: Diptera). Part V

CHARLES P. ALEXANDER, Amherst, Massachusetts [1]

The preceding part under this general title was published in ENTOMOLOGICAL NEWS, *72*: 235–243, 1961. In the present report I am continuing the studies on the very rich fauna of India, describing species that were taken in Kumaon and Sikkim by Dr. Fernand Schmid, and in South India by Mr. P. Susai Nathan, to both of whom my sincere thanks are extended. The types are preserved in my personal collection.

Rhabdomastix (Sacandaga) teriensis, new species

Size small (wing of male 4 mm or less); general coloration of head and thorax gray; wings weakly tinged, without stigma; veins pale brown, *Sc* long, vein *2nd A* sinuous, the cell broad; veins unusually glabrous; male hypopygium with outer dististyle slender; interbase on outer third expanded into a narrow blade, its tip somewhat obtuse.

♂. Length about 3–3.5 mm; wing 3.5–4 mm; antenna about 0.7–0.8 mm.

♀. Length about 4–5.5 mm; wing 3.5–5 mm.

Rostrum light gray; palpi black. Antennae black, scape pruinose; all flagellar segments distinct, suboval, shorter than the verticils. Head light gray; anterior vertex broad.

Pronotum brownish gray. Mesonotum gray, praescutum with vague indications of four darker stripes, the intermediate pair broader and more evident; pseudosutural foveae large, black. Pleura gray, more brownish gray ventrally. Halteres whitened, especially the knobs. Legs with coxae and trochanters brownish testaceous; remainder of legs brownish yellow, outer tarsal segments narrowly or scarcely darker. Wings weakly tinged, without a distinct stigma; veins pale brown, somewhat lighter in the prearcular and costal fields. Veins unusually glabrous, beyond the cord with a scattered series of

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

trichia on outer two-thirds or more of vein R_5 and a few near outer end of M_{1+2}; *Sc* and *R* glabrous. Venation: *Sc* long, Sc_1 ending just beyond midlength of *Rs*, Sc_2 preserved; vein R_3 erect, the distance on costa between R_{1+2} and R_3 variable, longer than vein R_3; *m-cu* at or near midlength of M_{3+4}; vein *2nd A* gently sinuous, the cell broad.

Abdomen dark brown, in cases the posterior borders of segments narrowly paler; hypopygium and genital segment of ovipositor light brown. Ovipositor with cerci long and slender, slightly upcurved on outer half. Male hypopygium with the outer dististyle slender, with a concentration of short darkened spicules at tip but without a major terminal spine; inner style moderately broad, outer margin before apex with long setae from strong tubercles. Interbase slender, weakly expanded on about the outer third into a narrow blade, the tip somewhat obtuse.

Habitat. INDIA (Kumaon). *Holotype:* ♂, Teri, Teri Garhwal, 2,500–5,000 feet, April 16, 1958 (Fernand Schmid). *Allotopotype:* ♀, pinned with type. *Paratopotypes:* 7 ♂♀.

The other small regional members of the subgenus, including *Rhabdomastix* (*Sacandaga*) *almorae* Alexander and *R.* (*S.*) *emodicola* Alexander, are most readily told by the structure of the male hypopygium, particularly the outer dististyle and interbase. In the paratype series a single female is considerably larger than the others (the largest measurements given) but seems to be conspecific.

Toxorhina (Ceratocheilus) monostyla, new species

Size medium (wing of male 5.7 mm); mesonotum brown and yellow, pleura conspicuously patterned; rostrum longer than body or wing; knobs of halteres dark brown; legs dark brown, outwardly passing into black; wings infuscated; macrotrichia lacking on most veins basad of cord; cell M_2 open by atrophy of *m;* male hypopygium without lobes on basistyle; a single dististyle.

♂. Length, excluding rostrum, about 6 mm; wing 5.7 mm; rostrum about 7 mm.

Rostrum black, very long, exceeding the wing or remainder of body. Antennae with scape light yellow; pedicel black,

flagellum brownish black. Head gray, without a corniculus; anterior vertex narrow, subequal to the diameter of scape.

Cervical region black. Mesonotum chiefly concealed in mounting; praescutum and scutum dark brown, more obscure brownish yellow laterally; parascutella obscure yellow; postnotum dark plumbeous. Pleura chiefly dark brown or plumbeous, especially above where it produces a broad longitudinal stripe; sternopleurite lighter brown, paling to yellow posteriorly; metapleura darkened. Halteres with stem light brown, knob dark brown. Legs with fore and hind coxae light yellow, very small, middle coxae darker; trochanters brownish yellow; femora dark brown, paler basally; remainder of legs black. Wings rather strongly infuscated, base slightly more yellowed; veins brown. Macrotrichia on *Rs,* both sections of R_5, second section of M_{1+2} and outer two-thirds of M_3; a single trichium on anterior branch of *Rs*; no trichia on *Sc, M, Cu* or the Anals. Venation: Sc_1 ending opposite origin of *Rs,* Sc_2 removed from tip; anterior branch of *Rs* long, gently sinuous, longer than either *Rs* or basal section of R_5, ending beyond level of *r-m*; cell M_2 open by atrophy of *m*; M_{3+4} subequal to M_4; *m-cu* at fork of *M*.

Abdomen dark brown, hypopygium more yellowish brown. Male hypopygium without modified lobes on basistyle, its mesal face with numerous normal setae, the outer ones small and very abundant. A single dististyle that includes a narrow yellow beak, its tip obtusely truncated, and a dark colored oval posterior prolongation that terminates in an apiculate point. Interbasal plates pale, gradually widened outwardly, tips obtuse. Arms of aedeagus darkened, relatively short, less than the beak of the dististyle.

Habitat. INDIA (Sikkim). *Holotype:* ♂, Dikchu, 2,300 feet, May 9, 1959 (Fernand Schmid).

Toxorhina (*Ceratocheilus*) *monostyla* is readily told from all regional species by the open cell M_2 of the wings and, especially, the structure of the male hypopygium, particularly the basistyle and dististyle.

Toxorhina (Ceratocheilus) luteibasis, new species

Size medium (wing of male about 6 mm); rostrum short; general coloration of mesonotum brownish black, including

three broad praescutal stripes; pleura with dorsal sternopleurite silvery; halteres light yellow; legs black, femoral bases obscure yellow; wings tinged with brown, the base conspicuously yellowed; macrotrichia of veins beyond cord relatively sparse; *Sc* long, cell *1st* M_2 closed; male hypopygium with basistyle conspicuously setiferous; dististyle complex, including a long sinuous outer spine; interbase unusually broad.

♂. Length, excluding rostrum, about 6.5 mm; wing 6.1 mm; rostrum about 3.2 mm.

Rostrum black, relatively short, only about one-half the remainder of body. Antennae black throughout. Head gray, darkened on sides posteriorly, orbits gray; a depressed median area behind the antennal bases, slightly elevated on either side, with no cornicular development; anterior vertex broad, more than twice the diameter of the large antennal pedicel.

Cervical region and pronotum black. Mesonotal praescutum almost covered by three broad brownish black stripes, the interspaces obscured, a little paler than the stripes, lateral borders narrowly gray; posterior sclerites of notum blackened, slightly paler along posterior border of scutum and on the parascutella. Pleura above brownish black, broadly silvery gray on dorsal sternopleurite, paler behind; meral region darkened. Halteres conspicuously pale yellow. Legs with coxae brownish black; trochanters brown; remainder of legs black, femoral bases obscure yellow, more extensively pale on fore femora. Wings tinged with brown, prearcular field conspicuously yellowed; veins brown, yellowed in the brightened areas. Macrotrichia of veins much less numerous than in *brevifrons*, beyond cord lacking on *Rs*, basal section of R_5, M_3 and M_4; about 15 trichia on outer two-thirds of distal section of R_5, more crowded on distal fifth; outer section of M_{1+2} with about 12 trichia, chiefly on distal half. Venation: *Sc* long, Sc_1 ending nearly opposite midlength of the straight *Rs*, Sc_2 before origin of the latter; anterior branch of *Rs* long and only gently sinuous, more than twice *Rs*; *m-cu* at or close to fork of *M*.

Abdomen, including hypopygium, black. Male hypopygium with posterior border of tergite low convex; setae small and sparse. Basistyle stout, with conspicuous setae; in the slide

mount it is uncertain as to where these setal groups are located but apparently as follows: A conspicuous tubercle on lateral or outer face beyond midlength of style, provided with about 18 to 20 strong dark setae; more distally near apex of style with a low dense area of shorter setae; inner face of style with well-distributed strong setae; remainder of style without setae or with these more scattered. A single contorted and complex dististyle, the moderately long beak obtuse, its base behind narrowed and roughened; at base of style with a long sinuous spine, narrowed to the acute tip. Interbase unusually broad, on outer two-thirds narrowed to the subacute tip. Arms of aedeagus shorter than the basal mass.

Habitat. INDIA (Sikkim). *Holotype:* ♂, Chateng, 8,700 feet, May 22, 1959 (Fernand Schmid).

Toxorhina (*Ceratocheilus*) *luteibasis* is most similar to *T.* (*C.*) *brevifrons* (Brunetti), differing in the coloration of the body and wings, the short rostrum, broad anterior vertex and the trichiation of the wing veins. The type specimen of *brevifrons* has been studied and re-described by the writer (*Philippine Jour. Sci.* 61: 202; 1936).

Toxorhina (Toxorhina) scita, new species

Size relatively large (wing of male about 5.5 mm); mesonotum brown, lateral praescutal borders broadly buffy; thoracic pleura brownish yellow with a conspicuous darker brown dorsal stripe; legs brown; wings weakly tinged with brown, unpatterned; Sc_1 ending opposite origin of Rs; abdominal tergites dark brown; male hypopygium with setae of mesal face of basistyle normal; aedeagus blackened, arms narrow.

♂. Length, excluding rostrum, about 6 mm; wing 5.4–5.5 mm; rostrum about 5 mm.

♀. Length, excluding rostrum, about 7.5 mm; wing 6 mm.

Rostrum elongate, as shown by the measurements, black throughout. Antennae with scape and the large pedicel dark gray; flagellum brown, unusually short. Head gray, more cinnamon behind the antennal bases, darker brown behind the more silvery corniculus; anterior vertex broad.

Pronotum and cervical region dark brown. Mesonotal praescutum with disk virtually covered by three confluent brown stripes, the interspaces faintly indicated, more evident behind, lateral borders broadly buffy; scutum dark brown, the posterior callosities more yellowed; scutellum brown, posterior border narrowly paler brown; mediotergite light gray. Pleura and pleurotergite brownish yellow, with a conspicuous darker brown dorsal stripe; ventral sternopleurite more reddish brown. Halteres with stem obscure whitish, knob darker. Legs with coxae and trochanters light brown; remainder of legs brown. Wings weakly tinged with brown, unpatterned, prearcular and costal fields slightly more yellowed; veins light brown. Macrotrichia on the branch of *Rs*, M_{1+2} and distal half of M_3. Venation: Sc_1 ending opposite origin of *Rs*; outer end of cell R_5 slightly narrowed; *m-cu* at or close to fork of *M*.

Abdominal tergites, with the hypopygium, dark brown; basal sternites paler brown. Male hypopygium with posterior margin of tergite rounded. Basistyle simple, setae of mesal face normal, relatively numerous and extending over virtually the entire surface. Dististyles terminal, the outer style a narrow sinuous rod, narrowed very gradually into a slender spine; inner style a little longer, at near midlength with a stout pendant spine. Gonapophysis broadly flattened. Aedeagus blackened, arms slender, separated by a broad U-shaped notch.

Habitat. India (Madras). *Holotype:* ♂, Cherangode, Nilgiri Hills, 3,500 feet, November 13, 1950 (P. Susai Nathan). *Allotopotype:* ♀. *Paratopotype:* ♂, pinned with the type.

Toxorhina (*Toxorhina*) *scita* differs from other Indian species of the subgenus by the larger size, coloration of body and especially in the structure of the male hypopygium.

Toxorhina (Toxorhina) sparsiseta, new species

Size small (wing of male 5.5 mm or less); general coloration of head and mesothorax gray, praescutum with four more plumbeous stripes; legs black; wings weakly darkened, base more yellowed; macrotrichia of veins sparse; abdomen, including hypopygium, brownish black; male hypopygium with tergal plate blackened, bilobed; basistyle with major setae simple, long

but sparse, including a compact group of four near apex; outer dististyle a strongly curved yellow rod; arms of aedeagus short, slender, divergent.

♂. Length, excluding rostrum, about 5 mm; wing 4.5–5.5 mm; rostrum about 3.5–4 mm.

♀. Length, excluding rostrum, about 6.5–7 mm; wing 5.5–6 mm; rostrum about 3.5–4 mm.

Rostrum black, about three-fourths as long as wing. Antennae black. Head light gray; anterior vertex without a well-developed corniculus, broad, especially in the female.

Cervical region and pronotum blackened. Mesonotum light gray, the praescutum with four more plumbeous stripes, intermediate pair narrowly separated, the laterals in front virtually confluent with the central stripes; scutal lobes similarly darkened. Pleura dark plumbeous. Halteres dusky. Legs with coxae strongly infuscated basally, tips obscure yellow; trochanters obscure yellow; remainder of legs black, the femoral bases vaguely paler. Wings weakly darkened, base more yellowed; veins pale brown. Macrotrichia of veins long but very sparse, beyond cord with about five or six on approximately the distal half or more of both R_5 and M_{1+2}, present on outer half of R, lacking on Sc. Venation: Sc_1 ending about opposite origin of Rs, Sc_1 long; *m-cu* close to fork of M.

Abdomen, including hypopygium, brownish black. Ovipositor with genital shield light brown apically; cerci dark brown horn color, long and slender, gently upcurved. Male hypopygium with the tergal plate blackened, bilobed, the lobes rounded, longer in the holotype. Basistyle with unusually few setae, especially the larger more basal ones; all setae simple, not bulbous, as in *incerta;* near apex with a compact group of four strong curved bristles. Outer dististyle a strongly curved yellow rod, narrowed to the acute tip; inner style darkened, tip broadly obtuse, on outer margin at near midlength with a strong erect to slightly recurved spine. Arms of aedeagus short, slender, divergent.

Habitat. INDIA (Madras). *Holotype:* ♂, Cinchona, Anaimalai Hills, 3,500 feet, May 1959 (P. Susai Nathan). *Allo-*

topotype: ♀, pinned with type. *Paratopotypes:* ♂♀, May 1956; April–May 1959 (P. Susai Nathan).

The most similar regional species is *Toxorhina* (*Toxorhina*) *brevirama* Alexander, readily told by the structure of the male hypopygium, particularly the tergite, vestiture of the basistyle, and the inner dististyle.

Three New Species of Trichoptera from Eastern North America

Herbert H. Ross, Illinois Natural History Survey, Urbana, Illinois

Although the following caddisflies come from relatively distant localities they appear to share the same ecological requirement of cool, clear, rapid, streams such as are provided in the heart of the temperate deciduous forest. The species of *Sericostoma* finds these conditions in a spring-fed stream some distance from an area which normally has small, clear, cold streams of surface origin.

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Types described in this paper are deposited in the collection of the Illinois Natural History Survey.

Hydropsyche hoffmani n. sp.

Male.—Length 11 mm. Color various shades of light brown; antennae almost straw color with the dorsal dark V-marks conspicuous and contrasting on the six basal segments of the flagellum, fading out on the seventh and eighth segments; wings with a poorly contrasting irregular pattern of various shades of brown. General structure typical for genus. Eyes fairly large, the malar space narrow, the eye occupying almost the entire lateral view of the head, and seen dorsally, each eye as large as the area of the head between the eyes. Genitalia as in Fig. 1. Ninth segment with a pronounced dorsal hump, tenth segment

joined imperceptibly with it. Posterior projections of lateral margin of ninth segment fairly sharp. Tenth tergite with only a slight apical indentation between its lateral lobes, each lobe with a large and irregular lateral wart. Clasper elongate, fairly parallel-sided, the apical segment only indistinctly set off, fairly short, its lateral aspect truncate and incised at the apex to form a sharp point on each side; in posterior view the clasper has the basal segment parallel-sided and gently curved mesad, and the apical segment is triangular, also curved mesad and narrowing to a sharp, pointed tip. Aedeagus obtusely angulate near middle, the apical portion with elongate lateral lobes; the ventral aspect of the apex, Fig. 1B, wider than the more basal portion, the ventral cavity only half the length of the apex and the lateral lobes produced beyond the cavity for a distance about equal to the length of the cavity.

Holotype male.—Radford Arsenal, Montgomery County, VIRGINIA, August 4–10, 1956, at light, R. L. Hoffman. *Paratype.*—Same data as for holotype but August 23–29, 1955, 1 male.

This species belongs to the *scalaris* group and within it is most closely related to *leonardi* Ross and *hageni* Banks. In both of these latter species the apical lateral lobes of the aedeagus are produced markedly beyond the mesal cavity as in *hoffmani* but in both *leonardi* and *hageni* the apical segment of the clasper is sinuate and the lateral aspect pointed rather than incised as it is in *hoffmani*. Judged on the basis of the shape of the aedeagus, *hoffmani* and *leonardi* are extremely close; in *hageni* the apex of the aedeagus is produced even more than in these two species. From this it appears probable that *leonardi* is the most primitive member of this complex of three species, and that *hageni* and *hoffmani* represent divergent specializations from almost the same ancestral form.

Sericostoma stannardi n. sp.

Male.—Length 11 mm. Color various shades of medium brown, the legs slightly lighter. Maxillary palp with a long sausage-shaped basal segment and a small ovate second segment situated on the inner side of the base of the first segment. Gen-

eral structure otherwise typical for genus. Genitalia as in Fig. 2. Ninth segment ovate laterally, narrow dorsally and ventrally. Tenth tergite elongate, narrow from dorsal or ventral view, the lateral aspect deep at the base and tapering to a pointed apex, the ventral margins at the base curving mesad beneath the aedeagus and forming a channel for this organ. Cercus slender and finger-like. Clasper elongate and complex, consisting of a long, sinuate, lateral lobe (the main body of the clasper) bearing numerous long setae, and a heavily sclerotized mesal structure bearing a curved dorsal process arising at the extreme base (*a*), a shorter mesal branch arising about a quarter of the distance from the base (*b*), and a long slender apical process which is angulate at the tip and which bears a series of minute spurs on its mesal margin (*c*). The bases of the opposed sclerotized processes and the main bodies of the claspers are fused into a strong sclerotized bridge which unites these structures solidly at the base. Aedeagus slender and sinuate, the apex of the sclerotized portion enlarged, a series of membranous folds projecting from the tip.

Holotype male and 4 paratype males.—Wall Doxey State Park, 7 mi. S of Holly Springs, Mississippi, May 21, 1957, Ross and Standard, at light. These specimens were taken along the banks of a small, clear, cold stream, issuing as a spring from sandstone strata in a dense beech forest.

This species is most closely related to *tetron* Ross, from which it differs in having two basal processes instead of one on the sclerotized inner structure of the clasper, and in having the apex of the lateral aspect of the tenth segment narrow and pointed at the extreme tip.

With *tetron, distinctum* (Ulmer), *griseum* (Banks), and *crassicorne* (Walker), this species brings to five the number of species in the distinctive North American subgenus *Agarodes* Banks. All the species except *stannardi* occur in the mountainous region of the Southern Appalachians or in boreal areas to the north. This suggests very strongly that *stannardi* may be a relic species existing in spring-fed streams to the south and west of the range of the other species of the genus. In this

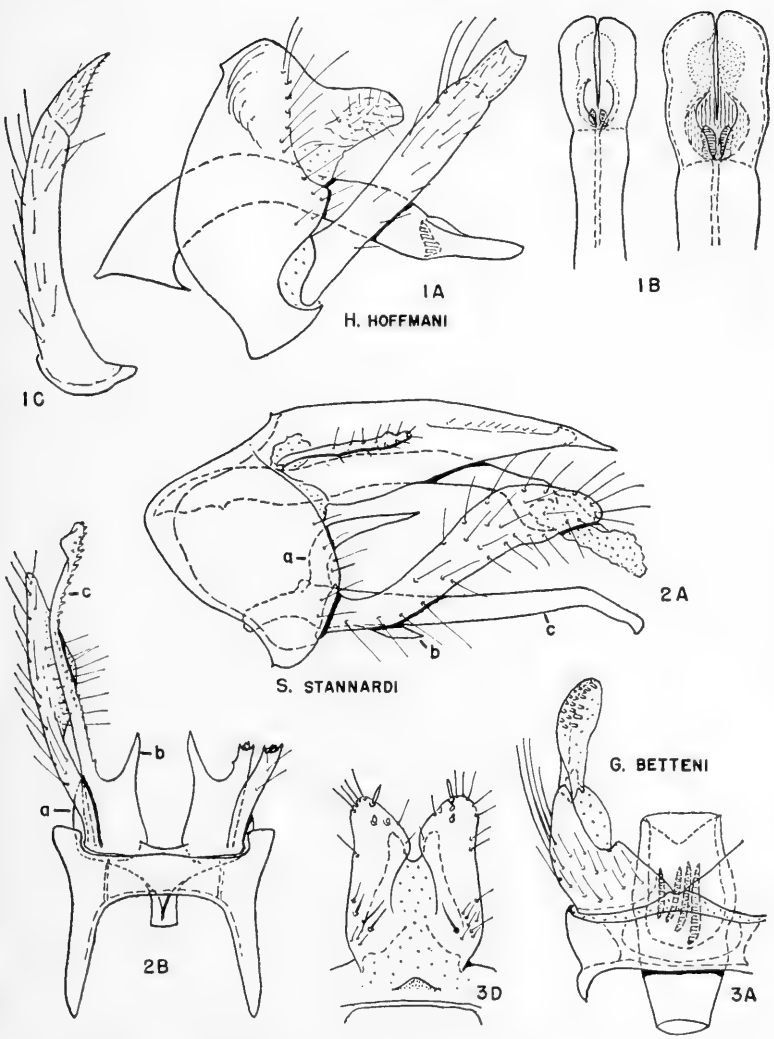
regard, it is interesting that larvae, pupae, and females of a species of *Sericostoma* have been taken in Jackson Parish, Louisiana, in a small spring issuing from sandstone strata. To date, males have not been obtained from the Louisiana locality. However, they should prove most interesting because this locality is a considerable distance south and west of the type locality of *stannardi.*

Goerita betteni n. sp.

Male.—Length 6 mm. Color light brown, antennae and legs lighter, shading to very pale straw color; dorsum of abdomen darker with blackish suffusions. General structure typical for genus. Eyes without hair. Tibial spurs fairly short, without scaly hair. Genitalia as in Fig. 3. Ninth segment narrow dorsally, with a minute mesal dorsal projection, with lateral lobes projecting anteriorly into the eighth segment, and with a fairly wide ventral expanse. Tenth tergite composed of a pair of clavate lateral lobes situated in a horizontal plane, the two lobes nearly touching on the meson toward their apex, the area between them semi-membranous; beneath these larger dorsal lobes there is a pair of smaller lobes extending to about where the dorsal lobes nearly touch on the meson. Clasper with a broad short basal segment, triangular in ventral view; apical segment clavate but narrow, bearing a dense row of setal pegs on the ventral half of the inner surface. Aedeagus short, wide and ovate in cross section, its apical margin truncate; within the aedeagus is an inverted membranous structure containing four slightly curved dark rods.

Holotype male.—Flag Run, Fellowsville, WEST VIRGINIA, June 17, 1958, H. H. and J. A. Ross.

This species differs from *semata* Ross and *genota* Ross, the only other species known in the genus, in having four instead of two rods in the aedeagus, and in the clavate lateral lobes of the tenth tergite. *G. betteni* is probably the species illustrated by Betten (1934, plate 67, figs. 6–11) and considered at that time as an unplaced genus and species which was recorded under the name "Sericostomatid sp." (*ibid.,* p. 413). Dr. Betten had a single specimen taken at West Falls, New York, July 15.



FIGS. 1–3. Male genitalia of Trichoptera. A, lateral aspect; B, ventral aspect; C, posterior aspect of clasper; D, dorsal aspect of tenth tergite. 1B includes two magnifications of the aedeagus. *a, b, c,* homologus branches of the sclerotized inner rod of the clasper.

REFERENCE CITED

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New Records and Species of Chilopods from Nevada and Oregon

RALPH V. CHAMBERLIN

The chilopods recorded in the present paper are represented in two collections placed in my hands for identification, one from the Nevada Test Area made in connection with a project supported by the Atomic Energy Commission and received by me through the courtesy of Dr. D. Elden Beck of the Brigham Young University; and the other from Saddleback mountain, Lincoln County, Oregon, made in connection with an ecological survey by Prof. Jane C. Dirks-Edmunds. The types of the new species are for the present retained in the zoological museum at the University of Utah.

ORDER SCOLOPENDRIDA

Scolopocryptops rubiginosus (L. Koch)

Locality: Oregon, Saddleback Mt. Several specimens.

Scolopendra michelbacheri Verhoeff

Locality: Nevada; Mercury, Clark Co., Nevada Test Area.

The specimens secured conform fully with the original description the type of which was taken in southern California at Walker's Pass.

ORDER GEOPHILIDA

Schendyla nemorensis (C. L. Koch)

Locality: Oregon: Saddleback Mt.

Nyctunguis stenus new species

Head a little longer than broad (*ca.* 9:8). Antennae short, composed of the usual twenty articles. Prebasal plate a little exposed at the middle. On anterior portion of the clypeus two pairs of setae forming a quadrangle. Labrum with median section forming a wide low arch and bearing 10–12 stout teeth; on each side presenting a few serrations or pectinae. Dental plate of mandible apparently undivided, bearing denticles on its distal part.

Claw of prehensors when closed not attaining front margin of head; articles of prehensors unarmed except a slight nodular prominence proximad of the distal end of the femuroid. Prosternum showing at middle of anterior border a narrow and acute excision.

Sternites with a median longitudinal sulcus. Ventral pores moderate in number, confined to a subcircular area at middle of plate.

Last ventral plate broad, trapeziform. Coxal pores simple, two on each side, these covered by border of sternite.

Terminal pores present.

Pairs of legs 55. Length 17 mm.

Locality: NEVADA: Clark Co., Mercury, Nevada Test Area.

The known species of *Nyctunguis* occur in the southwestern United States and northern Mexico except one species reported from the Hawaiian Islands and one recently described from Tennessee by Dr. Ralph Crabill. Although most of the species are known from but few specimens, or in some by only one, and as a result the range of variation of some characters presently used in separating the several forms remains uncertain, the following provisional key should prove of some aid pending revisional study following the accumulation of more ample material.

TENTATIVE KEY TO SPECIES OF NYCTUNGUIS

1. Prebasal plate normally exposed.....2
   Prebasal plate not exposed.....10
2. Dentiferous arch occupying entire width of labrum.....
   .....**arcochilus** Chamb.
   Labrum not so.....3
3. Median excavation of labrum deep, bearing 14 teeth at middle with 4 or 5 processes at each end of the series, the margin ectad of the arch on each side smooth....**dampfi** (Verhoeff)
   Not so, the dental series not terminated by such elongate processes, the margin ectad of the arch on each side with two or more serratures or pectinae.....4
4. Labrum deeply excavated, with the median portion semicircular and much narrower transversely than the serrate division on each side and bearing 10 teeth.....
   .....**danzantinus** Chamb.
   Not so.....5

5. Median dentiferous section of labrum much longer transversely than each lateral division, its teeth typically 20 in number.....**libercolens** Chamb.
This median section of labrum much shorter, its teeth 10 to 16 in number.....6
6. Anterior margin of prehensorial prosternum with two blunt or truncate processes.....**bryanus** Chamb.
With no such dentiform processes on prosternum.....7
7. Clypeus with a transverse band of very short setae in front of the labrum.....**molinor** Chamb.
With no such prelabral band of short setae or hairs.....8
8. Margin of labrum ectad of median arch on each side oblique and smooth except for two coarse serratures adjacent to the arch, dental plate of mandibles divided into three distinct and equal blocks.....**catalinae** Chamb.
Not so.....9
9. Margin of median arch of labrum in form of a reentrant angle; dental plate of mandible in two very unequal blocks, the larger of which bears typically 7 teeth.....
.....**montereus** Chamb.
Median arch evenly curved, low or flat; dental plate of mandible entire.....**stenus** n. sp.
10. Exposed portion of basal plate unusually short; ventral pores very numerous, arranged in an anterior and a larger posterior area which are not sharply defined and may be partially confluent.....**apachus** Chamb.
Exposed portion of basal plate not unusually short; ventral pores fewer, in a single more sharply limited circular area
.....11
11. Last ventral plate very wide in proportion to length.....
.....**mirus** Chamb.
Last ventral plate of more usual proportions.....12
12. Median arch of labrum semicircular, the lateral margins oblique and nearly straight, smooth throughout.....
.....**glendorous** Chamb.
Labrum not of this form.....13
13. Median dentigerous arch proportionately very short, bearing 10 teeth.....14
Median arch longer and bearing typically 16 teeth.....
.....**pholeter** Crabill
14. Basal plate exceptionally long; median excavation of labrum deep; pairs of legs in holotype 65.....**auxus** Chamb.
— Basal plate not exceptionally long; pairs of legs mostly near 45.....**heathi** Chamb.

ORDER LITHOBIIDA

Ethopolys integer Chamberlin
Locality: Oregon: Saddleback Mt., three specimens taken

Bothropolys victorianus Chamberlin
Locality: Oregon: Saddleback Mt., one specimen taken

Oabius mimosus Chamberlin
Locality: Oregon: Saddleback Mt.

Oabius wamus, n. sp.

Differing from other species at present known in having the claw of the female gonopods bipartite instead of tripartite. The outer of the two basal spines on each side is longer and broader than the inner one, in outline narrowing from middle of length distad.

Anal legs with the ventral spines 0, 1, 3, 2, 0; the dorsal 1, 0, 3, 1, 0. Penult legs with ventral spines 0, 1, 3, 3, 2; dorsal 1, 0, 3, 1, 1. Third article of anterior legs unarmed either above or below.

Coxal pores circular, small, numbering 2, 3, 3, 2.

Length of female holotype, 5 mm.

A specimen regarded as probably the male of this species has notably strongly crassate anal and penult legs. The anal legs have the ventral spines 0, 1, 3, 3, 2 and the dorsal 1, 0, 3, 2, 0 the fourth article having apparently an extra spine both above and below. Penult legs with ventral spines 0, 1, 3, 3, 1(2), the dorsal 1, 0, 3, 2, 0. Third joint of anterior legs unarmed either above or below.

Last two pairs of legs having in addition to the usual setae a dense clothing of short hair points which appear to be early lost upon the appearance of numerous fine pores.

Locality: OREGON: Saddleback Mt.

Oabius mercurialis, new species

This form falls in the group of species in which the dorsal spines of the anal legs are 1, 0, 3, 1, 0 from others of which group it differs in having the ventral spines of those legs

0, 1, 3, 1, 0 instead of 0, 1, 3, 2, 0 or more. Apparently further distinguished in the reduced spining of the twelfth legs, the dorsals being 0, 0, 1, 1, 0. Also characteristic is the arrangement of the few ocelli in a single series. These number three of full size with typically one of reduced size at each end of the series.

Antennae short, composed of the usual twenty articles.

Prosternal teeth 2–2; the median sinus V-shaped, narrowly rounded at bottom; porodont in form of a slender spine inserted ectad of outer tooth on each side.

Tarsi of all legs excepting the last two pairs strictly entire. Spines of first legs above 0, 0, 1, 2, 1, those below 0, 0, 0, 0, 0. Second legs with dorsal spines 0, 0, 0, 1, 0 and ventral spines 0, 0, 1, 2, 1. Penult legs with spines above 0, 0, 3, 2, 1, below 0, 1, 3, 2, 1. Dorsal spines of thirteenth legs 0, 0, 1, 1, 0, the ventrals 0, 0, 2, 3, 2. Dorsal spines of twelfth legs 0, 0, 1, 1, 0, the ventrals 0, 0, 2, 3, 3.

Claw of the gonopods of the female tripartite; the basal spines long and acute, 2–2.

Length, 9 mm.

Locality: NEVADA: Clark Co., Mercury. Female type taken Jan. 26, 1961, a second specimen taken Dec. 19, 1960.

Pokabius utahensis tidus, new subspecies

This form is very similar to *P. utahensis* (Chamberlin) in the modification of the anal legs of the male. In these the prefemur is produced dorsad or somewhat mesad into a conspicuous lobe which is contiguous with a corresponding lobe at proximal end of the femur. It differs from *utahensis* sens. str. in bearing on the lobe of the femur two conical teeth in place of the transverse series of denticles present in the former.

Last two pairs of legs inflated.

Spines of anal legs: ventral, 0, 1, 2, 1, 0; dorsal 1, 0, 2, 1, 0; claw single. Penult legs with ventral spines 0, 1, 3, 3, 1; the dorsal 1, 0, 2, 1, 1; a spine at base of claw.

Length of female holotype, 4.5 mm.

Locality: OREGON: Saddleback Mt. Two adults and many young and partly grown.

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.

Lyman Entomological Museum. In December, 1914, the H. H. Lyman Bequest established a collection of insects and an entomological library in the Redpath Museum on the McGill Campus of McGill University, Montreal. For various reasons the Lyman collections remained isolated spatially from the Entomology Department of the University. On December 26, 1961, however, the collection and library were moved to more spacious quarters, to be known as the Lyman Entomological Museum, in the Department of Entomology and Plant Pathology on the Macdonald College Campus near Ste Anne de Bellevue, Quebec. The Macdonald College collections have now been amalgamated with those from Montreal and the first full-time curator has been appointed. It is hoped that a new era of expansion and usefulness has begun. The collections are not large by international standards although comprising several hundred thousand specimens. Lepidoptera and American Heteroptera are strongly represented and there is fair representation of most other orders although not, so far, of Orthoptera, the smaller orders, or groups containing small insects. Donations (particularly of groups which are poorly represented) would be welcome from any part of the world but it is hoped to build by exchange also. Inquiries should be directed to V. R. Vickery, Curator, Lyman Museum, Macdonald College P.O., P.Q., Canada.—D. K. McE. Kevan, Chairman, Lyman Bequest Committee.

Entomologist's Market Place

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Notices of wants and exchanges not exceeding three lines are free to subscribers.

All insertions are continued from month to month, the new ones are added at the end of the column, and, when necessary, the older ones at the top are discontinued.

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

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

Cockroaches (Blattoidea) of Japan, Okinawa, Formosa (Taiwan), and the Philippines are being studied in cooperation with Dr. K. Princis. Loans of specimens from that area are desired. A. B. Gurney, U. S. National Museum, Washington 25, D. C.

Orthoptera. Gryllinae (except domestic sp.) and **Pyrgomorphinae** of the world wanted in any quantity for work in morphology, taxonomy, cytology, and experimental biology; dry, or in fluid, or living. Write D. K. Kevan and R. S. Bigelow, Dept. of Entomology, McGill University, Macdonald College, Quebec, Canada.

Beetles of the world wanted, all species in exchange for American beetles, moths and butterflies. James K. Lawton (age 18), 7118 Grand Parkway, Wauwatosa 13, Wisconsin.

Acanthomyops (Citronella ants) wanted for revisionary study. Will sort from yellow *Lasius*. M. W. Wing, State University College, Cortland, N. Y.

Cicindelidae of the World wanted in exchange for North American Coleoptera or in purchase. Carl Farr Moxey, 414 Woodland Ave., Wayne, Pennsylvania.

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CONTENTS

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ENTOMOLOGICAL NEWS

VOL. LXXIII JUNE, 1962 No. 6

The Collembola of New Mexico. VIII. Tomocerinae (Entomobryidae) [1, 2]

HAROLD GEORGE SCOTT [3]

Only one species of Tomocerinae has heretofore been recorded from New Mexico: *Tomocerus flavescens* (by Folsom, 1913, from a collection made by T. D. A. Cockerell at Beulah, San Miguel County, May 3, between 1893 and 1903). Specimens will be deposited with the Academy of Natural Sciences, Philadelphia, Pennsylvania.

Subfamily TOMOCERINAE Schaffer, 1896

Body elongate, not subglobose; scales usually present; pseudocelli absent; mouthparts chewing; Ant III and IV invariably annulate, with Ant III much longer than Ant IV; prothorax reduced, naked dorsally; body segments never ankylosed; furcula present, may reach collophore; Abd III and IV subequal; anal spines absent (Figs. 1 and 2).

KEY TO THE WORLD GENERA OF TOMOCERINAE

1. Postantennal organ present (see Wilkey, 1960) . . . . . **Tomolonus** Mills, 1948
   Postantennal organ absent . . . . . **Tomocerus** Nicolet, 1841

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

[2] Part VII appeared in ENT. NEWS 73(2): 45–51.

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

Genus **TOMOCERUS** Nicolet, 1841

Postantennal organ absent; eyes six and six or absent; antenna usually shorter than body; unguis with one to six teeth; unguiculus without teeth or with one or two teeth (Fig. 2).

Discussion. The genus *Tomocerus* is frequently divided into three subgenera: (1) subgenus *Tritomurus* Frausenfeld, 1854, with eyes, prostheca, and tenent hairs absent; (2) subgenus *Pogonognathellus* Paclt, 1944, with eyes six and six, and the prostheca and tenent hairs present; (3) subgenus *Tomocerus* Nicolet 1841, with the eyes six and six, the prostheca absent, and tenent hairs present.

Tomocerus bidentatus Folsom, 1913.

New Mexico Records. Sixteen samples (12 Berlese, 2 under rocks, 2 from fir logs) from grass roots, herb roots, and litter (red birch, cottonwood, yellow pine, spruce, fir, aspen, and alder); 5,000 to 12,300 ft; Taos, Sandoval, Santa Fe, Mora, San Miguel and Bernalillo Co.; May–Nov., 1950–1954.

Distribution. N. M., Ohio, Tenn., Va.

Tomocerus flavescens (Tullberg, 1871).

Discussion. It has been customary to differentiate four forms or varieties of this species: form *separatus* Folsom, 1913; form *americanus* Schott, 1896; form *arcticus* Schott, 1894; and form *flavescens* Tullberg, 1871. In the light of the New Mexico collections, recognition can no longer be given these forms. Folsom (1913, p. 461) reports that "Frequently the same individual has spines of *flavescens* on one dens and those of *americanus* on the other." The same author (1913, p. 463) reports similar intergrades between *arcticus* and *flavescens*. The form *separatus* is based upon the presence of three teeth on the unguis rather than two teeth as in *flavescens*. The dental formulae of *separatus* and *flavescens* are identical. In the New Mexico specimens, the merger of characteristics of two forms (*flavascens* and *americanus; flavescens* and *arcticus*) on one individual is again noted.

New Mexico Records. Twelve samples from beneath dung,

rocks, and bark of logs (aspen, fir, alder); among mushrooms; and from Berlese samples of litter (aspen, spruce, fir); 5,000 to 11,200 ft; Valencia, Bernalillo, San Miguel, Torrance, and Sandoval Co.; Sept., 1951–1954.

Distribution. Alaska, Calif., Colo., District of Columbia, Ga., Ill., Ind., Iowa, La., Maine, Md., Mass., Mich., Minn., Miss., Mo., N. H., N. J., N. M., N. Y., N. C., Ohio, Ore., Pa., Tenn., Texas, Utah, Va., Wash.; Northwest Territories (Canada), Europe, Asia.

This species was first recorded from New Mexico by Folsom (1913, p. 462).

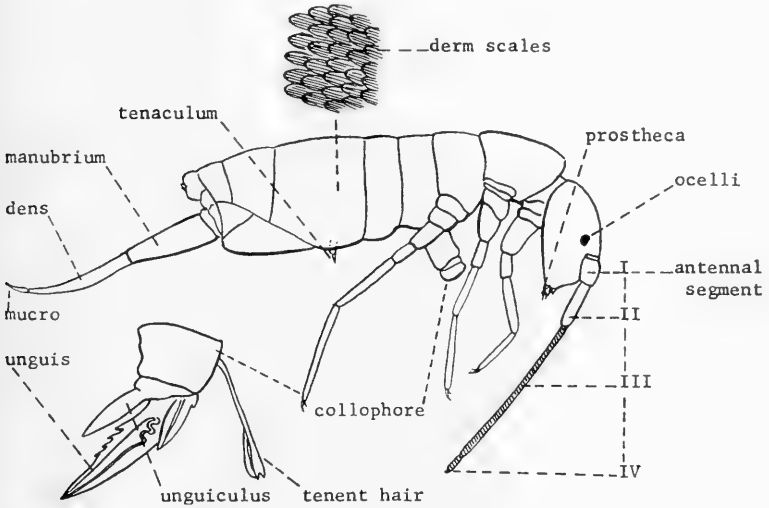

Fig. 1. *Tomocerus flavescens* with key structures labeled.

Tomocerus lamelliferus Mills, 1934.

New Mexico Records. Twenty samples (one from under bark of fir log, three from under rocks in Alpine Zone, and 16 Berlese from Gambel oak, oak, aspen, alder, cottonwood, spruce and fir litter); 5,000 to 12,000 ft; Rio Arriba, Taos, Sandoval, Santa Fe, San Miguel, Valencia, Bernalillo, and Socorro Co.; Jun.–Sept., 1951–1954.

DISTRIBUTION. Fla., Iowa, N. M., Ontario (Canada).

Tomocerus nigritus Maynard, 1951.

NEW MEXICO RECORD. Berlese sample of dead grass clumps between lava blocks, 5,700 ft, near Rio Puerco, along U. S. Route 66, west of Albuquerque, Bernalillo Co., July 1954.

DISTRIBUTION. N. M., N. Y.

Tomocerus vulgaris (Tullberg, 1871).

NEW MEXICO RECORDS. Twenty-eight samples (two beneath rocks; six from aspen, spruce or fir logs; twenty Berlese samples of litter from aspen, birch, alder, oak, Gambel oak, alpine vegetation, spruce and fir), 7,000 to 12,000 ft; Taos, Colfax, Sandoval, Santa Fe, San Miguel, Valencia, and Bernalillo Co.; Jun.–Nov., 1950–1954.

DISTRIBUTION. N. M., N. Y.

SUMMARY

Five species of *Tomocerus* are reported from New Mexico. Of these only *T. flavescens* has been recorded previously from the state. Ecological data based upon 77 collections are presented. Invalidity of forms of *T. flavescens* is discussed. A pictorial key to Nearctic species of Tomocerinae is presented.

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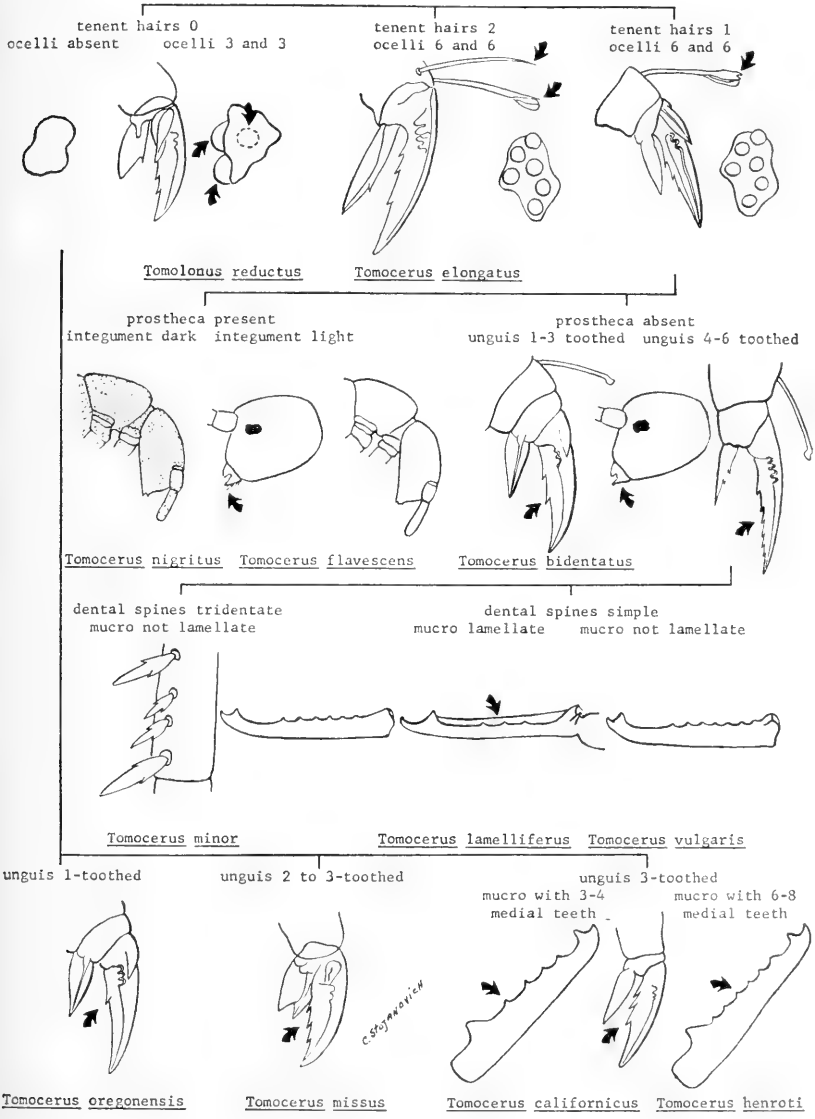
PICTORIAL KEY TO SPECIES OF NEARCTIC TOMOCERINAE

(Collembola, Entomobryidae)



By Harold George Scott, Ph.D.

The Taxon Trielis (Hym. Scoliidae) and its Type

J. G. Betrem *

Every one has overlooked the fact that Saussure founded the taxon *Trielis* in the year 1863 (*Ann. Soc. Ent. France* (4)3: 18), which antedated the Catalogus Specierum Generis Scolia of de Saussure and Sichel by one year. It is in the latter work that every one hitherto has believed that *Trielis* was established (see p. 14, p. 140).

The only species that Saussure mentioned in connection with *Trielis,* when he founded it, was *Elis xantiana* Sauss., 1863 from Lower California, which, therefore, is the type-species by monotypy. *Elis xantiana* is ranked as a subspecies of *Campsoscolia octomaculata* Say (Bradley, 1950, *Eos, tomo extraord.* p. 434).

The name *Trielis* must replace the name *Campsoscolia* Betrem, because their type-species, though different, both belong to the same taxon. *Trielis* will stand as a valid genus, the usual status given it in recent years.

Ashmead in 1903 designated the Australian species *Elis consanguinea* Saussure, 1854, to be type of *Trielis* Saussure and Sichel, 1864, but since the latter taxon was merely an extension of *Trielis* Sauss., 1863, and not a homonym of it, his action is without nomenclatural significance. As two different taxa are involved, one now standing without a name, it is possible to use *consanguinea* for type of the latter, and rename it, which I now proceed to do.

TRIELIS (AUSTRALELIS, subg. n.).

Type-species: *Elis consanguinea* Sauss., 1853 = *Trielis* (*Australelis*) *consanguinea* (Sauss., 1854) Ashmead, 1903.

For the description of this subgenus, I refer to the description of *Trielis* given by myself in 1928 (*Treubia* IX, suppl. p. 107).

This taxon will find status as a subgenus of *Trielis* Sauss.

Saussure first mentioned the taxa *Triscolia* and *Discolia* in the same 1863 paper. These taxa will be treated subsequently in a joint paper by Bradley and Betrem.

* This paper was completed with the help of a research grant from the National Science Foundation.

The Identity of Ceuthophilus guttulosus and its Subspecies (Orthoptera, Gryllacrididae, Rhaphidophorinae)

David C. Eades [1]

In his revision of *Ceuthophilus,* Hubbell (1936: 415) stated, "In 1869 Francis Walker described *Ceuthophilus guttulosus* from an unknown locality. I have not had access to the type, an imperfect female in the British Museum; but consideration of the rather inadequate original description in connection with measurements and sketches (Figs. 364–367) received through the kind coöperation of B. P. Uvarov make it appear not improbable that the species is the same as *nigricans.* Should careful study of the type substantiate this *nigricans* Scudder 1894 will fall as a synonym of *guttulosus* F. Walker 1869." In 1960 Hubbell examined the type of *C. guttulosus* Walker (1869: 203) in the British Museum (Natural History) and confirmed his suspicion that *guttulosus* and *C. nigricans* Scudder (1894: 28, 61) belong to the same species. My own studies, which will be published in detail at a later time, indicate that the entity which Hubbell (1936) called *nigricans* should be divided into two subspecies: *Ceuthophilus guttulosus guttulosus* Walker (new combination) and *C. guttulosus nigricans* Scudder (new combination). *C. neglectus* Scudder (1894: 30, 67), which Blatchley (1920: 622) synonymized under *nigricans,* is a synonym of *g. guttulosus.*

Hubbell (1936: 414) also called attention to specimens from Franklin, Muskingum, Perry, Hocking, Athens, and Vinton counties, Ohio, which appeared intermediate between *Ceuthophilus thomasi* Hubbell (1936: 51, 57, 419) and *nigricans.* He concluded (p. 414), "In view of the uncertainties involved, and the absolute distinction between the two types elsewhere than in this area, *thomasi* and *nigricans* are here treated as distinct species." As a result of additional collecting which has provided intermediate specimens from Ontario, Quebec, Indiana, West

[1] Contribution No. 711 from the Zoological Laboratories of Indiana University.

Virginia, Virginia, and North Carolina as well as Ohio, it is now apparent that *thomasi* and *nigricans* (as defined by Hubbell) intergrade wherever they come in contact with each other and that the former should be known as *Ceuthophilus guttulosus thomasi* (new combination). The species, *C. guttulosus,* corresponds to the entity which Hubbell (1936) called the "Nigricans Group."

Still another taxonomic change was foreseen by Hubbell (1936; 422), who stated, "It may prove necessary to recognize a southern mountain race and a northern interior lowland race of *thomasi,* since southern specimens show a strong tendency toward greater prolongation of the dorsal portions of the abdominal tergites and more accentuated carination of the abdomen." Examination of southern specimens indicates that they may also be distinguished by a higher length-of-caudal-tibia to length-of-caudal-femur ratio and by a greater number of spinulose denticulations on the ventrocephalic carina of the caudal femur in relation to the length of the caudal femur. The name *thomasi* should be restricted to the northern interior lowland race, and the southern mountain race is here described as a new subspecies of *Ceuthophilus guttulosus.* Key characters separating the four subspecies of *guttulosus* are shown in Table 1.

Ceuthophilus guttulosus angulosus [2] new subspecies

Diagnosis.—Specimens of *Ceuthophilus guttulosus* which resemble *C. g. thomasi* but differ in the greater median carination, angulation, and prolongation of the abdominal terga and in the higher length-of-caudal-tibia to length-of-caudal-femur ratio.

Holotype.—Male; Cliffside Recreation Area, 4.4 miles west of Highlands, Macon County, NORTH CAROLINA; 3,000 feet; September 7, 1952; T. H. Hubbell; University of Michigan Museum of Zoology.

Similar to *thomasi* except as noted in Table 1. Size small, length of body 11.3 (all measurements in millimeters), length of pronotum 3.2; slender for the species. Head with eyes

[2] *Angulosus,* having many angles, in allusion to the median angulation of most of the abdominal terga.

TABLE 1. *Key characters for distinguishing subspecies of Ceuthophilus guttulosus*

(Figure references in Hubbell, 1936)

	guttulosus	*nigricans*	*thomasi*	*angulosus* n. subsp.
Male subgenital plate	scoop-shaped (Figs. 557–9, 763–5)	scoop-shaped	conical, cleft (Figs. 766–7)	conical, cleft (Figs. 560, 768–9)
Number of abdominal terga with at least slight median angulation				
in male	1 to 4(5)	(3)4 to 6(7)	(2)4 to 7	(6)7 to 8
in female	1 to 3	2 to 4(5)	(1)2 to 5(6)	5 or 6
Production of male eighth tergum	slight to moderate (Fig. 618)	moderate	moderate to strong (Fig. 619)	strong to very strong (Figs. 620–1)
Pale area on lower part of lateral lobe of pronotum	broad or occasionally narrow	absent	absent or sometimes narrow	absent
Teeth on ventral ovipositor valve	normally 5	usually 6	normally 5	normally 5
Distribution	southern Que. U. S. from eastern Ohio and W. Va. eastward, and Putnam Co. Ind.	northeastern Ky.	southern Ont., lower peninsula of Mich., Ind., and western Ohio	Macon Co., N C. and Rabun Co., Ga.

prominent, length of eyes 0.83, breadth of eyes 0.70, interocular distance 1.01, infraocular distance 1.01; antennal length roughly 22; length of distal segment of maxillary palp 1.54; length of clypeal suture 1.47. Cephalic coxa with lateral carina produced in an acute spine; cephalic femur 4.1 mm long, with 1 (left side) or 2 (right side) spurs on ventrocaudal carina; cephalic tibia 3.9 mm long, with 3 spurs on ventrocephalic carina, 3 (right side) or 4 (left side) spurs on ventrocaudal carina, and 2 distal spurs on each side; middle femur 4.0 mm long, with 2 (left side) or 3 (right side) spurs on ventrocephalic carina and 1 spur on caudal genicular lobe; middle tibia 4.1 mm long, with 2 dorsal, 2 distal, and 3 ventral spurs on each side; caudal femur 8.3 mm long, maximum breadth 2.7, with 19 (left side) or 23 (right side) spinulose denticulations on ventrocephalic carina; caudal tibia 9.8 mm long, 0.39 mm deep, spine formula (as defined by Hubbell, 1936: 17) of cephalic carina 10/5/4–5/4/2, with 1 subdistal ventral spur, length of subdistal spur of cephalic carina

0.64, of dorsocephalic calcar 1.23, of dorsocaudal calcar 1.48; length of caudal tarsus 4.1, of metatarsus 2.15, of 2nd segment 0.81, of 4th segment 1.16, of claw 0.53, depth of 2nd segment 0.39, abdomen laterally compressed, tectate, a median carina present on distal half of each tergum and faintly indicated on metanotum and mesonotum; median angulation absent on 1st tergum, weak on 2nd, obtuse on 3rd through 5th, 70° on 6th, 60° on 7th, 8th with projection bulbous and with sides at one point subparallel, immediate apex right angulate; apices of 3rd through 8th terga raised above succeeding terga; dorsal outlines of 5th through 7th terga weakly concave in lateral view, of 8th strongly concave. Subgenital plate conical, lateral margins straight, with a deep median cleft, the paired lobes pressed tightly together and with apices asymmetrically rounded, more narrowly rounded toward the median line; pseudosternite normal for the species, with dorsocaudal lobes connected as a continuous transverse ridge which is only slightly weaker mesally. Middorsal stripe broad and strongly contrasted on thorax, somewhat narrowed near margins of nota; background color now dark brown but probably black prior to storage in alcohol; dark area of nota extending all the way to ventral margins.

Allotype.—Female; same data as holotype.

Similar to *thomasi* except as noted in Table 1. Length of body 13.6, of pronotum 3.6, of caudal femur 9.0, of caudal tibia 10.6, of ovipositor 5.2 Median femur with 1 (left side) or 3 (right side) spurs on ventrocephalic carina and 1 spur on caudal genicular lobe, caudal femur with 21 (left side) or 24 (right side) spinulose denticulations on ventrocephalic carina; ventral ovipositor valve with 5 teeth (including apical hook). Third through 8th abdominal terga with median angulation and with apices raised above succeeding terga. Coloration as in holotype.

Specimens examined.—(All in the University of Michigan Museum of Zoology unless otherwise stated.) TYPICAL MATERIAL: Cliffside Recreation Area, 4.4 miles W of Highlands, Macon Co., N. C., 3,000 ft; Sept. 7, 1952; T. H. Hubbell and I. J. Cantrall; 48 ♂, 42 ♀ (holotype, allotype, and paratypes). Highlands, Macon Co., N. C.; July 28, 1947; J. J. Friauf; 1 ♀

(paratype), 1 juv. ATYPICAL MATERIAL (not considered paratypic): Summit Walker Mt., Bland-Wythe Co. line, Va., 3,950 ft; Sept. 2, 1952; T. H. Hubbell, I. J. Cantrall, and S. K. Gangwere; 2 ♂, 3 ♀. 12.6 miles S of Wytheville on U. S. Hwy. 21, Wythe Co., Va.; Sept. 3, 1952; T. H. Hubbell, I. J. Cantrall, and S. K. Gangwere; 1 ♀. Abingdon, Whitetop Mt., Washington Co., Va., 5,400–5,500 ft; Sept. 9, 1933; J. R. Bailey; 2 ♂.[3] Whitetop Mt., Grayson Co., Va., 5,100–5,400 ft; Aug. 6–7, 1946; T. H. Hubbell; 3 ♂, 4 ♀. Along Little River, 7 miles NE of Sparta; Alleghany Co., N. C.; June 20, 1953; J. R. and R. M. Bailey; 1 ♂, 3 ♀. Pineola State Fish Hatchery, Avery Co., N. C., about 3,500 ft; Sept. 3, 1952; T. H. Hubbell, I. J. Cantrall, and S. K. Gangwere; 1 ♂. Hot Springs, Madison Co., N. C.; July 30, 1936; J. R. Bailey; 1 ♂. Mt. Sterling, Haywood Co., N. C., 4,900 ft; Aug. 1, 1924; T. H. Hubbell; 4 ♂, 1 ♀.[3] Walnut Bottom, Great Smoky Mts. Nat'l Park, near Mt. Sterling, Haywood Co., N. C., about 3,000 ft; June 24, 1938; W. B. Jones; 1 ♀; Ala. Mus. Nat. Hist. Mt. Sterling, Haywood Co., N. C.; Sept., 1938; Chambers; 3 ♀. Swannanoa, Buncombe Co., N. C., 3,000–4,000 ft; Sept. 2, 1933; C. F. Walker; 2 ♂;[3] Ohio State Mus. High Hickory Mt., 1 mile SW of Swannanoa, Buncombe Co., N. C., 2,500–3,000 ft; J. R. Bailey; Aug. 11, 1933, 1 ♂, 1 ♀;[3] Aug. 21, 1933, 1 ♂;[3] Sept. 2, 1933, 1 ♀.[3] Lake Toxaway, Tranyslvania Co., N. C., about 3,200 ft; Sept. 8, 1952; T. H. Hubbell, I. J. Cantrall, and S. K. Gangwere; 1 ♀. ADDITIONAL LITERATURE RECORDS: Watauga Co., N. C. and Rabun Co., Ga.

Acknowledgments.—The author wishes to thank Dr. T. H. Hubbell for permission to publish data pertaining to the type of *Ceuthophilus guttulosus*. The University of Michigan Musem of Zoology, the Academy of Natural Sciences of Philadelphia, and the Ohio State Museum assisted with loans of large numbers of specimens. Field work was assisted by grants from the National Science Foundation for work at Mountain Lake Biological Station, Virginia and from the Sigma Xi-RESA Research Fund.

[3] Paratypes of *thomasi* Hubbell.

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Walker, F. 1869. Catalogue of the specimens of Dermaptera Saltatoria in the collection of the British Museum. Part I. London. 117 p.

Another Mexican Ambrysus (Hemiptera: Naucoridae)

Ira La Rivers, University of Nevada, Reno

Ambrysus rotundus species novum

General appearance: a rather large, robust and convex species with the mottled coloration so typical of ambrysi. Lighter anteriorly. Size 12.5–13.0 mm long and 8.0–9.0 mm wide. Color predominantly yellow over head and prothorax, mottled yellow and brown over remainder of dorsum. Venter yellow.

Head: shiny, weakly punctate, relatively flat. Vertex slightly but distinctly protuberant before the eyes, flat in front. Eyes flush with head surface; junction of outer and posterior eye margins weakly angulate. Labrum fairly sharply rounded in front; ratio of length-to-width 15::25 (60%). Head ratios are:

(1) total length to width (including eyes) 68::103 (66%)
(2) anterior distance between eyes to posterior distance between eyes 50::62 (81%)
(3) anterior distance between eyes to inner eye length 50::48 (96%)
(4) posterior distance between eyes to greatest length of head posterior to this line 62::16 (26%)

Pronotum: smooth, shiny, shallowly punctate. Color light yellow, with thin brown line paralleling posterior edge and forming a broad, whitish border not extending through lateral areas; two accumulations of brown spots laterally on the disc. Lateral edges without pilosity, smooth, curving weakly anteriorly, then strongly to form the smooth postero-lateral "angles"; per cent of curvature (viewed perpendicular to the frontal plane of section of the animal as a whole) about 15% (av. 80::12). Venter light yellow, with whitish pilosity along posterior edge and incrassate femora. Keel ridged anteriorly, than sloping abruptly and flatly posteriorly beneath median union of propleura, the slope smooth except for a suggestion of transverse rugosity; ratio of anterior keel ridge to total keel length (including posterior sloping face) 17::12 (71%). Prosternum free from propleura, and disappearing caudad beneath propleura. Propleura thinly but firmly united along median line just posterior to prosternum. Pronotal ratios are:

(1) width between anterior angles to width between posterior angles 53::106 (50%)
(2) median length to greatest width 37::106 (35%)
(3) distance between anterior and posterior angles on same side to perpendicular distance between anterior angle and baseline of pronotum 105::90 (86%)

Scutellum: yellow along two lateral sides and through middle, brownish elsewhere. Ratio of three sides, anterior and two laterals, 72::52::52.

Hemelytra: background color various shades of black-brown, interspersed with yellow on embolia, major sutures and disk of hemelytra. Shiny, white-shagreened. Embolia well-defined at posterior ends, broad for the genus (length-to-width 90::31 = 35%); emboliar crease weak, apparent only anteriorly; embolia light yellow in anterior $\frac{2}{3}$rds, dark brown in remainder. Hemelytra rather broadly exposing lateral connexival margins posterior to the embolia and not quite attaining abdominal tip. Wings functional, with the usual large "costal" cell.

Venter: the prothoracic venter has been discussed. All connexival segments modestly spinose except Segment I, the angles being acutely prolonged and progressively enlarged posteriorly. All connexival segments except I have minute serration along margins, only visible under high magnification. Female subgenital plate quadrisinuate in tip outline, the outer angles more cephalad (= lower) and dorsad, the median sinuosities caudad and ventrad, so that the subgenital plate is almost half-tubular or markedly convex. Male genital process having an inverted boot-shape, or appearing much like a miniature boomerang (see illustration).

Legs: Prolegs—structure typical for the genus. Color yellow. Femoral incrassation about average, ratio of length to greatest width 84::60 (71%). Tibia average, combined tibia-tarsus, when closed, strongly overlapping adjacent (proximal) end of femur.

Mesolegs—Femoral ratio of length-to-greatest median width 92::16 (17%): length 3.0 mm. Tibia with strong, brown spines and tipped with two transverse rows of spines at distal end, the secondary (proximal) row not complete; tibia wider toward distal end; ratio of length-to-greatest width 76::10 (13%); length 1.8 mm. Tarsus 3-segmented, basal segment small; terminating in two prominent, moderately curved claws.

Metalegs—Femoral ratio of length-to-greatest median width 122::20 (16%); length 4.0 mm. Tibia longer, slimmer and more parallel-sided than mesotibia; ratio of length-to-greatest width 138::9 (7%); terminal transverse spination as in mesotibia; length 4.6 mm. Tarsus larger edition of mesotarsus.

Type locality data: Mexico—San Luis Potosi (*El Salto,* 19 June 1953), (*Tamazunchalo,* 21 June 1953). Holotypic male, allotypic female and two paratypes in the collection of the author, Reno, Nevada.

"Rotundus," rotund, referring to the rounded, convex appearance of the species.

Comparative data: the following modification of the key to Mexican ambrysi (La Rivers 1953) can be used to place *A. rotundus:*

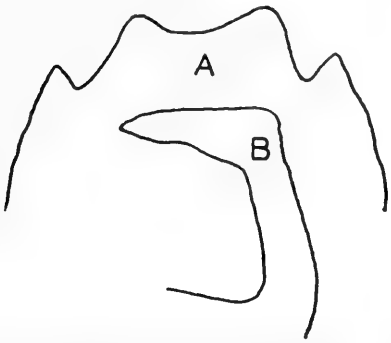

FIG. 1. *Ambrysus rotundus:* (A) Terminal outline of female subgenital plate, allotype. (B) Male genital process, holotype.

26 (25). Lateral apical angles of female subgenital plate lower than median angles or sinuosities (i.e., more cephalad in position than the medians) 26A

———Lateral apical angles of female subgenital plate approximately even with the median sinuosities....27

26A (26). Median sinuosities at tip of female subgenital plate close together, shallow, much closer to each other than to the lateral apical angles. Male genital process somewhat "dog" headed, but smoothly rounded on all sides...**Ambrysus guttatipennis** Stål 1862

———Median sinuosities much farther apart so that they are at least as close to the lateral angle as they are to each other. Male genital process quite angular and boot-shaped, with a sharp heel and toe.....
.....**Ambrysus rotundus**

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STÅL, C. 1862. Hemiptera mexicana enumeravit speciesque novas descriptsit. Stetiner ent. Zeit. 23: 437–462.

A Preliminary Survey of West Virginia Dragonflies (Odonata)[1]

ROBERT W. CRUDEN,[2] University of Oklahoma Biological Station, Willis, Oklahoma

Needham and Westfall (1955) list twenty species of Anisoptera from West Virginia, of which one, *Aeschna canadensis* Walker, is also listed by Walker (1958) as occurring in the state. Kormondy (1960) gives records for an additional eight species, all Anisoptera, and all but one collected by C. Ahrens in 1935. Other than the above there is apparently no literature pertaining specifically to the Odonata of the state, and there is none at all on the Zygoptera. As 147 species of Odonata are reported from Ohio (Cruden & Currie, 1961) and 100 species from Kentucky (Cook, 1951) it seems highly unlikely that the 28 species recorded is at all representative of the actual number occurring in West Virginia.

From its geographical location and physiographic character one would expect many northern forms to occur in the state. The mountains, of course, provide access to the state for the northern species while a few eastern and southern species might come into the state through Maryland and along the New River respectively.

As a preliminary to monographing the Odonata of West Virginia sample collecting was done during the summer of 1961 on the 13th and 14th of June, 7th, 10th and 11th of July and the 10th and 11th of August. In the following list the dates of capture (all 1961) are given for 291 individuals representing 55 species. The county records number 156 plus sight records of easily identified species. In the case of sight records the name of the county is preceded by an asterisk. Species listed in Needham and Westfall (1955) are followed by an (N&W). The county records given by Kormandy (1960) are followed

[1] Research supported by a National Science Foundation grant-in-aid from the University of Oklahoma.

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by (K). All specimens are in the collection of the author and have been identified by the author, and many have been verified by Dr. and Mrs. George Bick, St. Mary's College, Notre Dame, Indiana. The following list probably represents a little more than half the total number of species that occur in the state.

List of Species

Cordulegasteridae

1. *Cordulegaster diastatops* (Selys) (N&W) Pocahontas, 5 ♂, VII–11.
2. *C. erroneus* Hagen (N&W).
3. *C. maculatus* Selys Monogalia (K); Pocahontas, 2 ♂, VII–11.
4. *C. obliquus* (Say) (N&W).

Gomphidae

5. *Progomphus obscurus* (Rambur). (N&W).
6. *Hagenius brevistylus* Selys Randolph (K).
7. *Ophiogomphus mainensis* Packard (N&W).
8. *Dromohomphus spinosus* (Selys) (N&W) Dodridge, ♂, VII–10; Summers, ♂, VIII–11.
9. *Lanthus albistylus* (Hagen) Randolph (K).
10. *Gomphus* (*Gomphurus*) *fraternus* (Say) (N&W).
11. *G.* (*Gomphurus*) *lineatifrons* Calvert Randolph (K).
12. *G.* (*Gomphurus*) *vastus* Walsh (N&W).
13. *G.* (*Gomphus*) *exilis* Selys Hancock, 2 ♂, VI–13.
14. *G.* (*Gomphus*) *lividus* Selys Mason, ♀, VII–7.
15. *G.* (*Stylurus*) *notatus* Rambur (N&W).
16. *G.* (*Stylurus*) *spiniceps* (Walsh) (N&W).

Aeschnidae

17. *Basiaeschna janata* (Say) Upshur, 2 ♂, VI–14.
18. *Boyeria grafiana* (Say) Logan, ♂, VIII–10.
19. *B. vinosa* (Say) (N&W).
20. *Anax junius* (Drury). *Gilmer, VII–10; Greenbrier (K); *Ritchie, VII–10; Summers, VIII–11 (exuviae); Taylor, ♂, VI–14.
21. *A. longipes* Hagen Taylor, ♂, VI–14.
22. *Nasiaeschna pentacantha* (Rambur) Mason, ♀, VII–7.
23. *Epiaeschna heros* (Fabricius) Mason, ♀, VII–7.
24. *Aeschna canadensis* Walker (N&W).
25. *Ae. umbrosa* Walker Logan, 2 ♂ & ♀, VIII–10.

Libellulidae

26. *Macromia illinoiensis* Walsh (N&W).
27. *Neurocordulia yamaskanensis* Provancher (N&W).
28. *Epicordulia princeps* (Hagen) Mason, ♂ & ♀, VII–7; *Ritchie, VII–10; Summers, ♂, VIII–11; Taylor, ♂, VI–14; *Upshur, VI–14.
29. *Tetragoneuria cynosura* (Say) Pocahontas, 2 ♂, VII–11; Taylor, ♂, VI–14; Tucker (K); Upshur, 4 ♂, VI–14.
30. *T. spinigera* Selys (N&W).
31. *Somatochlora linearis* (Hagen) Putnam, 4 ♂, VIII–10.
32. *Perithemis tenera* (Say) Mason, ♂, VII–7; Putnam, ♂, VIII–10; Ritchie, ♂, VII–10; Summers, ♂, VIII–11.
33. *Celithemis elisa* (Hagen) Lincoln, ♂, VIII–10; Mason, 2 ♂, VII–7; Nicholas, ♂, VIII–11; Summers, ♂, VIII–11; Taylor, 3 ♂, VI–14.
34. *C. eponina* (Drury) Mason, 2 ♂, VII–7.
35. *C. fasciata* Kirby Randolph (K).
36. *Libellula cyanea* Fabricius Dodridge, ♂, VII–10; Mason, ♀, VII–7; Taylor, ♂ & ♀, VI–14.
37. *L. luctuosa* Burmeister *Dodridge, 7–10; Gilmer, ♂, VII–10; *Greenbrier, VIII–11; Lincoln, ♂, VIII–10; Mason, ♂, VII–7; Ritchie, ♂, VII–10; Summers, ♂, VIII–11; Taylor, ♀, VI–14; *Wood, VII–10.
38. *L. pulchella* Drury *Dodridge, VII–10; *Greenbrier, VIII–11; Gilmer, ♂ & ♀, VII–10; Lincoln, ♂ & ♀, VIII–10; Mason, 2 ♂, VII–7; Pocahontas, ♂, VII–11; Taylor, ♀, VII–14; *Wood, VII–10.
39. *L. semifasciata Burmeister* Taylor, 2 ♀, VI–14.
40. *Plathemis lydia* (Drury) (N&W). *Dodridge, VII–10; *Greenbrier, VIII–11; Hancock, ♂, VI–13; *Mason, VII–7; Pocahontas, ♂, VII–11; Ritchie, ♂, VII–10; Taylor, ♀, VI–14.
41. *Erythrodiplax miniscula* Rambur (N&W).
42. *Sympetrum rubicundulum* (Say) Mason, ♂, VII–7.
43. *S. semicinctum* (Say) (N&W).
44. *S. vicinum* (Hagen) Gilmer, ♂, VII–10; Mason, ♂, VII–7; Nicholas, 5 ♂, VIII–11.
45. *Erythemis simplicicollis* (Say) Gilmer, ♂, VII–10; Lincoln, ♂, VIII–10; *Mason, VII–7; *Pocahontas, VII–11; Summers, ♂, VIII–11.
46. *Pachydiplax longipennis* (Burmeister) (N&W) Dodridge, ♂, VII–10; Gilmer, ♂, VII–10; Greenbrier, ♂, VII–11; *Mason, VII–10; Putnam, ♂, VIII–10; *Wood, VII–10.

47. *Tramea lacerata* Hagen Mason, ♂, VII–7; Summers, ♂, VIII–11; *Taylor, VI–14.

Agrionidae

48. *Agrion amatum* Hagen Pocahontas, ♂, VII–11.
49. *A. maculatum* Beauvais Dodridge, ♂, VII–10; Greenbrier, ♂, VII–11; Lincoln, ♀, VIII–10; Logan, ♂, VIII–10; Mason, ♂, VII–7; Pocahontas, ♀, VII–11; Putnam, ♂, VIII–10; Summers, ♂, VIII–11; Wood, ♂, VII–10.
50. *Hetaerina americana* (Fabricius) Summers, ♂ & ♀, VIII–11.
51. *H. titia* (Drury) Greenbrier, ♂, VIII–11.

Lestidae

52. *Lestes disjunctus australis* Walker Greenbrier, 2 ♂ & ♀, VII–11; and ♂, VIII–11.
53. *L. eurinus* Say Greenbrier, 3 ♂, VII–11; and ♂, VIII–11; Taylor, ♀, VI–14.
54. *L. rectangularis* Say Greenbrier, ♂, VII–7; and ♂, VIII–11; Mason, 4 ♂ & 3 ♀, VII–7; Nicholas, ♂, VIII–11; Summers, 2 ♂, VIII–11.

Coenagrionidae

55. *Argia apicalis* (Say) Putnam, ♂, VIII–10; Summers, ♂, VIII–11.
56. *A. moesta* (Hagen) Greenbrier, ♂ & ♀, VII–11; Summers, 2 ♂, VII–11; and ♂, VIII–11.
57. *A. sedula* (Hagen) Summers, 3 ♂, VIII–11.
58. *A. tibialis* (Rambur) Lincoln, 2 ♂, VIII–10; Mason, ♀, VIII–10; Putnam, ♀, VIII–10; Ritchie, 5 ♂, VII–10.
59. *A. translata* Hagen Summers, 3 ♂ & ♀, VIII–11.
60. *A. violacea* (Hagen) Dodridge, ♂, VII–10; Mason, ♂, VII–7; Pocahontas, ♂, VII–11; Putnam, ♂, VIII–10; Ritchie, ♂, VII–10; Summers, ♂, VIII–11; Upshur, 2 ♂, VI–14; Wood, ♂, VII–10.
61. *Nehalennia irene* Hagen Taylor, ♂, VI–14.
62. *Chromagrion conditum* (Hagen) Pocahontas, 4 ♂, VII–11; Taylor, 3 ♂, VI–14.
63. *Enallagma antennatum* (Say) Hancock, ♂, VI–13.
64. *E. aspersum* (Hagen) Gilmer, ♂, VII–10; Greenbrier, 2 ♂, VII–11; Pocahontas, ♂, VII–11; Ritchie, 3 ♂ & ♀, VII–10; Summers, ♂, VIII–11; Taylor, 4 ♂ & ♀, VI–14.
65. *E. basidens* Calvert Hancock, ♂ & ♀, VI–13; Mason, ♂ & ♀, VII–7; Ritchie, ♂, VII–10.

66. *E. civile* Hagen Greenbrier, ♂, VIII–11; Mason, ♂ & ♀, VII–7; Putnam, ♂, VIII–10; Ritchie, 2 ♂ & ♀, VII–10; Summers, 2 ♂, VIII–11.
67. *E. divagens* Selys Dodridge, ♂, VII–10; Upshur, ♂, VI–14.
68. *E. exsulans* (Hagen) Dodridge, 2 ♂ & ♀, VII–10; Greenbrier, 3 ♂, VII–11; Lincoln, 2 ♂ &♀, VIII–10; Mason, ♂, VII–7; Pocahontas, 3 ♂, VII–11; Ritchie, 4 ♂ & ♀, VII–10; Summers, 2 ♂ & ♀, VII–11; and ♂ & ♀, VIII–11; Upshur, 3 ♂ & ♀, VI–14.
69. *E. hageni* (Walsh) Greenbrier, ♂, VII–11; Pocahontas, ♂, VII–11.
70. *E. signatum* (Hagen) Mason, ♂, VII–7; Summers, ♂, VIII–11.
71. *E. traviatum* Selys Mason, ♂, VII–7.
72. *Ischnura posita* (Hagen) Gilmer, ♂, VII–10; Mason, ♂, VIII–10; Summers, ♂, VIII–11; Upshur, 2 ♂, VI–14.
73. *I. verticalis* (Say) Gilmer, ♂, VII–10; Greenbrier, ♂, VII–11; and ♂, VIII–11; Mason, ♂, VII–7; Nicholas, ♂, VIII–11; Pocahontas, ♂, VII–11; Putnam, 3 ♂, VIII–10; Ritchie, 2 ♂, VII–10; Summers, ♂, VIII–11; Taylor, 3 ♂, VI–14; Upshur, ♂, VI–14.
74. *Anomalagrion hastatum* (Say) Mason, ♂, VII–7; Nicholas, ♂, VIII–11.

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A New Species of Dennyus (Mallophaga: Menoponidae) from the White-Naped Swift [1]

Roger D. Price and James R. Beer, University of Minnesota

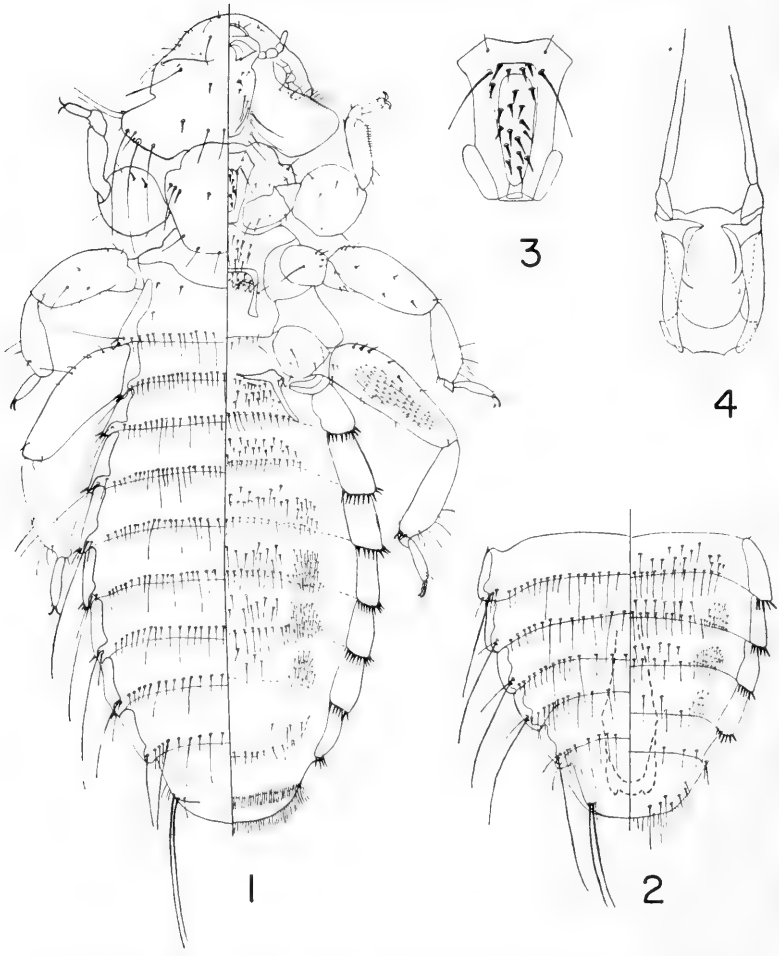
A small series of Mallophaga was obtained by J. Stuart from the white-naped swift (*Streptoprocne semicollaris* (DeSaussure)) collected on 20 July 1960 near Cuernavaca, Morelos, Mexico. This swift is reported only from Mexico. The lice were sent to us for identification by C. Don MacNeill of the California Academy of Sciences and subsequently determined to be an undescribed species belonging to the genus *Dennyus*. The members of this genus have been recorded only from the swifts (Apodidae). Carriker (1954) and Emerson and Pratt (1956) have reviewed the status of the species reported from the Western Hemisphere.

Dennyus semicollaris, n. sp.

The chaetotaxy and structure of the female are shown in Fig. 1. The male resembles the female except for the terminal segments (see Fig. 2). *D. semicollaris* possesses a characteristically shaped prosternal plate (see Fig. 3) with 16 to 20 (for the 5 specimens—16, 18, 19, 20, 20) short thickened setae in the central area and 2 pairs of additional setae in the broad border. This combination of shape of the plate and the large number and types of setae set this species apart from all others described.

In the head shape and chaetotaxy, *D. semicollaris* most closely resembles *D. spininotus* Carriker. However, the prosternal plate of the latter has only 11 stout setae in the central area and has a convex anterior margin and straight sides. In addition, the new species has a pair of distinct sternal plates on abdominal segments I–II. In shape this is similar to that found on *D. rotundocapitis* Carriker. Our specimens show this structure as two distinctly separate plates; the illustrations of the other species invariably show this as a single plate fused at the mid-line.

[1] Paper No. 4751, Scientific Journal Series, Minnesota Agricultural Experiment Station, St. Paul 1, Minnesota.



FIGS. 1–4. *Dennyus semicollaris*, n. sp. 1. Dorsal-ventral view of allotype female. 2. Dorsal-ventral view of terminal segments of holotype male. 3. Prosternal plate of allotype. 4. Genitalia of holotype.

The male genitalia, with a unique formation at the distal end of the endomeral plate (see Fig. 4), is, as nearly as we know, different from all other known males of *Dennyus* with the exception of *D. major* (Uchida) described from *Hirundapus caudacutus* (Latham) in Japan (Uchida, 1926). However, both sexes

of *D. major* show abdominal segment IX deeply indented into VIII, a condition completely lacking in *D. semicollaris*.

Measurements (in mm) of *D. semicollaris* are as follows: 3 females—head length, 0.52, 0.52, 0.52; head width, 0.92, 0.92, 0.89; total body length, 3.33, 3.22, 3.17; 2 males—head length, 0.50, 0.50; head width, 0.85, 0.83; total body length, 2.71, 2.60.

Type specimens: Holotype male, allotype female and one female paratype deposited with the California Academy of Sciences, and one male and one female paratype in the collection of the University of Minnesota.

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Obituary

Dr. Eduard Handschin-Hofstetter, former director of the Zoological Museum in Basel, and professor emeritus in the University of Basel, died on the 23rd of January, 1962.

Professor Handschin was recognized as one of the world's foremost Entomologists. He was a member of the Permanent Committee of the International Congresses of Entomology.

Professor Handschin was deeply interested in the Apterygota, and in the phylogenetic origin of the Insecta.

Nomenclature Notice

Proposed designation of a type species for **Cyrnus** Stephens, 1836 (Trichoptera). Z.N.(S.) 1491. See *Bull. Zool. Nomencl.* Vol. 19, Part 2.) Comments are to be sent, marked with the File Number, to Intern. Commission on Zoological Nomenclature, British Museum (N.H.), Cromwell Road, London, S.W. 7, England, before September 23rd.

Neotype Designation for Melissodes leprieuri Blanchard (Hymenoptera: Apoidea)[1]

Wallace E. LaBerge

The type material of *Melissodes leprieuri* Blanchard, 1849, has been lost or destroyed according to the authorities of the Paris Museum (*in litt.*). While in Europe during the summer of 1957, the author was unable to locate any specimens in European museums which might have been the type material. This species is important nomenclatorially, as it is the type species for the genus *Melissodes*. The author has recently completed a revision of this genus in North and Central America (LaBerge, 1956, 1956a, 1961). It seems reasonable, therefore, to designate a neotype for *M. leprieuri* at this time.

Blanchard (1849, p. 216, plate 128 bis, fig. 4) did not provide a detailed description of *M. leprieuri,* nor did he give a locality other than America. His figure of this species indicates a male specimen of an entirely black species. To the author's knowledge, only one such species exists in this genus and that is a Cuban species, *Melissodes maura* Cresson (1865, p. 188). Cresson's holotype of *maura* is a female. In order to make the probable synonymy objective, the female holotype of *Melissodes maura* Cresson is hereby designated as the neotype of *Melissodes leprieuri* Blanchard. This neotype is in the collection of the Academy of Natural Sciences of Philadelphia. Adequate descriptions of this specimen can be found in Cresson (1865, p. 188) and LaBerge (1956, p. 1111).

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[1] Contribution No. 208 of the Department of Entomology, University of Nebraska, Lincoln, Nebraska.

LaBerge, W. E., 1956, 1961. A revision of the bees of the genus Melissodes in North and Central America (Hymenoptera, Apidae). Part I (1956). Univ. of Kansas Sci. Bul. 37: 911–1194. Part II (1956) *Ibid.* 38: 533–578. Part III (1961) *Ibid.* 42: 283–663.

Review

How to Know the Butterflies. Paul R. and Anne H. Ehrlich. 1961. Wm. C. Brown Co., 135 South Locust St., Dubuque, Iowa. [5] + 262 p., 525 fig. (Spiral-bound, $2.75; cloth-bound, $3.25.)

Consisting primarily of illustrated original keys to the families, subfamilies, genera, and species of true butterflies occurring in North America north of Mexico, this book provides the first comprehensive and scientific treatment of our entire papilionoid fauna. Nearly all species are shown—usually in either dorsal or ventral view—in A. H. Ehrlich's pen and ink drawings, which capture subtleties of facies with black and white to a remarkable degree. Many of the individual species accounts briefly summarize information on geographic distribution, larval foodplants, and adult flight periods; and, preceding the keys and interspersed accounts of keyed taxa, there is a series of discussions that usefully survey major features of morphology, life history, classification, collection, preservation, and study of butterflies.

But this compact book is more than a handy synopsis of familiar data. The availability to its authors of a manuscript of dos Passos' as yet unpublished butterfly check list (not rigidly followed) has promoted nomenclatural reform. And eight specialists have contributed sections, some of which contain striking conclusions—involving especially the recognition and description of new genera and subgenera, as well as the redefinition of certain old ones—that reflect revised understanding of relationships among various of our most difficult groups. Of the collaborators, D. L. Bauer has handled the tribe Melitaeini (and proposed the new genus *Poladryas*); H. K. Clench, both the tribes Theclini (new genera: *Chlorostrymon, Phaeostrymon,*

Ministrymon, Euristrymon, Hypostrymon, Electrostrymon; new subgenera: *Xamia, Cyanophrys*) and Lycaenini; C. F. dos Passos, *Oeneis* and, in conjunction with P. R. Ehrlich, *Polygonia;* J. C. Downey, *Plebejus* and *Philotes;* L. P. Grey, *Speyeria;* A. B. Klots, *Colias* and *Boloria;* W. S. McAlpine, *Calephelis;* and K. H. Wilson, family Papilionidae. Of particular importance is the emphasis often placed on morphological characters that, though less easy to study than wing facies, are far more informative and reliable in determining and relating many species.

The overall excellence of the book is slightly marred by a number of errors and by appreciably uneven handling that different groups receive, not only because some are better known than others, but also because authorship, as noted above, varies. The characters given for distinguishing butterflies, skippers, and moths are not altogether trustworthy, the statement that adult skippers, "usually rest with wings held vertically over back," being particularly untenable. The otherwise fine introductory discussions include an unsatisfactory one on life zones (p. 25–27): many of the butterflies listed here are not valid indicator species of the zones to which they are assigned but instead are typically distributed in two to as many as five zones. Especially misleading are the ascription of *Anthocaris sara* to the Canadian Zone; *Lycaena helloides* and *Plebejus acmon* to the Transition; *Anthocaris genutia* and *Euptychia cymela* to the Upper Austral; *Atlides halesus* and *Calycopis cecrops* to the Lower Austral; and *Apodemia mormo* and *Callophrys siva* to the Upper Sonoran. For the most part, identification keys are clear, accurate, and well-designed; but occasional flaws are detectable; and much of the key to *Polygonia* is seriously inadequate.

In the species accounts, the ranges stated are sometimes vague, incomplete, or exaggerated. For example, significant portions of the ranges of the Californian species *Anthocaris lanceolata* and *Satyrium auretorum* are lacking; and the entire western half of the extremely broad United States distribution of *Hemiargus ceraunus* is overlooked. Very rarely, figured specimens (the geographic origin of which is given when known) fall outside

the range described in the accompanying text—a situation indicating that the stated range is deficient or that the specimen drawn is misdetermined or mislabeled (see *Chlosyne janais,* p. 139, and *Phyciodes barnesi,* p. 144). Foodplant data are not always critically treated. To mention but one case, virtually half of the foodplants attributed to *Papilio eurymedon* and *P. rutulus* (see p. 40–41) should not be so regarded, their status as such having previously been shown by L. P. Brower (*Lepid. News* 12: 103–114) to stem from undocumented records. Nor are flight period data, when offered, wholly acceptable. Finally, the proportion of typographical errors in the book is annoyingly high; but, fortunately, few of them can cause significant confusion.

It must be stressed, however, that factual errors of the sort cited above are, on the whole, minor and infrequent and that they are greatly outweighed by the accuracy and terseness of the bulk of the material. Never has so much vital information on our butterflies been condensed in so small a volume. The result is both a good summary and an important stimulus to further work on North American butterflies. Despite (and because of) their popularity, our butterflies are still rather poorly understood; but this book takes a long stride in advancing our knowledge of these animals and is indispensable to anyone with a biological interest in them—as well as to the butterfly collector. Surprisingly enough, the cost of this lepidopterological work is inversely proportional to its high value.

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Entomologist's Market Place

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ENTOMOLOGICAL NEWS

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North American Muscoid Diptera [1]

H. J. REINHARD, College Station, Texas

The new forms characterized herein are all based upon material received from various sources and I am indebted to all the collectors listed below for the privilege of studying this material.

Clairvillia amicta, n. sp.

Similar to *C. curialis* Reinhard in most essential characters, including genitalia, but readily distinguished by the smaller build and the more distinctly pollinose abdomen.

Male.—Front at vertex 0.18 of head width, diverging rapidly forward to antennal base; sides of front and face including cheeks gray pollinose on black ground color; frontalia deep brownish to black, wider than parafrontal on upper half; ocellar bristles weak, slightly reclinate; inner verticals distinct but not very large; frontals in a single row extending one bristle below antennal base; antenna black, reaching to lower third of face, apical segment subovate, barely exceeding length of second; black, bare arista slightly thickened near base thence fine or delicate to tip; clypeus but little depressed, epistoma gently bowed forward; vibrissae well separated near level of oral margin; facialia bearing a few setae at lower extremity, parafacialia bare, little narrowed downward; large bare eye reaching below vibrissae level; palpus black with swollen tip; cheek largely ventral and sublinear in profile; proboscis rather slender but well under head height; shiny black occiput flat above neck and

[1] Contribution No. 3998, Department of Entomology, Texas Agricultural Experiment Station.

slightly swollen below, sparsely clothed with mostly short black hairs.

Thorax and scutellum shiny black, entire upper surface pruinose in favorable view with two poorly defined vittae before suture, none behind. Chaetotaxy: Acrostichal 0 or 1, 0; dorsocentral 2, 3; intraalar 2; supraalar 3 (only middle one large); notopleural 2; presutural 1 (outer); humeral 2–3; sternopleural 3; pteropleural 1 (small); scutellum with 2 lateral, and 1 good-sized decussate apical pair, no differentiated discals. Legs subshiny black, weakly bristled; mid tibia with two weak anterodorsal bristles; claws and pulvilli subequal last tarsal segment. Wing with a light uniform tawny tinge on costal half and becoming grayish hyaline behind; first posterior cell barely closed at costa a little before wing tip; cubitulus obtusely rounded, without stump or fold; third vein bearing one short seta near base; no costal spine; calypters semitransparent white.

Abdomen black, narrower and longer than thorax, first segment fully as long as each of following three, which are gray pollinose above on basal half or more, with hairs on upper surface erect but short; one pair of median marginal bristles on segments one and two, a complete marginal row on last two segments, no discals; genitalia caudoventral, first segment polished and slightly elongated, second globose, forceps slender, bearing a pair of broad-tipped appendages near base behind as in *curialis* (*Ent. News* 69: 236). Female unknown.

Length, 4.5–5 mm.

Holotype: Canelo, Arizona, July 20, 1958 (M. Adachi). Paratype: 1 male, same data as type.

Archytas russatus, n. sp.

In Curran's key traces to *A. nivalis* Cn., from which it is immediately distinguished by the predominantly red translucent abdomen.

Male.—Head pollen subsilvery on pale ground color becoming slightly yellowish on parafrontal, which bears intermixed black and pale hairs on upper part but only pale ones below middle; parafacial and cheek pale-haired, latter one-third eye length; vertex 0.34 of head width; frontals in two irregular rows on

each side of pale yellow frontalia; ocellars absent; two pairs of strong verticals, inner decussate; antenna red, third segment black on dorsal half or more; arista black, proximal segment usually well under one-half length of third; palpus yellow, beset on upper margin from base to widened tip with short black spinose hairs; proboscis subequal to head height; occiput pale pollinose, with a dense ruff of pale pile.

Thorax black dusted with yellowish gray pollen, dorsal vittae narrow, interrupted at suture; disc of prescutum clothed with pale and black hairs; acrostichals normally 3–4; dorsocentrals 4, 4; sternopleurals 2, 3; pteropleurals 2 (equal sternopleurals in size); scutellum reddish yellow, with 4 lateral, 1 decussate apical, 1 short spine-like preapical and 2 appressed but well differentiated discal pairs in a transverse row behind middle; propleuron and propleura wholly pale pilose. Legs black, strongly bristled, claws and pulvilli elongate. Wing gray hyaline becoming opaque yellow on narrow basal margin; calypters white with rims deep yellow to golden.

Abdomen reddish but usually marked above with a narrow dark median vitta, surface mostly shiny except narrow basal margin of second segment and basal half or more of last dusted with whitish pollen; one pair of median marginal bristles on segment two, a marginal row on three and four besides two irregular rows of discals on last; fused genital forceps broad and deeply concave behind, with narrow free part slightly recurved and notched at apex; accessory process divided apically into two apical arms, anterior one slender and bowed inward near tip, posterior arm simple, a little shorter and considerably stouter; penis geniculate near basal third, apical segment widened distally to apex which bears a reflexed pale membranous border; lobes of fifth sternite but slightly widened on inner apical margin.

Female.—Front at vertex 0.35 of head width; parafrontal yellow pollinose; two proclinate and two reclinate orbital bristles all stout; cheek one-half or more eye length; abdomen darker, claws and pulvilli shorter than in male.

Length, 11–12.

Holotype male and allotype female, Cuernavaca, Mor. Mexico; March 3–5, 1959, 5500–6000 ft (H. E. Evans & D. M.

Anderson) in Cornell University Collection. Paratypes: 2 males and 2 females, same locality as type, dated March 3–10, 1959 (H. E. Evans); 1 male, Chilpancingo, Guer. Mexico, 4400 ft, March 19, 1959 (H. E. Evans); and 1 female, Rio Tehuantepec, Oxa, Mexico, September 6, 1947 (F. A. Cowan & M. R. Wheeler.

PLAGIOSIPPUS, n. gen.

Differs from *Dichocera* in the longer front, simple male antennae, parafacial haired to lower extremity, abdomen with discals on intermediate segments, etc.

Head wider than high, frontal profile subequal to gently receding facial, vibrissal axis four-fifths antennal which is near eye middle; clypeus moderately depressed, epistoma nearly full width of same and somewhat produced; vibrissae strong and decussate, on oral margin; facialia divergent and flattened downward, bearing three to five bristly hairs on lower extremity; haustellum stout, shorter than palpi; frontal bristles in a single row extending uninterruptedly on parafacial to or below mid face level; male without orbitals, weak proclinate ocellars in both sexes; first antennal segment erect and nearly one-half length of second, third concave on front margin and in profile with broad truncate apex obtusely angulate on anterior extremity; arista bare, geniculate, proximal segment short; eye moderately pilose; cheek with a vestiture of fine to coarse bristly hairs, nearly one-half eye length; occiput gently convex. Thoracic chaetotaxy: acrostichal 3, 3; dorsocentral 3, 3; intraalar 3; supraalar 3; humeral 4–5; presutural 2 (inner one weak); sternopleural 3; pteropleural 1 (larger than sternopleural); scutellum with 3 long lateral, 1 smaller decussate apical and 1 discal pair; propleuron bare; prosternum and postnotal slope setose. Legs stoutish, claws and pulvilli short, female front tarsi noticeably flattened and widened. Wing normal in size, third vein with 4 or 5 bristly hairs near base; cubitulus rounded rectangularly, without stump or fold; first posterior cell open well before wing tip. Abdomen ovate, segment two with one median marginal and two or three pairs of discals but only one

discal pair besides a marginal row on segment three, a marginal and discal row on segment four; sternites narrowly exposed in both sexes.

Type: *Plagiosippus invasor,* n. sp.

Plagiosippus invasor, n. sp.

Male.—Front at vertex 0.27 of head width but widening rapidly downward into facial angle; parafrontal blackish with thin gray lusterless pollen visible in favorable light, moderately clothed with black hairs which extend downard on full length of parafacial; latter with heavier grayish pollen on dark background; six frontal bristles below antennal base, reaching well below mid face level; cheek groove red; frontalia brown, narrowed upwards from antennal base and well under parafrontal width; antenna black, second segment somewhat rufous, about one-third length of third; arista black, thickened beyond middle, second segment hardly over twice as long as wide; palpus yellow, with numerous black hairs on apical half; cheek and occiput dusted with bluish gray pollen and latter clothed with a dense ruff of whitish pile.

Thorax black scutellum red, dusted with gray pollen; mesonotum marked with four velvety black vittae before suture and five behind, of latter only the median one attains scutellar base; calypters opaque white. Legs subshiny black, femora moderately thickened; mid tibia with three stoutish anterodorsal bristles. Wing slightly infuscated costobasally and along two apical cross veins besides a very distinct brown macula over small cross vein; costal spine vestigial; epaulet and subepaulet black.

Abdomen black, last three segments entirely pollinose above, viewed from behind the pollen is distinctly tawny on the two apical segments but more grayish to white on preceding one; genital segments black, beset with spiny bristles; forceps fused beaklike, gently bowed and sharp-tipped in profile; accessory process shiny red, broad convex base suddenly reduced near middle to a narrow lobe tapering to a rounded apex.

Female.—Front at vertex 0.30 of head width; outer verticals and two strong proclinate orbitals present; third antennal seg-

ment slender, evenly rounded on apex; arista thickened about to middle; four to five frontal bristles below antennal base with lowermost about at mid face level; parafrontal pollen largely obscuring dark background; tarsal claws small; genitalia retracted.

Length, 7.5–9 mm.

Holotype: Male, Miller's Cyn. 4 mi. W. Knicksville, Cochise Co., Ariz., X–18–1956, J. W. MacSwain. Allotype female, Mt. Home Cn. San Bdno. Co., Calif., IX–20–1922, F. R. Cole.

Xanthocera lucentis, n. sp.

A small shining blue-black fly, which differs widely from the type species, *X. clistoides* Townsend, in having the thorax and abdomen entirely devoid of pollen.

Female.—Parafrontal, cheek and occiput shining black; face gray pollinose; frontals in a single row descending to base of antenna; verticals two pairs, inner decussate; two pairs of proclinate orbitals and good-sized ocellars; front at vertex 0.27 of head width, diverging evenly into facial angle; antenna reddish yellow, reaching lower fourth of face, third segment about two and one-half times length of second; bare arista concolorous with antennae, moderately thick and tapering to middle, second segment slightly under twice longer than wide; bare parafacial almost equal clypeal width; facialia bare; vibrissae on oral margin; palpus yellow; haustellum short; eye sparsely short-haired; cheek one-third eye length, beset with coarse black hairs which extend on occiput.

Thoracic chaetotaxy: acrostichal, 2, 3; dorsocentral 3, 3; intraalar 3; supraalar 3; presutural 1 (outer); notopleural 2; humeral 4; sternopleural 2; pteropleural 1 (as large as sternopleural); scutellum shining black, with 3 lateral, 0 apical and 1 discal pair. Wing hyaline with a slight yellowish tinge becoming grayer on hind margin, veins including costa pale yellow; third vein with two small setae near base; first posterior cell open at wing tip; hind cross vein a little over its length from cubitulus, latter broadly rounded without appendage; costal spine minute; epaulet reddish; calypters transparent, pale tawny. Coxae and femora shiny black, tibiae and tarsi pale yellow; mid

tibia with two stout anterodorsal bristles; claws and pulvilli short.

Abdomen broadly ovate, one median marginal on first two and marginal row on last two segments, one discal on intermediate segments, a discal and submarginal row on anal segment; sternites exposed; genitalia retracted, not adapted for piercing. Male unknown.

Length, 5.5 mm.

Holotype: Cranberry Lk., N. Y., July 10, 1951, L. L. Pechuman.

PSEUDOLOMYIA, n. gen.

A robust species with the habitus of *Orasturnia* Reinhard, but the clypeus more deeply sunk, facialia strongly bristled to middle or above; vibrissae larger and decussate; antennal axis higher above eye middle; etc.

Head but little wider than high, frontal profile shorter than moderately receding facial, vibrissal axis two-thirds length of antennal; full width epistoma moderately warped from clypeal plane; vibrissae on oral margin; frontals in a single closely set row extending from level with base of third antennal segment to upper third of front, one reclinate stoutish prevertical and one stronger reclinate inner vertical; ocellars proclinate, weak to vestigial: parafacial bare; antenna subequal length of face; arista practically bare, proximal segments short; eye large reaching below vibrissal level, thickly short-haired; cheek narrow in profile about one-ninth eye length; proboscis under one-half head height, labella large and fleshy; palpus stoutish and slightly bowed upward from base to tip; occiput flat to gently convex below neck: Thoracic chaetotaxy; acrostichal 3, 3; dorsocentral 3, 4; intraalar 3; supraalar 3; intrapostalar strong; presutural 1 (outer); notopleural 2; posthumeral 3; humeral 5; pteropleural 3–4 (differentiated in hair cluster); sternopleural 2, 1 (only hindmost strong); scutellum with 3 strong lateral, 1 good-sized decussate apical and 1 appressed but well differentiated discal pair; postnotal slope and propleuron bare; prosternum setose. Legs moderately long and slender, hind tibiae evenly ciliated. Wing clear, first posterior cell open well before

wing tip; third vein setose near base; costal spine not developed. Abdomen obovate, as wide as thorax and clothed with a dense vestiture of short appressed hairs; third segment with a marginal row of rather short stoutish bristles and anal segment with entire upper surface bearing weaker erect bristles without a differentiated marginal row.

Type: *Pseudolomyia scissilis,* n. sp.

Pseudolomyia scissilis, n. sp.

Male.—Head densely gray pollinose with black ground color apparent on cheek and on front before vertex, latter 0.21 of head width; parafrontal with a uniform vestiture of fine short black hairs extending on parafacial to aristal level or lower; frontalia velvety brown, exceeding parafrontal width except at anterior extremity; antenna mostly black, third segment three times length of second, apex of latter and base of third on inner side reddish; arista brownish on slightly thickened basal half, thence tapered to a delicate tip; parafacial below subequal to width of third antennal segment; facialia bearing a row of equistrong infraclinate bristles to mid face level or above besides a row of hairs outside and ascending higher up than main bristle row; palpus yellow; back of head densely pale pilose.

Thorax black dusted with gray pollen marked with three broad shiny black uninterrupted vittae reaching to scutellar base and a well defined but much narrower or almost linelike one between the latter stopping far before scutellum; latter reddish, surface moderately shining above but distinctly pruinose in a flat rear view. Wing gray hyaline; cubitulus obtusely rounded, about length of small cross vein from hind margin; hind and apical cross veins oblique and in same plane; calypters longer than wide, opaque white with a slight yellow tinge. Legs wholly black, mid tibia with three anterodorsal bristles; claws and pulvilli subequal length of last two tarsal segments.

Abdomen black sides reddish with grayish pollen above which in rear view appears thinner along median line and laterally on a large triangular area extending forward from hind margin of each intermediate segment; anal segment shorter than preceding

and more heavily pollinose; hypopygium small, caudoventral; genital forceps fused, extreme apex suddenly reduced to an acute curved hook; accessory process red, stouter and slightly longer than forceps in profile; penis short, widened to apex which bears a pale membranous lobe on posterior extremity; venter without any modified vestiture on apical segments. Female not known.

Length, 12–13 mm.

Holotype: Amherst, Ohio, Jul.–Aug. 1958 (H. J. Reinhard). Paratypes: 1 male, San Antonio, Texas, July 19, 1924 (H. B. Parks); and 1 male, Chiricauhua Mts., Arizona, September 6, 1958, no collector's label.

Mimologus emulatus, n. sp.

Differs from the type species, *M. effectus* Reinhard, in the following characters among others: body build smaller; parafacial vestiture restricted to outer margin of lower third; four lateral scutellars; proximal abdominal segments without median marginals.

Male.—Front at vertex 0.22 of head width, equibroad about to middle thence widening evenly into facial angle; head pollen gray with a slight yellowish cast on parafrontal which bears a vestiture of erect fine black hairs; deep brown frontalia subequal parafrontal width; frontal bristles in a single row, three beneath antennal base; inner verticals and ocellars broken off but scars indicating good-sized bristles; antenna black, third segment nearly two and one-half times second; black bare arista only slightly thickened on basal fourth; clypeus well depressed, epistoma warped and moderately prominent; vibrissae not far above oral margin; facialia weakly bristled on lower third; cheek clothed with fine black hairs, one-fifth of eye length; thick haustellum barely exceeding length of enlarged labella; palpus red infuscated basally, bearing black hairs on upturned apical half; occiput densely pale-haired.

Thorax black gray pollinose, notum marked with four narrow but well defined black vittae, scutellum largely reddish. Chaetotaxy: acrostichal 3, 3; dorsocentral 3, 4; presutural 2; intra-

alar 3; supraalar 3; sternopleural 2, 2; pteropleural 1 (weak); scutellum with 4 lateral, 1 discal and 1 weaker short decussate apical pair. Wing clear, first posterior cell open well before tip; third vein with three setae near base; costal spine vestigial; calypters opaque, whitish yellow. Legs subshiny black, hind tibia ciliate on outer posterior side; mid tibia with two anterodorsal bristles; claws and pulvilli elongated.

Abdomen shining black with side of second and third segments obscurely reddish, latter including anal segment gray pollinose above on basal third to half at sides; segments three and four with a marginal row of bristles besides several irregular rows of discals on last; shiny black genital forceps rather slender terminating in a moderately flattened divided apex; accessory process reddish, a trifle shorter but distinctly wider than forceps in profile and bearing a vestiture of short black hairs on outer side of apical third or more.

Female.—Front at vertex 0.21 of head width; parafrontals yellowish gray; two verticals and proclinate orbitals; claws and pulvilli short; intermediate abdominal segments more distinctly reddish in ground color, otherwise shining black and pollinose as in male.

Length, 8–9 mm.

Holotype female and allotype male, "10 mi. E. Navajoa, Son., Mex., VIII–13–59, W L Nutting & F G Werner."

Books Received

Ferguson, W. E.—Biological characteristics of the mutillid subgenus Photopsis Blake and their systematic value (Hymenoptera). University of California Publications in Entomology, Vol. 27 (1): 1–92, 7 pls., 2 figs. Univ. of Cal. Press, Berkeley and Los Angeles, 1962. Price: paper, $2.00.

Linsley, E. G.—The Cerambycidae of North America. Part II, Paradrinae, Prioninae, Spondylinae, Aseminae. *Ibidem,* Vol. 19, 102 pages, 1962. Price: paper, $2.50. Part III, Cerambycinae, Tribes Opsimimi through Megaderini. *Ibidem,* Vol. 20, 188 pages, 1962. Price: paper, $3.50.

A New Interpretation of some Troublesome Dignathodontid Species and Genera [1] (Chilopoda: Geophilomorpha)

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

In 1954, R. V. Chamberlin presented a redescription of what he took to be *Tomotaenia parviceps* (Wood), 1862. As junior synonyms he listed the following: *Strigamia epileptica* Wood, 1862; *Scolioplanes imperialis* Broelemann, 1896; *Linotania rubelliana* Chamberlin, 1904; *Paraplanes californicus* Verhoeff, 1938. His redescription was based upon the holotype of Wood's *epileptica* and upon non-typical Californian material.

In fact, the giant red polypod *Tomotaenia* to which he refers is actually reducible to two forms that are very similar but presumably different species. The most obvious character distinguishing the two is the condition of the ultimate pedal pretergite. In one form it is bilaterally fissate; the pleurites are separated from the pretergite by deep fissures. In the other form the pleurites are wholly fused with the pretergite, and there is no trace of fissures on each side. His study of the *epileptica* holotype showed that its ultimate pretergite is not fissate. But since the holotype of *parviceps* cannot be found, and since its original description gives no clue to the condition of this critical character, he could only have guessed that it is conspecific with *epileptica* and the others. I believe, therefore, that synonymizing *parviceps* with *epileptica* and the other species, and ascribing the non-fissate condition to *parviceps,* are untenable. Accordingly, I propose that *parviceps* be set aside as a *species inquirenda* within *Tomotaenia,* and that those species with non-fissate ultimate pretergites be referred to the next oldest appropriate synonym, *epileptica.* Broelemann's *imperialis* and Chamberlin's *rubelliana* must also be considered *inqui-*

[1] Undertaken with the aid of a grant from the National Science Foundation. I should like to express my profound gratitude to the following gentlemen whose aid and unstinting hospitality have made this study possible: Dr. Wolfgang Engelhardt, Dr. Egon Popp, Zoologische Sammlung des Bayerischen Staates, Munich; Dr. Gerhard Pretzmann, Naturhistorisches Museum, Vienna.

rendae, but, as we shall see, Verhoeff's *californicus,* as a junior synonym of an older name, can be referred to the sibling, fissate species.

The oldest species of *Tomotaenia* with a fissate ultimate pretergite is *Diplochora fusata* Attems, 1903. When Attems proposed *Diplochora* for this single Mexican species, his major diagnostic generic character was its supposed labral state of atrophy (see Attems, 1903, pp. 215, 281). On page 281 Attems described the labrum as follows: "Oberlippe verkümmert, besonders der Mitteltheil . . . ," and further: "Die Oberlippe ist sehr rudimentär, in der Mitte ist von ihr nichts deutlich zu sehen. . . ." In 1929, p. 219, he went even further and stated that the labral midpiece was absent, or, p .229, "ganz reduziert." Again, this was his chief generic diagnostic distinction separating *Diplochora* from the other dignathodontid genera.

When I examined the holotype of *fusata* in Vienna in 1960, I found it to be a *Tomotaenia* identical with the California species having a fissate ultimate pretergite. The allegedly atrophied labral midpiece is easily explained. That structure, which is normally extremely delicate and weakly sclerotized in any case, in Attems' holotype obviously had been largely destroyed, actually dissolved, by prolonged treatment in potassium hydroxide. Despite its extremely poor condition, the vestiges of the holotype's labral midpiece are still clearly discernible. As I have noted, in all other respects the Attems specimen is identical with the fissate Californian material that I have studied.

It is also possible at this time to clarify the identity and allocation of *Paraplanes californicus* Verhoeff, 1938.[2] In 1960 and 1961 I studied the two syntypes at Munich. Both are clearly conspecific with the holotype of *fusata* and with the other fissate Californian specimens that I have examined. One syntype is a male with 61 pairs of legs and is about 64 mm long. The other, a female, has 71 pairs of legs and is about 72 mm long. The female is here selected as the lectotype. I have labelled the Munich specimens accordingly.

[2] The species was described as new in two different articles in 1938: Zoologischer Anzeiger, issued June 15th; Zoologische Jahrbücher, issued December 12th. Thus the former must be considered to be the organ of original publication.

Finally, I believe it is also possible now to make a disposition of the name *Paraplanes,* which Verhoeff proposed in 1933, p. 22, for the reception of a single species, *svenhedini,* from China. Unfortunately, the holotype is not in the Verhoeff Collection at Munich. According to the authorities there, it may well have been lost during the war. However, two kinds of evidence strongly suggest it to be referable to Cook's *Tomotaenia.* First, the original description of *svenhedini* is very clearly suggestive of the Cook genus. Although Verhoeff neglected to mention in the original description whether the ultimate pedal pretergite was fissate or not, in 1938, p. 372, he did state that it is. Secondly, I have studied fissate Chinese specimens that are surely referable to *Tomotaenia* and, if they are not conspecific with *svenhedini,* then they are very closely similar to it. Provisionally we may synonymize *Paraplanes* beneath *Tomotaenia.* The foregoing is summarized by the following conspectus.

Species inquirendae: Strigamia parviceps Wood, 1862, p. 49. *Scolioplanes imperialis* Broelemann, 1896, p. 60. *Linotaenia rubelliana* Chamberlin, 1904, p. 56.

Tomotaenia Cook, 1895.
Type Species: *Strigamia parviceps* Wood, 1862 [= *Tomotaenia parviceps* (Wood)]. (By original designation.)

Paraplanes Verhoeff, 1933. (= **Tomotaenia,** New Synonymy.)
Type Species: *Paraplanes svenhedini* Verhoeff, 1933 [= *Tomotaenia svenhedini* (Verhoeff)]. (Monobasic.)

Diplochora Attems, 1903. (= **Tomotaenia,** New Synonymy.) [3]
Type Species: *Diplochora fusata* Attems, 1903 [= *Tomotaenia fusata* (Attems)]. (Monobasic.)

Tomotaenia epileptica (Wood, 1862. (New Combination.)
Strigamia epileptica Wood, 1862, p. 49. (Ultimate pretergite non-fissate.)

[3] Should a subgeneric arrangement be desirable, the non-fissate species would be referable to the nominate generic name, whereas the fissate species would take *Diplochora* as their subgeneric designation.

Tomotaenia fusata (Attems), 1903. (New Combination.)
Diplochora fusata Attems, 1903, p. 281. (Ultimate pretergite fissate.)
Paraplanes californicus Verhoeff, 1938, p. 283.

Following is a description of *Tomotaenia fusata*. It is based upon the 17 specimens that I have examined. All available locality data are given in the underlying list. All but the Attems and Verhoeff types are in the collection of the U. S. National Museum.

MEXICO: Ventanas (holotype of *fusata*). Baja California, station 1, "about 4 miles down," I.1.25, A. D. Harvey.

CALIFORNIA. Berkeley (types of *californicus*). South of Pascedera, II.29.1929, O. F. Cook. Menlo Park, Dr. Horning. Berkeley, II.28.1958, R. V. Williams. Santa Cruz, La Playa Canyon, IV.1913. Pala and Temecula, II.12.1929. Fallbrook, I.1925, O. F. Cook. Vista, II.12.1929. South side of Fremont Pass, II.28.1929, O. F. Cook. San Mateo County, III.1933, P. C. Ting.

Tomotaenia fusata (Attems). (Composite Description.)

COLLECTION DATA. Holotype in the Attems Collection of the Naturhistorisches Museum, Vienna; mouthparts and head on microscopic slide, remainder of specimen in alcohol. Collected at Ventanas in western Mexico by Rorrer, March 3, 1883.

GENERAL. Length: Females (7), 44–75 mm; Males (10), 37–64 mm. Pedal Segments: Females, 71 = 3, 73 = 3, 75 = 1; Males, 65 = 1, 67 = 2, 69 = 4, 71 = 2, 73 = 1. Color: Undoubtedly badly faded in all specimens seen. In very old specimens dorsum varying from deep sordid brown to very pale yellow. In fresher material dorsum and head brownish-red to sordid orange-red; with numerous tiny white dots, each pierced by a setal alveolus; legs yellowish to white; sternites white or nearly white, thereby contrasting markedly with deeply pigmented dorsum. Shape: Approximately the anterior third of the body gradually (not abruptly) attenuate anteriorly; rear of body very slightly attenuate. ANTENNAE. Filiform. Setae all

very short; gradually increasing in number distally from second article. Ultimate article: About a third longer than the penult; on ectal surface with a small elongate patch of very short, hyaline, inflated setae. Cephalic Plate. Dorsally prominently domed; slightly longer than wide; laterally gently excurved, rear margin evenly rounded, anteriorly slightly rostrate. Frontal suture prominent and evenly curved. Prebasal plate exposed in most specimens; very narrow antero-posteriorly, divided into right and left halves. Clypeus. Paraclypeal sutures extremely vague in a few specimens and not discernible in most. Centrally with two shallowly areolate, pigmented, alate areas (plagulae), these separated by a long midlongitudinal strip of coarser areolation the area surrounding the alate areas is colorless, coarsely, irregularly, finely areolate. Setae: Postantennals, 4; midclypeals (between the alate areas), 2, one behind the other; no prelabrals. Just posterior to postantennal setae a wide procurved fold (or suture?). Labrum. Midpiece: Wide and deep; manifest as a partially amalgamated group of colorless, irregular, flabby, "teeth" or serratures. Sidepieces: Degenerate, thin, short; colorless or weakly pigmented. Each fultura (komendibulares Gerüst) essentially T-shaped and well-pigmented. Epipharynx. Conspicuously divided into deeply pigmented right and left sides, these separated by a U-shaped hyaline area. Each sidepiece shallowly areolate, not minutely scaly. Central part with numerous hyaline, short, scabriform papillae. Preoral sensilla in number 6–7, arranged in various patterns. First Maxillae. Coxosternal lappets absent. Medial lobes very indistinctly separated from coxosternum. Each telopodite with a short, broad, wholly or largely concealed lappet. Second Maxillae. Isthmus undivided; wide from side to side; very narrow antero-posteriorly. Telopodite: First article with distinct dorsal and ventral condyles basally; terminal claw of ultimate article basally broad, relatively short, about half as long as its article. Prosternum. With prominent white maculae. Antero-centrally with a large, bilobed white area, the surrounding pigmentation dark and essentially matching that of cephalic plate. Prehensorial Telopodite. Tarsungula: In cross-

section not extremely flattened or blade-like; basal denticle massive, essentially thumb-shaped. Tibioid without a denticle but its entirely mesal surface swollen and produced. Poison calyx always massive and much longer than wide; poison gland extending posteriorly beyond limit of telopodite and into prehensorial somite. TERGITES. Surface roughened, not bisulcate. Setate very sparse and short. STIGMOPLEURITES. Anterior to each spiracle usually 2 setae; these frequently broken off but their positions shown by their alveoli. LEGS. Setae very short and sparse. Pretarsi: The anterior parungues about a fifth as long as the ungues and slightly more robust and longer than the posterior parungues. STERNITES. Setae very spare, extremely short. Each deeply midlongitudinally grooved, the groove narrowly dividing the posterior porefields. Each sternite with two posterior porefields; these very narrowly separated on the more anterior sternites, but more widely separated on rear of body; pores very numerous and tiny; porefields present on sternites 1 through the penultimate. Anterior lateral porefields absent; in their positions 1 to about 4 minute, obscure pores. Subcoxal porefields present and conspicuous on somites 1 through the penultimate. ULTIMATE PEDAL SEGMENT. Pretergite bilaterally fissate, thus separated by deep fissures from its pleurites. Tergite much wider than long; sides slightly excurved and convergent posteriorly; rear margin broadly rounded. Presternite broadly membranous centrally and so apparently divided into

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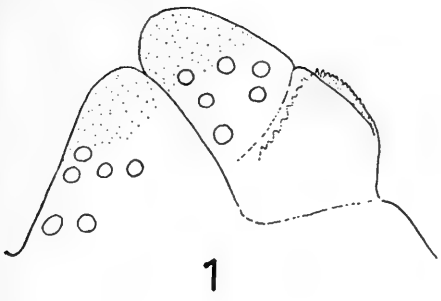
EXPLANATION OF FIGURES

Tomotaenia fusata (Attems). Adult female (not a type) from Berkeley, California.

1. First maxillary telopodite and medial lobe, left. Membranous areas stippled; setal alveoli shown; lappet concealed behind basal article of telopodite.
2. Sternite from anterior third of body. Principal setae shown.
3. Ultimate pedal sternite and left coxopleuron. Setae deleted; fleshy membranous outgrowth shown stippled bordering sternite.
4. Right prehensor. Setae deleted; poison calyx stippled; outline of poison gland shown in dashes.
5. Labrum and epipharynx. a = fleshy, membranous teeth of midpiece. b = right labral sidepiece. c = right plate of epipharynx. d = central portion of epiharynx. e = one of the preoral sensilla.



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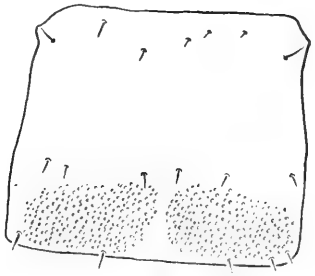

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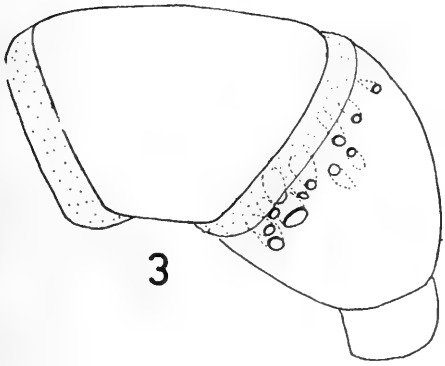

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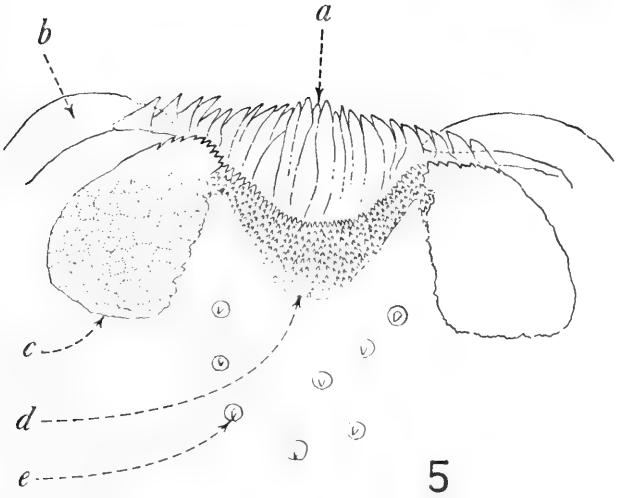

5

right and left halves. Sternite: Midlongitudinally grooved, this groove deeper in larger specimens. Greatest width far exceeding length. Sides nearly straight to greatly excurved, always strongly convergent posteriorly; rear margin essentially straight to prominently incurved or embayed, depending upon sex and degree of telescoping of postpedal segments. In most specimens (and always in the largest ones) the sternite bordered on each side by a hyaline, membranous or fleshy excresence, an outgrowth apparently originating from beneath the sternite. Coxopleuron: Moderately inflated. Its ventral surface in males (not females) densely clothed with minute setae. Pores always restricted to the area along and beneath the sternite; in younger specimens these pores partly or entirely concealed in a fossa; in older specimens pores are largely exposed in their uncovered fossae, the fossae varying greatly in depth, in some specimens the fossae essentially obliterated. Male ultimate leg: In younger specimens only slightly inflated and with few ventral setae; in the largest males the legs enormously swollen and markedly flattened, ventrally densely clothed with minute setae. Female ultimate leg: In all only slightly longer and more robust than the penult legs; ventrally without dense vestiture of minute setae. The pretarsal claw is as long as that of penult legs (whereas in mature males it is fully formed but minute). Postpedal Segments. Anal pores large, lateral. Male gonopods distinctly bipartite. Female gonopods unipartite, conspicuously flattened, joined medially.

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A Remarkable Anophthalmic Immigrant to North America: Anommatus duodecimstriatus Müller (Coleoptera: Colydiidae)

Kenneth W. Cooper, Hanover, New Hampshire

Twenty-one specimens of *Anommatus duodecimstriatus* Müller have been collected over the past four years at Rochester, N. Y., by Prof. William B. Muchmore of the University of Rochester. There is therefore no doubt that this bizarre, perplexing, eyeless beetle, known throughout much of Europe, has become established in the nearctic fauna. All specimens were obtained in Berlese funnel samples taken from litter and damp soil that underlay old railroad ties, within city limits, close to River Boulevard and near Mount Hope Cemetery—a locality notable for the exotic arthropods captured there (see Crabill 1955, Muchmore 1957, Cooper 1961). The beetle may be recognized from the following description which I have drawn from the series of Rochester specimens.

Anommatus duodecimstriatus Müller, Germ. Mag. IV: 190, 1821.

Amber-brown, eyeless, wingless, tarsi 3–3–3; mean length 1.7 mm, mean width 0.55 mm. Elongate, convex; integument shining, that of pronotum and elytra transparent or nearly so, sparsely punctured, each puncture bearing a short, nearly erect seta. Head slightly broader than long, with antennal insertions contiguous to postero-lateral margins of clypeus; a carina on each side at the antero-lateral margin of the front, extending behind the antennal insertions ventrally to the gular surface. Antennae 11-jointed, joints 10 and 11 in the ratio of 2.5:1, fused, capitate. Mandibles 3-toothed, maxillary and labial palpi 4-jointed, apical joints enlarged, pyriform. Pronotum widest at anterior fifth, slightly wider than long, punctures loosely ordered and enclosing a median, longitudinal, glabrous band; prosternum broad, prosternal spine inconspicuous; procoxae globular, nearly contiguous, cavities open behind. Elytra slightly wider than pronotum at base, with transverse basal margins obscurely den-

tate; scutellum invisible; greatest elytral width just posterior to midpoint, equal to maximal pronotal width; the elytra are laterally sinuate and curve evenly behind to an acute but rounded apex; 6 rows of large punctures per elytron, those of innermost 3 rows becoming obsolescent behind the middle. Mid-coxae spherical, contiguous. Hind coxae transverse, widely separated by the broadly rounded anterior process of the first abdominal sternite. Five abdominal sternites visible, their mid-line ratios from first to last being approximately 26:16:8:6:9. Range in total length: 1.5–2.0 mm, in maximum width: 0.48–0.63 mm.

Parenthetically it may be noted that all of the specimens of *A. duodecimstriatus* so far collected at Rochester are very likely females. Thus all nine specimens which were dissected (4 by R. D. Pope, 5 by me) proved to be females, for which $P \sim 0.002$ were the sexes equally frequent. Can it be that the Rochester population is thelytokous, or the males rare or short-lived, for males have been recorded and figured for other species of *Anommatus* by Binaghi (1941)?

The individual records of capture are: **1957**, May 17 (1 specimen); **1960**, June 7 (1), Oct. 27 (1), Nov. 13 (1); **1961**, May 17 (1), June 2 (10), June 15 (1), Aug. 12 (3), and Oct. 22 (2). Other clavicorns of more common occurrence in these Berlese samples are *Tychus minor* Lec., *Sericoderus lateralis* Gyll., and especially *Tomarus pulchellus* Lec. Specimens of *A. duodecimstriatus* from the foregoing have been deposited in the following collections: British Museum of Natural History (2 specimens), U. S. National Museum (4), American Entomological Society (2), Museum of Comparative Zoology at Harvard University (2), Chicago Natural History Museum (2), and the Florida State Museum (2).

It is not unlikely that *Anommatus duodecimstriatus*, though wingless and blind, will turn up elsewhere in North America. Ganglbauer (1899) records it not only from Europe, but from the islands of Madeira and St. Helena, and Schröder (1929) mentions that it has been found about grass roots in Hobart, Tasmania. Mr. R. D. Pope has written me that two specimens of *A. duodecimstriatus*, collected by Lea at Hobart (and prob-

ably the same two minute, blind clavicorns mentioned by Lea 1900), are in the British Museum collection and bear identification labels in G. C. Champion's handwriting. As the beetle is said to be subterranean, and is apterous, there is little doubt that it is somehow being slowly spread by commerce.

In conclusion it may be mentioned that appropriate taxonomic placement of *Anommatus duodecimstriatus* is by no means obvious, and that even today it is a matter of more than ordinary puzzlement. In the past *Anommatus* has been regarded as a colydiid by some (thus G. Horn, Ganglbauer, Binaghi), as a genus of Lathridiidae by others (Duval, Jacquelin, Seidlitz). Most recently Crowson (1955) has suggested that the Merophysiinae and Holoparamecinae be separated from the Lathridiidae and brought together, along with the genus *Anommatus,* in a grouping of family status: the Merophysiidae. Nevertheless, the 11-segmented cerylonoid antennae of *Anommatus,* their insertions which are not hidden under the side margins of the front, the moderate trochanters, and the general habitus (which is that of a slender, convex colybiid) collectively would seem to ill-fit *Anommatus* for such status. Indeed Horn (1878) commented that *Anommatus* cannot be remotely separated from the blind and undoubted colydiid *Aglenus brunneus* Gyll. Be that as it may, the incredulous will find to their consternation that the 3–3–3 tarsal formula, the procoxal cavities that are open behind, and the abdominal sternites (neither connate nor with femoral lines), do in fact force specimens of *Anommatus duodecimstriatus* to trace directly to the Lathridiidae in those keys to families now in most frequent use by North American coleopterists (namely: Blatchley 1910, Bradley 1930, Brues, Melander and Carpenter 1954, and Arnett 1960).

It is pleasant to thank Drs. P. J. Spangler and P. J. Darlington, Jr., for their kind help and suggestions, and Prof. W. B. Muchmore for repeatedly gathering additional Berlese samples in response to my pleas. I am especially grateful to Mr. R. D. Pope, of the Commonwealth Institute of Entomology, on whose authority the final specific determination rests. Mr. Pope compared five specimens from Rochester with material in the British

Museum, and made the arduous dissections required to check genital structure in these minute beetles.

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Nomenclature Notice

Comments relating to the following should be marked with the Commission's file number and sent in duplicate, before November 28, to the Secretary, International Commission on Zoological Nomenclature, c/o British Museum (N.H.) Cromwell Road, London, S.W. 7, England.

Validation of the specific name **caricae (Cynips)** Linnaeus, 1762 (Hymenoptera). Z.N.(S.) 1047.

Designation of a neotype for **Gryllus campestris** Linnaeus, 1758 (Orthoptera). Z.N.(S.) 1485.

Validation of the specific name **alveofrons (Dasiops)** McAlpine, 1961 (Diptera). Z.N.(S.) 1492.

Suppression of Dahl's "Coleoptera und Lepidoptera," 1823. Z.N.(S.) 398.

Suppression of Kishida's pamphlet "Notes on the Family Trombidiidae of Japan." 1909. (Z.N.(S.) 400.

For details see Bull. Zool. Nomencl., Vol. 19, Part 3.

New Records of Michigan Odonata

Edward J. Kormondy, Oberlin College, Oberlin, Ohio

Since publishing a catalog of Michigan Odonata (Kormondy, 1958) over 3,000 specimens have been examined. This material, none of which was available when the catalog was prepared, contained 245 new county records and 54 new season records but no new state or region records. Abbreviations are those of the earlier catalog: ownership of material, D—Dr. R. R. Dreisbach, S—Michigan State University Museum of Entomology, courtesy of Dr. Roland L. Fischer, no abbreviation—University of Michigan Museum of Zoology, courtesy of Dr. Irving J. Cantrall; regions of Michigan: UP—Upper Peninsula, NLP—Northern Lower Peninsula, SLP—Southern Lower Peninsula.

Calopterygidae

Calopteryx aequabilis Say. SLP: Ionia(S). vi.31–viii.24.
C. maculata (Beauvois). UP: Chippewa(D). vi.4–viii.15. NLP: v.26–viii.26. SLP: Calhoun(S), Eaton(S).
Hetaerina americana Fabricius. SLP: Cass, Eaton(S), Saginaw(S).

Lestidae

Lestes congener Hagen. UP: Baraga(D), Houghton(D), Iron(D), Schoolcraft(D). vii.29–viii.27. NLP: Oscoda(S). SLP: Cass(D), Huron, Lenawee(S), Oakland(S), St. Joseph(S). vi.16–ix.24.
L. disjunctus australis Walker. SLP: Allegan(S), Oakland(S). v.10–vii.14.
L. disjunctus disjunctus Selys. UP: Alger(D), Ontonagon(D). NLP: Mecosta(D). SLP: Livingston. vi.26–ix.27.
L. dryas Kirby. SLP: Branch(S), Calhoun(S), Cass(S), Lenawee(S).
L. eurinus Say. NLP: Clare(D).
L. forcipatus Rambur. UP: Schoolcraft(D). vi.14–viii.15. NLP: Benzie(D). vi.16–viii.22. SLP: Cass(S), Hillsdale(S), Lenawee(S), St. Joseph(S).
L. inaequalis Walsh. SLP: Hillsdale(S). vi.15–vii.28.
L. rectangularis Say. UP: Dickinson(D), Houghton(D). vi.11–ix.1. NLP: Ionia(D), Manistee(D). SLP: Barry(S), Calhoun(S), Cass(S), Hillsdale(S), Lenawee(S), St. Joseph(S).

L. unguiculatus Hagen. SLP: Allegan(S), Cass(S), Lenawee(S), St. Joseph(S).
L. vigilax Hagen. SLP: Allegan(S), Calhoun(S), Eaton(S), St. Joseph(S). vi.6–viii.14.

Coenagrionidae

Amphiagrion saucium (Burmeister). NLP: Ionia(D). SLP: Barry(S). vi.15–viii.1.
Argia apicalis (Say). SLP: Berrien(S), Lenawee(S). vi.16–ix.14.
A. moesta (Hagen). UP: Delta(S). vi.27–viii.20. NLP: Ionia(S). SLP: Berrien(S), Calhoun(S).
A. sedula (Hagen). SLP: Branch, St. Joseph(D).
A. violacea (Hagen). SLP: Allegan(S), Calhoun(S), Lenawee(S), Monroe(S), St. Joseph(S). vi.5–ix.12.
Chromagrion conditum (Hagen). UP: Marquette. vi.6–vii.30. NLP: Benzie(D), Clare(D). v.27–vii.28. SLP: Monroe(S).
Coenagrion resolutum (Hagen). UP: Delta(S), Marquette. SLP: Clinton(S), Gratiot(S). v.15–vi.16.
Enallagma antennatum (Say). SLP: Branch(S), Calhoun(S), Hillsdale(S), Lenawee(S), St. Joseph(S).
E. boreale Selys. UP: Delta(S). SLP: Branch.
E. carunculatum Morse. SLP: Allegan(S), Barry(S), Cass(D). vi.12–ix.24.
E. civile (Hagen). SLP: Branch(S).
E. ebrium (Hagen). SLP: Allegan(S), Barry(S), Berrien(S), Calhoun(S), Cass(S), Eaton(S), Hillsdale(S), Lenawee(S).
E. exsulans (Hagen). SLP: Calhoun(S), Lenawee(S). v.29–ix.1.
E. geminatum Kellicott. NLP: Oceana(S). vi.25–viii.26. SLP: Allegan(S), Berrien(S), Eaton(S), Lenawee(S). v.23–viii.18.
E. hageni (Walsh). SLP: Allegan(S), Barry(S), Calhoun(S), Cass(S), Eaton(S), Hillsdale(S), Lenawee(S).
E. signatum (Hagen). SLP: Berrien(S), Lenawee(S). v.1–ix.21.
E. traviatum (Selys). SLP: Calhoun(S), Lenawee(S), Van Buren(S). vi.6–vii.15.
E. vernale Gloyd. UP: Marquette. SLP: Branch(S).
E. vesperum Calvert. SLP: Kalamazoo(S), Lenawee(S). v.1–viii.19.
Ischnura posita (Hagen). SLP: Berrien(S), Branch(S), Cass, Eaton(S), Livingston, Monroe(S), Van Buren(S).

I. verticalis (Say). UP: Delta(S). NLP: Ogemaw(S), Oscoda(S). SLP: Allegan(S), Cass(S), Hillsdale(S).
Nehalennia gracilis Morse. NLP: Cheboygan(D). vii.4–vii.10. SLP: Allegan(S), Kalamazoo(S). vi.18–vii.18.
N. irene (Hagen). UP: Delta(S). vi.11–viii.21. SLP: Calhoun(S), Cass(S), Hillsdale(S), Kalamazoo(S), Lenawee(S), St. Joseph(S). v.11–ix.21.

Cordulegasteridae

Cordulegaster maculatus Selys. UP: vi.6–vii.27.
C. obliquus (Say). NLP: v.30–vi.14.

Gomphidae

Dromogomphus spinosus Selys. NLP: Gladwin(D), Ionia(S).
Gomphus brevis Hagen. UP: Luce(D). vi.8–vii.26.
G. cornutus Tough. UP: vi.6–vii.25.
G. exilis Selys. SLP: Barry(S), Calhoun(S), Cass(S).
G. fraternus (Say). NLP: Manistee(D).
G. lividus Selys. NLP: Clare(D), Missaukee(D). v.21–vii.28.
G. scudderi Selys. UP: Luce. vii.17–viii.20.
Ophiogomphus rupinsulensis (Walsh). NLP: Ionia(S).

Aeshnidae

Aeshna clepsydra Say. NLP: Newago.
Ae. interrupta Walker. NLP: vii.22–ix.3. Distribution is corrected to read E-5.
Ae. tuberculifera Walker. NLP: Oscoda(S). vii.24–ix.3.
Ae. umbrosa Walker. UP: Delta(D).
Anax junius (Drury). UP: Delta(S), Iron(D), Menominee(D). SLP: Branch(S), Eaton(S), Ionia(S), Lenawee(D).

Corduliidae

Didymops transversa (Say). UP: Schoolcraft(D).
Macromia illinoiensis Walsh. NLP: Ionia. SLP: v.30–vii.14.
Cordulia shurtleffi Scudder. UP: Alger(D), Luce(D), Schoolcraft(D). vi.6–vii.29.
Epicordulia princeps (Hagen). SLP: Kalamazoo(S). vi.9–viii.10.
Somatochlora forcipata (Scudder). UP: vi.15–vii.26.
Tetragoneuria canis MacLachlan. UP: Delta(S).
T. cynosura (Say). SLP: Allegan(S), Branch(S).
Williamsonia fletcheri (Williamson). UP: v.29–vi.5.

Libellulidae

Celithemis elisa (Hagen). SLP: Cass(S), Lenawee(S).
C. eponina (Drury). NLP: Manistee(D). vi.23–viii.15. SLP: Jackson(S). vi.16–viii.19.
C. monomelaena Williamson. SLP: Cass(S).
Erythemis simplicicollis (Say). SLP: Berrien(S), Calhoun(S), Hillsdale(S).
Ladona julia (Uhler). UP: Delta.
Leucorrhinia frigida (Hagen). UP: Alger(D). vi.6–viii.13. SLP: Allegan.
L. hudsonica (Selys). UP: v.27–viii.8.
L. intacta (Hagen). UP: Delta(S), Luce(D). NLP: Ionia(S), Manistee(D). SLP: Allegan(S), Branch, Calhoun, Hillsdale(S), Lenawee(S).
L. proxima Calvert. NLP: Mecosta(D), Missaukee(D). vi.31–vii.28.
Libellula cyanea Fabricius. SLP: Calhoun(S), Lenawee(S).
L. incesta Hagen. SLP: Barry(S).
L. luctuosa Burmeister. SLP: Hillsdale(S), Lenawee(S).
L. pulchella Drury. NLP: Ionia(S), Wexford(D). SLP: Allegan(S), Eaton(S), Hillsdale(S), Lenawee(S), Monroe(S).
Pachydiplax longipennis (Burmeister). SLP: Hillsdale(S), Ingham(S), Lenawee(S), Monroe(S).
Pantala flavescens (Fabricius). SLP: Gladwin(S). vii.23–ix.4.
Plathemis lydia (Drury). UP: Delta(S). NLP: Wexford(D). SLP: Allegan(S), Branch(S), Ionia(S), Monroe(S).
Sympetrum internum Montgomery. UP: Delta(D). NLP: Manistee(D). vi.23–ix.14. SLP: vi.16–vii.26.
S. obtrusum (Hagen). NLP: Benzie(D), Ogemaw(S), Oscoda(S). SLP: Allegan(S), Branch(S), Cass(S), Lenawee(S), St. Joseph(S). vi.8–ix.27.
S. rubicundulum (Say). SLP: Allegan(S), Cass(S), Hillsdale(S), Lenawee(S), Monroe(S), St. Joseph(S).
S. semicinctum (Say). SLP: Branch(S), Washtenaw. vi.14–ix.21.
S. vicinum (Hagen). NLP: Alpena(S), Newago, Oscoda(S). SLP: Allegan(S), Berrien(S), Cass, Hillsdale(S), Jackson(S), Lenawee(S), Macomb, St. Joseph(S). vi.15–x.24.

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Kormondy, E. J. 1958. Catalogue of the Odonata of Michigan. Misc. Publ. Mus. Zool. Univ. Mich. 104: 43 p.

Record of the Unique Headed Bug in North Carolina (Hemiptera, Enicocephalidae)

D. L. Wray [1] and J. F. Greene [2]

Four specimens of the unique-headed bug, *Systelloderes biceps* (Say) were found in some leaf mould samples collected on March 6, 1961, by the authors. Two were winged; one had partially developed wings, and one was a nymph. The leaf mould from the forest floor covering had been run through Berlese funnels during our micro-faunal studies. These particular samples came from the banks of the Little River about 20 miles east of Raleigh. At this place, a large area of about two acres of flat rocks extend from the edge of the river to the forest floor. Moss, lichens, and sedums grow profusely over these rocks. Intermingled over the rocks are many small basin-shaped rain water pools. Leaf mould in this situation would stay very moist throughout the year.

To our knowledge, this is the first time this rare bug has been recorded from North Carolina in our Insect Survey. Few records are found in literature for *S. biceps*. Blatchley [3] gives its distribution as: from New England west to Utah, Arizona, Mexico, south to Florida and Cuba. Other records are for New York, Pennsylvania, Indiana, and Missouri. However, we have found no records for states in this immediate area.

This bug has been collected beneath boards near water, in leaf and weed debris in damp places, at lights, and one record by Johannsen [4] states that a large swarm was observed in the air in his garden late in the afternoon until dark.

One specimen was sent to Dr. R. C. Froeschner, USNM, who confirmed the determination.

[1] Entomologist, Division of Entomology, N. C. Department of Agriculture, Raleigh, N. C.

[2] Associate Entomologist, Division of Entomology, N. C. Department of Agriculture, Raleigh, N. C.

[3] Blatchley, W. S. 1926. Heteroptera or true bugs of eastern North America. Indianapolis.

[4] Johannsen, O. A. 1909. *Psyche* 16: 1–4, illus.

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

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

Cockroaches (Blattoidea) of Japan, Okinawa, Formosa (Taiwan), and the Philippines are being studied in cooperation with Dr. K. Princis. Loans of specimens from that area are desired. A. B. Gurney, U. S. National Museum, Washington 25, D. C.

Orthoptera. Gryllinae (except domestic sp.) and **Pyrgomorphinae** of the world wanted in any quantity for work in morphology, taxonomy, cytology, and experimental biology; dry, or in fluid, or living. Write D. K. Kevan and R. S. Bigelow, Dept. of Entomology, McGill University, Macdonald College, Quebec, Canada.

Beetles of the world wanted, all species in exchange for American beetles, moths and butterflies. James K. Lawton (age 18), 7118 Grand Parkway, Wauwatosa 13, Wisconsin.

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Cicindelidae of the World wanted in exchange for North American Coleoptera or in purchase. Carl Farr Moxey, 414 Woodland Ave., Wayne, Pennsylvania.

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CONTENTS

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ENTOMOLOGICAL NEWS

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A Redescription of the Tribe Chiasognathini, with the Descriptions of a New Species and a New Subspecies of the Genus Sphaenognathus Buquet (Coleoptera: Lucanidae) [1]

Carl Farr Moxey, Wayne, Pennsylvania

This paper is presented to describe the tribe Chiasognathini and to describe two new forms in the collection of the Academy of Natural Sciences of Philadelphia.

Tribus **CHIASOGNATHINI** Burmeister

Chiasognathidae Burmeister, 1847, Handbuch der Entomologie **5**: 315, 316, 334–342, 535, 536.
Chiasognathides Lacordaire, 1856, Genera des coléoptères **3**: 10–14.
Chiasognathitae Thomson, 1862, *Ann. Soc. Ent. France* ser. 4, **2**: 391, 405–410 (on p. 392, Thomson gives the name as Chiasognatitae).
Chiasognathidae Parry, 1864, *Trans. Ent. Soc. London* ser. 3, **2**(1): 67–70.
Chiasognathidae van Vollenhoven, 1865, *Tijdschrb. Ent.* **8**: 140.
Chiasognathidae Parry, 1870, *Trans. Ent. Soc. London* 1870, pt. 1: 104–105.
Chiasognathidae Parry, 1874, *Trans. Ent. Soc. London* 1874, pt. 3: 365–370.
Chiasognathini Felsche, 1898, Verzeichniss der Lucaniden, pp. 6–14.
Chiasognathini van Roon, 1905, *Tijdschr. Ent.* ser. 2, **48**: 84–91.

[1] This study was made possible by a 1961 summer appointment as a Jessup Fund student at the Academy of Natural Sciences of Philadelphia.

Chiasognathinae van Roon, 1910, Coleopterorum Catalogus 19, pars 8: 4–8.

Lamprimini Schröder, 1924, Handbuch der Entomologie 3: 695.

Chiasognathinae Blackwelder, 1944, *Bull. U. S. Nat. Mus.* no. 185: 195.

Chiasognathinae Didier and Séguy, 1953, *Encycl. Ent.* ser. A, 27: 12, 70–73.

Chiasognathini Benesh, 1960, Coleopterorum Catalogus Supplementa pars 8: 149–152.

Original diagnosis: "Lam. pectin. labro exserto, coriaceo, immobili, connato cum clypeo; maxillarum mandone utriusque sexus membranaceo ciliato; ligula elongata, biloba penicillata, menti paginae internae affixa, antennis longis fractis, flabello 6-phyllo; oculis septo completo divisis. Prosterno lamella parva angusta descendente."

Description: Lucanidae of medium size (length 24 mm to 75 mm); body elongate, convex. Head small, transverse, subtrapezoidal, never broader than pronotum; labrum and clypeus united, projected beyond anterad angles; maxillary palpi more than twice as long as labial palpi; mentum subtriangular, slightly notched at apex; mandibles longer than head, armed internally with short spines in male; ligula elongate, bilobed, penicillate; antennae slender, 10-segmented, clava 6-segmented, scape somewhat thickened distally, base of antennae hidden underneath anterad angles; eyes convex, completely divided by canthus. Pronotum transverse, subtrapezoidal, almost always with acute posterad angles, sometimes pitted or roughened. Elytra subparallel, subtruncate, often sculptured; humeri occasionally forming spine-like projections. Abdomen with five visible ventral segments, eight dorsal, clothed with fine hairs beneath. Anterior coxae oblong, attaining the pronotal epipleura; legs slender in male, stouter in female, armed with short spines in both sexes. Wing with two detached anal veins.

Type genus: Chiasognathus Stephens.

Range: Venezuela, Colombia, Ecuador, Peru, Bolivia, Chile, and Argentina.

Table of Genera

Clypeus projected beyond anterad angles, usually pointed; antennal scape of male long, one and one-half to three times as long as funicle and clava together; elytra of both sexes practically free of sculpture.....**Chiasognathus** Stephens.
Clypeus not pointed in front; antennal scape of male not much longer than funicle and clava together; elytra usually sculptured.....**Sphaenognathus** Buquet.

Sphaenognathus rehni Moxey, species novum.

Male: Elongate, subparallel, subelliptical in profile; ferruginous, margins and tarsi deeper, nearly black; venter and underparts of thorax clothed with dense fulvous pubescence, head ventrally finely clothed with pubescence.

Head transverse, produced in front and truncate, faintly granulate, horizontal, with faint median furrow; epicranium dorsally nearly glabrous, ventrally sparsely clothed; antero-laterad angles acute; lateral margins emarginate, gently convergent posteriorly; anteocular area elevated. Eyes small, convex, ovate, completely divided by canthus; canthus broad, densely clothed with pubescence. Clypeal suture rounded subtrapezoidal; clypeus rugose, with two antero-laterad tuberculate excresences, fused with labrum; mandibles amphiodont, longer than head and pronotum together, incurved in apical third, inner margin with numerous teeth, upper margin finely denticulate, sparsely pubescent and finely granulate throughout, with dense pubescence in dorsal part of apical fourth, and small setae in ventral basal area, dorsal spiniform projection in basal third reduced; mentum subtriangular, emarginate at apex; gula annulate in posterior half. Antennae slender; scape piceous, club-shaped, gently bowed, knob-like distally; base hidden under antero-laterad angle, longer than either funicle or clava; funicle three-segmented, first segment subglobulose, second segment regularly dilated from base to apex, twice as long as first, third segment similar to second but slightly shorter; clava 6-segmented, rufous, subopaque, divergent apically, finely setose, terminal segment thickest.

Pronotum transverse, strongly convex; anterior margin sinuate; antero-laterad angles obtuse, not acicular; sides divergent posteriorly; postero-laterad angles obtuse, acicular; posterior margin faintly sinuate. Disc with faint median canaliculation, subrugose, strongly punctate; lateral area with fulvous pubescence; marginal pit obscure.

Scutellum semi-circular, with fine fulvous pubescence.

Elytra subparallel, faintly sculptured, gently rounded distally, remotely punctate (punctures not discernible to naked eye); humeri pointed.

Space between elytra and pronotum clothed with dense pubescence.

Femora fairly stout, unarmed, remotely punctate, clothed beneath with sparse pubescence. Tibiae curved; anterior nude, but armed internally with four spine-like projections, outer margin denticulated; intermediate with sparse pubescence, armed externally with four spines; posterior with sparse pubescence, armed externally with four spine-like projections. Tibial spurs slightly curved. Tarsi piceous, setose beneath; tarsal claws large, simple.

Type: Male; Santa Marta, COLOMBIA; John W. Angell Collection (Collection of the Academy of Natural Sciences of Philadelphia, Type number, 8271).

Female: Elongate, subparallel, stouter than male. Color similar; pubescence almost entirely wanting.

Head transverse, produced but slightly in front, faintly granulate, horizontal, median furrow similar to male; epicranium dorsally roughly punctate, ventrally sparsely clothed; antero-laterad angles subacute; lateral margins emarginate, gently convergent posteriorly; anteocular area but slightly elevated. Eyes small, convex, more rounded than in male, completely divided by canthus; canthus with more elevated margin than male. Clypeus roughly punctate, two excresences wanting; mandibles stout, short, roughly punctate throughout, clothed with fine hairs internally; mentum not as broad as in male; gula annulate as in

male, but not as long. Antennae stouter, color similar to male; scape club-shaped, slightly bowed, knob-like distally, two-thirds the length of scape; funicle and clava similar to male, but stouter.

Pronotum transverse, glabrous, strongly convex; antero-laterad angles obtuse, not acicular; side margins diverging posteriorly to posterior margin; postero-laterad angles obtuse, not acicular; posterior margin faintly sinuate. Disc with median canaliculation extremely faint, strongly punctate; lateral area not so strongly punctate; marginal pit pronounced.

Space between elytra and pronotum nearly bare.

Femora and tibiae stouter than in male. Anterior tibiae with internal spination wanting; intermediate with sparse pubescence, armed externally with three spines; posterior with sparse pubescence, armed externally with one reduced spine-like projection. Tibial spurs slightly curved. Tarsi piceous, setose beneath; tarsal claws large, simple.

Allotype: Female; Santa Marta, Colombia; John W. Angell Collection (Collection of the Academy of Natural Sciences of Philadelphia, Type number, 8271.1).

Measurements: Length of head in male, 6 mm; length of head in female, 3.5 mm; width of head in male, 11 mm; width of head in female, 7 mm; length of mandibles in male, 17 mm; length of mandibles in female, 4 mm; length of pronotum in male, 9 mm; length of pronotum in female, 7.5 mm; width of pronotum in male, 15.5 mm; width of pronotum in female, 13 mm; length of elytra in male, 23.5 mm; length of elytra in female, 21 mm; width of elytra in male, 16 mm; width of elytra in female, 15 mm.

Remarks: I have named this new species after Mr. James A. G. Rehn, Chairman of the Department of Insects of the Academy of Natural Sciences of Philadelphia.

This species differs from its nearest relative, *Sphaenognathus nobilis* Parry, in coloration, vestiture, armature of the legs, general profile of the body, and comparative size of the genitalic structures. (The male genitalia in *rehni* are much larger and stouter than those of *nobilis*.)

Sphaenognathus nobilis subspecies **colombiensis** Moxey, subspecies novum.

Male: Elongate, similar in shape to *Sphaenognathus nobilis* Parry, but more convex; aeneous Prussian green, pubescence generally wanting; body smaller than *nobilis;* head, pronotum, and elytra granulate.

Head transverse, smaller than *nobilis,* produced in front and truncate; eye canthus glabrous. Mandibles finely granulate throughout, with long hairs in ventral portion of distal fourth. Antennae similar to *nobilis,* but slenderer.

Pronotum smoother than *nobilis,* antero-laterad angles slightly rounded.

Scutellum semi-circular, nude.

Elytra subovoid in outline, strongly convex; humeri pointed.

Femora slenderer than *nobilis;* tibiae less profusely armed, pubescence less dense.

Type: Male, Santa Marta, Colombia; John W. Angell Collection (Collection of the Academy of Natural Sciences of Philadelphia, Type number, 8272).

Paratype: Male; Santa Marta, Colombia; John W. Angell Collection (Collection of the Academy of Natural Sciences of Philadelphia, Type number, 8272.1).

Female: Unknown.

Remarks: This new subspecies from Colombia may be distinguished at once by its coloration, slenderer build, and greater convexity.

A New Species of Mallophaga from the Mink

K. C. Emerson, Stillwater, Oklahoma

The few published records of Mallophaga from the mink were listed by Hopkins in 1960. In the same paper, he considered the form found on the mink to be conspecific with *Stachiella ermineae* Hopkins, 1941, normally found the ermine. From a comparison of several recently acquired series of excellent specimens from the mink and the ermine, it is evident that the two forms are not conspecific. The species from the mink is herewith described and illustrated.

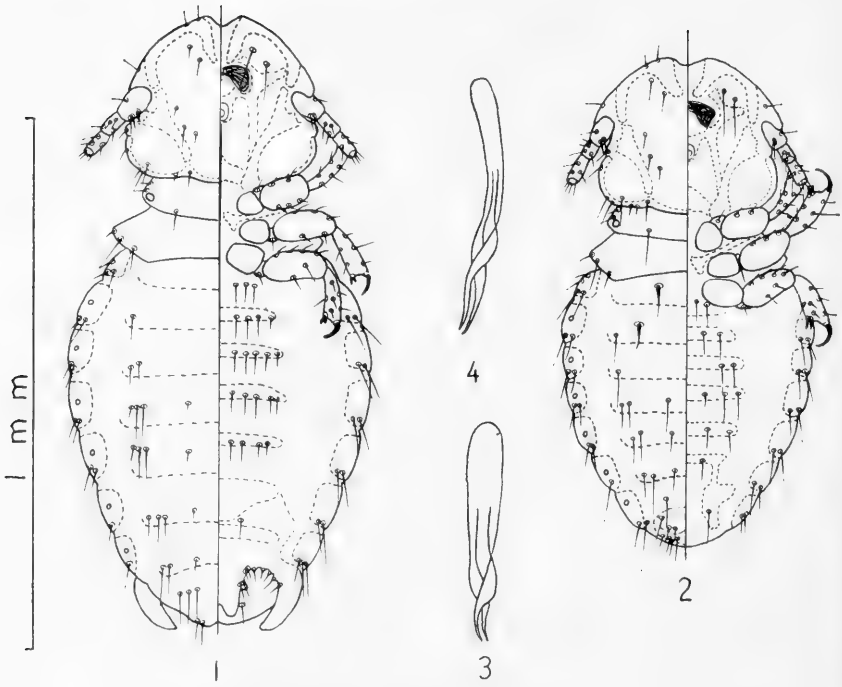
Stachiella larseni n. sp.

Male. General shape and chaetotaxy as shown in Figure 2. Abdominal tergal plates without narrow heavily sclerotized bands. Two heavy spine-like setae on the first two apparent abdominal tergal plates. Setae on the remaining abdominal tergal plates are smaller and fewer in number per segment than on *S. ermineae.* Setae on each abdominal sternal plate are smaller and fewer in number than in *S. ermineae.* Genitalia as shown in Figure 3.

Female. General shape and chaetotaxy as shown in Figure 1. Setae on each abdominal sternal and tergal plate are smaller and fewer in number than in *S. ermineae.* Abdominal tergal plates without narrow heavily sclerotized bands.

Discussion. Stachiella ermineae was described from specimens collected from *Mustela erminea stabilis* Barrett-Hamilton and *Mustela erminea aestiva* Kerr in England and Germany. Specimens from these two hosts collected in Cheshire, England and Reutlingen, Germany, were examined in this study. The species has pronounced heavily sclerotized narrow bands on the abdominal tergal plates in both sexes as illustrated by Werneck in 1948. The male genitalia, illustrated from German specimens, as shown in Figure 4.

Stachiella larseni is approximately the same size as *S. ermineae,* in both sexes. It is distinguished from *S. ermineae* by the male genitalia, the sparse abdominal chaetotaxy, the heavy



Figures 1–3 refer to *Stachiella larseni* n. sp.
FIG. 1. Dorsal-ventral view of female.
FIG. 2. Dorsal-ventral view of male.
FIG. 3. Male genitalia.
FIG. 4. Male genitalia of *Stachiella ermineae* Hopkins.
All figures are drawn to the same scale.

spine-like setae on the first two apparent abdominal tergal plates of the male, and the absence of the narrow heavily sclerotized narrow bands on the abdominal tergal plates.

Type host. *Mustela vison ingens* (Osgood).

Type material. Holotype male, allotype female and paratypes from the type host collected at Eagle Environs, ALASKA. Paratypes from *Mustela vison mink* Peale and Palisat de Beauvois collected in Maryland and North Carolina. The holotype and allotype will be deposited in the U. S. National Museum.

Dr. Cluff E. Hopla, University of Oklahoma, obtained the

Alaskan specimens from a trapper, Mr. Mike Molchan. This species is named for Dr. Finn J. Larsen, a noted scientist and personnel friend who has been a staunch supporter of basic research in the life sciences.

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Hopkins, G. H. E. 1941. Ann. Mag. Nat. Hist. (11), 7: 35–50.
——. 1960. Bull. Brit. Mus. (N.H.), Ent. 10: 79–95.
Werneck, F. L. 1948. Os Malofagos de Mamiferos. Rio de Janeiro, Brazil.

The Taxon Dielis (Hymenoptera: Scoliidae) and its Type

J. G. Betrem *

Saussure and Sichel, 1864 (*Cat. Gen. Scolia,* p. 161), in founding the genus *Dielis* included among others, two entirely distinct species, namely: the Australian *Tiphia radula* Fabr., 1775, and (as a synonym of *Scolia plumipes* Drury) *Scolia radula* Fabr., 1775, of North America.

In 1928 (*Treubia* IX, suppl., p. 56) I selected *Scolia radula* Fabr., 1775, as the type-species of *Dielis,* but I did not intend to do so. It was the Australian *Tiphia radula* Feb., 1775, that I had meant to make type, as is clear from my further discussion, pages 87 and 88, *l.c.*

It is impossible to correct this error, except by action of the International Commission on Zoological Nomenclature under its plenary powers, which the importance of the case does not warrant. Therefore my designation of *Scolia radula* F. as type-species is *Dielis* S. & S. must stand as a "fait accompli."

In my subjective view the North American *Scolia radula* F., and the Australian *Tiphia radula* F. typify two different sub-

* This paper was completed with the help of a research grant from the National Science Foundation.

genera of *Campsomeris*. The taxon, which I had intended to have bear the name *Dielis* is thus left without a name. I now name it *Radumeris,* a new subgenus of *Campsomeris*.

RADUMERIS, n. subgen.

1928 *Campsomeris* (*Dielis,* Group I) Betrem, *Treubia* IX, suppl. p. 87.

Type-species: *Tiphia radula* Fabr., 1775, i.e. *Campsomeris* (*Radumeris*) *radula* (Fabr.).

Description: ♀. Usually with a yellow dot on the vertex next to the eyes, tempora often with a yellow stripe, abdomen always with more or less extensive yellow markings.

Frons impunctate, without a small punctate area before the anterior ocellus; temporal groove absent or merely indicated; carina occipitalis complete medially, above.

Scapulae weakly, longitudinally impressed; cavity before the tegulae small, distinctly defined posteriorly, but without a limiting carina; a distinct impunctate space on the sides of the pronotum before the large, deeply punctate callosities.

Transition of the horizontal area to the vertical portion of mesopleura straight, without a distinct median elevation; lower posterior area of mesopleura almost entirely punctate. Transition of horizontal area to vertical portion of metapleura rather sharp, without a carina; upper plate of metapleura impunctate except more or less above; lower plate partly punctate.

Carina lateralis reaching beyond the spiracles, mostly distinct on the apex of the area horizontalis lateralis and on the upper part of the area posterior lateralis; the transition between the area horizontalis lateralis and the area lateralis sharp.

Area horizontalis medialis entirely punctate, produced posteriorly in an angle; transition between the area horizontalis medialis and the area posterior medialis somewhat rounded except medially; area horizontalis lateralis usually entirely punctate; area posterior medialis impunctate except sometimes on its upper third.

Second recurrent vein present; first submarginal and radial cells bare.

Longer spur of tibiae III long, three fourth of the length of metatarsus III, spatulate apically, brown-yellow.

Tergites opaque; no punctures between the subapical row of punctures and the fringes on tergites 3(2) and 4(3); sternite 2(1) short, impunctate except for some punctures on the lateral margins.

♂. Profuse yellow markings on the whole body, almost always a yellow spot on the vertex near the eye-orbit; a large yellow spot near the mandibles on the tempora, extended to a yellow line on the outer orbits. Scutellum and metanotum with yellow spots or stripes; coxae I yellow anteriorly; most of the tergites and sternites with yellow apical bands; legs profusely marked with yellow.

Subgenus **DIELIS** Sauss. & Sichel, 1864.

1957 *Campsomeris* subgenus *Campsomeriella,* V, Group of *C. plumipes* (Drury), Bradley, *Trans. Am. Ent. Soc.* 83, p. 69.
Type-species: *Scolia radula* Fabr., 1775, i.e. *Campsomeris (Dielis) plumipes* (Drury).

Scolia radula Fabricius, 1775, now confirmed as the type-species of *Dielis,* was a name originally proposed by Fabricius as a new name for *Sphex plumipes* Drury, 1770, now *Campsomeris plumipes* (Drury, 1770) Viereck, a common species in the southeastern United States. This is evident from the fact that Fabricius listed that species and only that species as its synonym. Bradley agrees with me in this interpretation, although he listed formerly *Scolia radula* as synonym of *Campsomeris trifasciata* (Fabr. 1793) on other grounds (1928, *Proc. Acad. Nat. Sci. Phila.,* 80, p. 321).

Since *C. plumipes* and *C. trifasciata* are very closely related species in the same subgenus, the question of which one is synonymous with *radula* has in any event no bearing upon the identity of the subgenus *Dielis.*

Record of the Collembolan Uzelia setifera (Absolon) in North America (Isotomidae)

David L. Wray [1]

Recently a small collection of Collembola from eastern Canada were sent me for determination. Amongst them I was surprised to find four specimens of *Uzelia setifera* (Absolon), a species heretofore found only in Europe.[2] Although a new species of this genus (*Uzelia hansoni*) was described by Mills and Richards [3] as from Baker Lake, Northwest Territories, it differs from *U. setifera* by having a vestigial furcula and in other minor points. All four of the above specimens fit Stach's description and illustrations except that the anal horns are situated on well-developed and separated papillae. Nevertheless, all other structural details fall in the *U. setifera* fascies.

All of the specimens were collected by Dr. Carl B. Huffaker in 1961 from dwarf mistletoe sites. Two specimens were taken two miles west of Havre Boucher, Nova Scotia, July 27, and were associated with a considerable number of *Xenylla maritima* Tullberg. The other two were collected near Beddeck, Nova Scotia, July 29.

This is not the only instance of a European form turning up in North America, or of an Arctic form being found in more southern regions. For example, *Tetracanthella* was formerly found only in Northern Europe or Arctic areas until it was found in North Carolina far south of its supposed range in North America. Another species, *Folsomia diplophthalma* (Axelson), of northern-Holarctic distribution has now been taken as far south as North Carolina in North America. Still another form, *Anurophorus laricis* Nicolet, of similar northern distribution has now been taken in North Carolina. The three genera, *Uzelia, Tetracanthella,* and *Anurophorus* are very close relatives belonging to the family Isotomidae and from the records so far their distributional range appears to fall into a similar pattern.

[1] Entomologist, Insect Survey, Division of Entomology, N. C. Department of Agriculture, Raleigh, N. C.

[2] Stach, J., 1947. The Apterygotan Fauna of Poland in Relation to the World-Fauna of this group of Insects. Krakow. pp. 67–71.

[3] Mills, H. B. and W. R. Richards, 1953. Jour. Kansas Ent. Soc. 26: 53–59.

New Exotic Crane-Flies (Tipulidae: Diptera). Part VI

CHARLES P. ALEXANDER, Amherst, Massachusetts [1]

The preceding part under this general title was published in ENTOMOLOGICAL NEWS, 73: 122–129, 1962. At this time I am describing further species from India, all belonging to the great genus *Hexatoma,* particularly well developed in southeastern Asia. All materials discussed at this time were taken by Dr. Fernand Schmid in Assam, chiefly in Manipur State, the most easterly part of India, and especially on the two highest mountains of Manipur, Sirhoi Kashong and Hkayam Boum. An instructive account of Manipur, with particular reference to Sirhoi Kashong, has been provided by the late Frank Kingdon-Ward.[2] I am greatly indebted to Dr. Schmid for this continued interest in making known the vast crane-fly fauna of India. All types are preserved in my personal collection of these flies.

Hexatoma (Hexatoma) khasiensis, new species.

General coloration of thorax brownish gray, praescutum with three opaque more blackened stripes; antennae of male very long, about three times the wing; wings tinged with gray, the relatively large stigma dark brown, conspicuous; *m–cu* about one-half longer than distal section of Cu_1.

♂. Length about 5.5 mm; wing 6.5 mm; antenna about 20 mm.

Rostrum very short, yellow; palpi small, blackened. Antennae of male greatly lengthened, about three times the wing, dark brown to black, base of the enlarged scape more yellowed; flagellar segments elongate-cylindrical, outer segments progressively more lengthened, the last one very long; segments with an abundant dense white pubescence on upper face, the vestiture

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

[2] KINGDON-WARD, FRANK. Plant hunter in Manipur, pp. 1–254, 12 pls., 1 map; 1952 (Jonathan Cape, London).

slightly longer than the diameter of the segment. Head brownish gray, the exceedingly large bulbous vertical tubercle darker brown to black.

Prothorax small, light brown. Mesonotal praescutum brownish gray with three opaque more blackened stripes, the central one with a vague capillary still more blackened median line; posterior sclerites of notum brownish black, surface sparsely pruinose, posterior border of scutellum, parascutella and postnotal suture more yellowed; mesonotum glabrous. Pleura blackened, sparsely pruinose; dorsopleural membrane and ventral pteropleurite paler. Halteres with stem yellowed, knob brownish black. Legs with coxae light brown, fore pair darker; trochanters yellowish brown; remainder of legs dark brown. Wings tinged with gray; stigma oval, dark brown, relatively large; veins brownish black, some, including the cord, heavy and conspicuous, *M*, its outer branches and vein *1st A* more slender. Veins behind costa virtually glabrous, distal section of R_5 with a few small punctures; costal fringe short. Venation: *Sc* long, Sc_1 ending about opposite fork of *Rs*, Sc_2 removed; R_2 at fork or R_{2+3} present as a short element about one-third as long as R_2; radial branches divergent, cell R_3 at margin slightly more extensive than cell R_2; *m–cu* near fork of *M*, about one-half longer than distal section of Cu_1, cell M_4 at margin unusually extensive.

Abdomen, including hypopygium, uniformly black.

Habitat. INDIA (Assam). *Holotype:* ♂, Kalanga, Mikir Hills, United District of Mikir and North Cachar Hills, 200 feet, May 1, 1960 (Fernand Schmid).

The most similar regional species is *Hexatoma* (*Hexatoma*) *brevistigma* Alexander, of Thailand, which differs especially in the coloration of the body and wings, including the small but distinct stigmal area.

Hexatoma (Eriocera) kala, new species

Size medium (wing of male about 12 mm); thorax orange yellow, praescutum and scutum patterned with brown; head in-

tense black; antennae, halteres and legs black; wings strongly blackened, cell M_1 present; abdomen orange, segments five to seven intensely black.

♂. Length about 10.5–11 mm; wing 12–13 mm; antenna about 2.3–2.4 mm.

Rostrum dull orange, mouthparts more yellowed; palpi black. Antennae of male 8-segmented, black throughout; flagellar segments gradually decreasing in length outwardly, with very elongate verticils. Head intense black; vertical tubercle small, unequally quadrituberculate, the central pair more evident.

Pronotum light orange yellow. Mesonotal praescutum with anterior fourth and broad anterior lateral margins light orange yellow, the posterior area patterned with brown, lateral triangles darker, continued backward to include the scutal lobes; central region of praescutum with two paler brown intermediate stripes that are separated by a narrow yellow vitta; median region of scutum, the broad scutellum and postnotum clear orange yellow, with a depressed pale brown area on the postnotal suture immediately behind the wing roots; thoracic dorsum unusually glabrous, with very sparse small setae on posterior praescutal interspaces and the scutellum. Pleura light orange yellow, including the dorsopleural membrane; a small brown spot on dorsal posterior part of anepisternum, before the wing root. Halteres black. Legs with coxae orange, unusually glabrous, with sparse setae on fore and middle pairs, longer at tips, hind coxae with longer setae on posterior faces; trochanters obscure yellow; remainder of legs black, femoral bases very narrowly and vaguely obscure yellow; interpolated scales of legs very slender, setoid; basal spine of claw conspicuous. Wings strongly blackened, without stigma; vague paler streaks in certain of the cells, especially in outer ends of *R* and *M* and base of *1st A*. Longitudinal veins beyond cord with abundant black trichia, lacking on Cu_1; basad of cord with trichia on apical fifth of *Rs*, very sparse and scattered on outer third of *M* and end of *1st A*. Venation: *Sc* relatively short, Sc_1 ending about opposite midlength of R_{2+3+4}; R_2 slightly oblique; R_{2+3+4} about twice R_{1+2}; cell M_1 present, about twice its petiole; *m–cu* at near two-thirds M_{3+4}.

Abdomen clear orange, segments five, six and seven intensely black; in cases the extreme lateral and posterior borders of tergites two to four narrowly and vaguely darkened; ninth tergite with coarse black setae on lobes.

Habitat. INDIA (Assam). *Holotype:* ♂, Sirhoi Kashong, Manipur, 7,500 feet, July 12, 1960 (Fernand Schmid). *Paratopotypes:* 3 ♂♂, July 11–12, 1960.

Hexatoma (*Eriocera*) *kala* is an especially attractive species that is allied to *H.* (*E.*) *aurantia* (Brunetti), from which it is readily told by the coloration of the body and by the venation. In *aurantia* the entire body is orange and cell M_1 is very deep.

Hexatoma (Eriocera) karma, new species

Size medium (wing of female to 17 mm); general coloration dull black, the genital segment fulvous; mouthparts, antennae, halteres and legs black; wings strongly suffused with brown, base narrowly more yellowed; cell M_1 present.

♀. Length about 15–19 mm; wing 14–17 mm; antenna about 2.6–3 mm.

Rostrum and palpi black. Antennae of female 8-segmented, black throughout; flagellar segments gradually decreasing in length and diameter, the last two subequal. Head dull velvety black; posterior vertical tubercles small, simple, anterior tubercles low and ill-defined.

Thorax dull black, praescutum with four narrow glabrous more plumbeous stripes; setae of interspaces long and delicate, erect. Pleura black. Halteres and legs uniformly black. Wings strongly suffused with brown, costal border more evidently darkened; no stigma; wing base narrowly more yellowed; veins brown, those at wing base more yellowed. Longitudinal veins of outer radial field with macrotrichia, including R_{1+2}, R_3, R_4 and R_5, very sparse and scattered on R_{2+3}, M_1 and M_2. Venation: *Sc* long, Sc_1 ending opposite R_2, Sc_1 shorter than R_{2+3+4}, the latter subequal to or longer than R_{2+3} or about two-thirds R_{1+2}; cell M_1 present, subequal to its petiole; cell *1st* M_2 short, subrectangular; *m–cu* about one-half longer than the distal section of Cu_1, at near midlength of M_{3+4}.

Abdomen black, the surface weakly shiny, basal rings of the more proximal segments slightly more nacreous; genital shield and valves of ovipositor fulvous, contrasting with the remainder of abdomen. Ovipositor with cerci long and slender, gently upcurved to the acute tips.

Habitat. INDIA (Assam). *Holotype:* ♀, Hkayam Boum, Manipur, 8,500 feet, June 21, 1960 (Fernand Schmid). *Paratopotypes:* 6 ♀♀; *paratypes:* 5 ♀♀, Khamassom, Manipur, 3,900 feet, June 24, 1960 (Fernand Schmid).

Hexatoma (*Eriocera*) *karma* is generally similar to *H.* (*E.*) *semilimpida* (Brunetti) which is readily told by the brightened wing disk and darkened wing base, as well as by the increased number of antennal segments in the female.

Hexatoma (Eriocera) mitra, new species

Size medium (wing of female about 15 mm); general coloration of body, antennae, halteres and legs intense black; wings bright brown, prearcular field light yellow; veins unusually glabrous, cell M_1 lacking; ovipositor and genital valves intensely blackened.

♀. Length about 16 mm; wing 15.5 mm; antenna about 3 mm.

Rostrum and palpi black. Antennae of female 9-segmented, black throughout; first flagellar segment slightly less than twice the second, succeeding segments progressively shorter, terminal segment subequal to the penultimate. Head deep black, without an evident vertical tubercle; anterior vertex about four times the diameter of scape.

Thorax velvety black, praescutum with four narrow more plumbeous stripes, the intermediate pair separated by a ground vitta of approximately the same width; remainder of notum velvety black, posterior borders of scutellum and mediotergite vaguely pruinose; praescutal setae relatively sparse but very long and conspicuous, black. Pleura black. Halteres and legs uniformly black. Wings bright brown, prearcular field light yellow, the extreme base of costa brightened; no stigma; veins dark fulvous, slightly darker than the ground. Longitudinal veins beyond cord unusually glabrous, distal section of R_5 with about

a dozen scattered long trichia. Venation: Sc_1 ending shortly before R_2; *Rs* relatively short, slightly more than one-half longer than R_{2+3+4}, the latter subequal to R_{1+2}; cell M_1 lacking; cell *1st* M_2 long-subrectangular; *m–cu* at three-fourths M_{3+4}.

Abdomen black, the basal lateral areas of tergites light silvery gray, interrupted at the midline. Ovipositor intensely black, including the very long slender nearly straight cerci.

Habitat. INDIA (Assam). *Holotype:* ♀, Sirhoi Kashong, Manipur, 7,500 feet, July 11, 1960 (Fernand Schmid).

This attractive fly suggests species such as *Hexatoma* (*Eriocera*) *shirakii* (Edwards), *H.* (*E.*) *morosa* (Osten Sacken), *H.* (*E.*) *aterrima* (Brunetti) and some others, differing evidently in the coloration and venation of the wings. The very long intensely blackened valves of the ovipositor should be noted.

Hexatoma (Eriocera) pennata, new species

Size medium (wing of male 10 mm); general coloration black, including the antennae, halteres and legs; wings strongly blackened; abdomen short, black, with bluish reflections; posterior basitarsus enlarged, provided with conspicuous elongate setae to present a feathered appearance; cell M_1 lacking; macrotrichia present on outer radial veins, lacking on medial branches.

♂. Length about 9 mm; wing 10 mm; antenna about 4 mm.

Rostrum and palpi black. Antennae of male 7-segmented, relatively long, nearly one-half of the body, black throughout; all flagellar segments with sparse scattered coarse erect setae, smallest on terminal one; first flagellar segment subequal in length to the succeeding three combined, second to fourth flagellar segments progressively smaller; terminal segment about one-fourth the penultimate. Head dull black, with abundant porrect black setae; vertical tubercle bilobed, the larger lobe lying behind the anterior one.

Thoracic dorsum almost uniformly dull black, the central line of praescutum and scutum and posterior borders of scutellum and postnotum weakly pruinose. Pleura black, restrictedly more pruinose on pteropleurite and ventral sternopleurite, the latter with small delicate setae. Halteres short, black. Legs entirely

black; posterior legs long, the apex of tibia and the basitarsus dilated, provided with conspicuous fringes of long black setae to produce a feathered appearance, the setae of the basitarsus subequal in length to the diameter of the segment. Wings strongly blackened, prearcular and costal portions more saturated; centers of cells *R* and *M* and bases of *Cu* and *1st A* slightly paler; veins dark brown. Macrotrichia of longitudinal veins beyond cord relatively sparse, occurring on distal ends of veins R_3, R_4 and outer section of R_5, lacking on all outer medial veins. Venation: *Sc* long, Sc_1 ending opposite the transverse R_2; *Rs* relatively long, nearly twice R_{1+2}; R_{2+3+4} shorter than basal section of R_5; cell M_1 lacking; *m–cu* at near four-fifths the length of M_{3+4}, subequal to distal section of Cu_1.

Abdomen short, black, with bluish reflections, hygopygium black.

Habita. India (Assam). *Holotype:* ♂, Sirohi, Manipur, 4,300 feet, June 26, 1960 (Fernand Schmid).

Hexatoma (*Eriocera*) *pennata* is a very distinct species by the peculiar structure of the posterior legs. In its general appearance it somewhat resembles *H.* (*E.*) *waterstoni* (Edwards), of Macedonia, Greece, a very different fly.

Hexatoma (Eriocera) setigera, new species

General coloration dark brown to black; antennae of male elongate, flagellar segments with conspicuous erect setae; antennae, halteres and legs black; wings strongly infuscated, without stigma, R_2 at or just before radial fork; ovipositor with long slender valves.

♂. Length about 8–8.5 mm; wing 8–8.2 mm; antenna about 8 mm.

♀. Length about 8–9 mm; wing 8–9.5 mm; antenna about 1.9–2.0 mm.

Rostrum exceedingly reduced, black; palpi small, black. Antennae of male 7-segmented, subequal in length to the body or wing, in female much shorter, 9-segmented; scape and pedicel testaceous brown, flagellum black; flagellar segments of male very long, with coarse erect setae over the whole length, addi-

tional to an abundant pale erect pubescence; terminal segment very small, oval, terminating in long setae; in female, segments gradually decreasing in length outwardly, with comparable conspicuous setae, terminal segment about one-half the penultimate. Head dark brown, orbits pruinose; vertical tubercle bilobed, more elevated and conspicuous in the female.

Thorax almost uniformly dark brown, the posterior sclerites of notum in male more yellowed, in female more gray pruinose, in cases the three praescutal stripes darker and more distinct; vestiture of praescutum small and weak. Pleura brown, with darker areas on ventral anepisternum and ventral sternopleurite. Halteres brownish black. Legs with coxae and trochanters brown; remainder of legs black, femoral bases restrictedly paler; claws of male with a slender basal spine, in female this reduced to a small tooth. Wings strongly infuscated, stigma not differentiated; a slightly darker seam over *Rs;* veins dark brown. Veins unusually glabrous, beyond cord with a complete series of trichia on distal section of *Rs;* costal fringe very short. Venation: Sc_1 ending slightly before to nearly opposite fork of *Rs*, Sc_2 near its tip; R_{1+2} and R_2 subequal, the latter at or shortly before fork, in the latter case leaving an element R_{3+4} that is approximately one-half R_2; cell M_1 lacking; *m–cu* subequal to distal section of Cu_1, placed at from one-third to one-half M_{3+4}.

Abdomen brown to brownish black, more or less pruinose, including the genitalia. Ovipositor with valves long and slender, straight. Male hypopygium very large, dististyles blackened.

Habitat. INDIA (Assam). *Holotype:* ♂, Hkayam Boum, Manipur, 8,500 feet, June 21, 1960 (Fernand Schmid). *Allotopotype:* ♀, pinned with type. *Paratopotypes:* 1 ♀, with type; *paratypes:* ♂♀, Sihai Khulen, Manipur, 4,700 feet, June 25, 1960; ♀♀, Khaiyang, Manipur, 3,200 feet, June 18, 1960 (Fernand Schmid).

In its general appearance the present fly is most like *Hexatoma* (*Eriocera*) *prolixa* Alexander, of the western Himalayas, differing conspicuously in the structure of the antennae and, especially, of the ovipositor.

A New Host Record of the Chrysidid, Omalus auratus Linnaeus (Hymenoptera: Chrysididae)

Sylvan J. Thomas, St. Clair Shores, Michigan

The purpose of this paper is to record the adventive European wasp, *Passaloecus turionum* Dahlbom, as a host of the chrysidid, *Omalus auratus,* in Michigan and to give some data on the post-diapause developmental time of two specimens reared from a nest of this host species.

Chandler (1960) has published some notes on *Pemphrendon lethifer* Shuckard and has listed *O. auratus* as a parasite reared from its nests. Krombein (1959) states that *O. auratus* is a parasite of *P. lethifer* and that there are no records of it parasitizing other twig-nesting pemphredonines in the United States. His recent paper (1961) lists the few known specimens of *P. turionum* collected in the United States. I am indebted to Dr. Krombein of the U. S. National Museum for identifying my reared specimens and supplying taxonomic records and biological references for these species.

During the summer of 1960, I placed a redwood nesting site containing pre-bored tunnels in a field of Macomb Co., Michigan. The nesting tunnels were brought indoors on January 5, 1961 and examined. One tunnel contained diapause larvae of *P. turionum* and *O. auratus.* The larvae were placed separately in gelatin capsules and kept in temperatures above 60° F to force pre-season development. The chrysidids hatched on March 23 and 24. The host in the nest containing the chrysidids continued development but failed to eclose. However, specimens from an adjacent nest of the host, *P. turionum,* emerged on March 19. The elapsed days for developmental stages are given for both species in Table 1 below.

The larva of the chrysidid measured about 4 mm in length and 2 mm in width at the middle. The host larva measured about 5.5 mm in length. Both species were yellow in color during the prepupal period. The cell partitions enclosing the chrysidid larvae were similar to those enclosing the host larvae. Beyond

TABLE 1.—Elapsed days from diapause for developmental stages of *Passaloecus turionum* and *Omalus auratus*. (Observations made between January and March, 1961.)

	Pupa Formed (Ecdysis)	Head, Thorax Pigmented	Adult Hatched (Ecdysis)	Emerged from Cell
*Passaloecus turionum**	47	62	—	—
*Omalus auratus**	59	—	76	77
*Omalus auratus**	60	—	77	78
Passaloecus turionum	51	—	74	75

* Same nest.

this, however, there are no observations to indicate which developmental stage of the host was attacked by the chrysidid.

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Types of the Nearctic Species of the Genus Pedilus Fischer (Coleoptera, Anthicidae, Pedilinae)

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The following is a report on the type specimens of the North American species of the genus *Pedilus* originally described by LeConte (1847, 1851, 1855, 1866), Horn (1871, 1874, 1883) and Fall (1915, 1919). In several cases lectotypes have been designated. M.C.Z. stands for the Museum of Comparative Zoology, Harvard University; and P.A.S. represents the Philadelphia Academy of Natural Sciences. I am thankful to the Sigma Xi-RESA Grants-in-Aid of Research Committee for an award which made this study possible.

1. *Pedilus abnormis* (Horn): holotype at P.A.S. #3032, male.
2. *P. alticolus* Fall: holotype at M.C.Z. #24312, male.
3. *P. arizonensis* Fall: holotype at M.C.Z. #24313, male.

4. *P. bardi* (Horn) : lectotype at P.A.S. #3033, male; paratype at M.C.Z. #7983, male.
5. *P. canaliculatus* LeConte: holotype at M.C.Z. #4876, male.
6. *P. cavatus* Fall: holotype at M.C.Z. #24314, male.
7. *P. crotchi* (Horn) : lectotype at P.A.S. #3093, male; paratype at M.C.Z. #7981, male.
8. *P. distinguendus* (Horn) : lectotype at P.A.S. #3035, male; paratype at M.C.Z. #7982, male.
9. *P. flabellatus* (Horn) : holotype at P.A.S. #3036, male.
10. *P. flexiventris* Fall: holotype at M.C.Z. #24316, male.
11. *P. funebris* (Horn) : lectotype at P.A.S. #3037, female; paratype at M.C.Z. #8177, female.
12. *P. inconspicuus* (Horn) : lectotype at P.A.S. #3038, male; paratype at M.C.Z. #7985, male.
13. *P. inconspicuus* var. *flavidus* Fall: holotype at M.C.Z. #24315, male.
14. *P. infectus* Fall: holotype at M.C.Z. #24317, male.
15. *P. lewisi* (Horn) : lectotype at P.A.S. #3039, male; paratype at M.C.Z. #8178, male.
16. *P. lineatus* Fall: holotype at M.C.Z. #24318, male.
17. *P. longilobus* Fall: holotype at M.C.Z. #24319, male.
18. *P. monticolus* (Horn) : holotype at M.C.Z. #7984, male.
19. *P. newmani* LeConte: lectotype at M.C.Z. #30493, male.
20. *P. oregonus* Fall: holotype at M.C.Z. #24320, male.
21. *P. parvicollis* Fall: holotype at M.C.Z. #24321, male.
22. *P. picipennis* Fall: holotype at M.C.Z. #24322, male.
23. *P. pulcher* LeConte: holotype at M.C.Z. #4877, male.
24. *P. punctulatus* LeConte: holotype at M.C.Z. #4875, female.
25. *P. serratus* Fall: holotype at M.C.Z. #24323, male.
26. *P. vittatus* (Horn) : holotype at P.A.S. #3040, male.

A detailed treatment of the systematics and phylogeny of the genus *Pedilus* will be published elsewhere.

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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.

Second Supplement to "Hymenoptera of America North of Mexico."—The Hymenoptera Unit of the Insect Identification and Parasite Introduction Research Branch, Entomology Research Division, U. S. Department of Agriculture, is now preparing copy for the Second Supplement to the catalog of North American Hymenoptera. Literature published through 1963 will be included. Authors are requested to send reprints of articles on Hymenoptera as soon after publication as possible to insure inclusion of the information in the supplement. The reprints may be addressed to the undersigned, or to the appropriate subject matter specialist in the Hymenoptera Unit. We would also appreciate receiving significant extensions in geographic range, and new host or prey records.

Karl V. Krombein, Editor
Insect Identification
c/o U. S. National Museum
Washington 25, D. C.

XII International Congress of Entomology.—The XIIth Congress will be held in London, from the 8th to the 16th of July, 1964, under the presidency of Prof. O. W. Richards. If you are hoping to attend, please write to: The Secretary, XIIth International Congress of Entomology, c/o British Museum (Natural History), Cromwell Road, London, S.W. 7, England, as soon as possible, and in any case before December 31, 1962 in order to receive preliminary announcements and application forms that will be sent mailed in June, 1963. The fee for full membership, with the printed Proceedings, will be £8 sterling.

XVIth International Congress of Zoology.—This Congress will be held in Washington, D. C., from the 20th to the 27th of August, 1963. The preliminary announcements look very promising. The third Circular will appear this month (October) and will contain pertinent forms as well a more de-

tailed information on the program, registration, etc. If you have not received earlier circulars write to: Secretariat, 2101 Constitution Ave., Washington 25, D. C.

Journal of Research on the Lepidoptera.—This is a new journal in which the emphasis is to be on environmentally and genetically induced variation, population analysis, evolution, phylogenetic taxonomy, zoogeography, comparative morphology, ecology, geographical variation, speciation, etc. It will be in printer's type, with illustrations in half-tone, line, and color. Personal subscriptions, per volume of 300 pages, $8.00, institutional subscriptions $12.00, benefactor subscriptions, amounts in excess of the above. The Journal of Research on the Lepidoptera, 1140 W. Orange Grove Ave., Arcadia, California. Manuscripts may be sent to the editor, William Hovanitz, at the above address.

Reviews

Destructive and Useful Insects. Their Habits and Control by **C. L. Metcalf** and **W. P. Flint,** Revised by **R. L. Metcalf.** 4th Edition. Pp. xii + 1087. McGraw-Hill Book Co., Inc., New York, 1962. Price: $17.50.

This new edition, enlarged and extensively revised by Professor Metcalf of the University of California, follows the plan of the first edition, which is too well known to require detailed description. Major improvements are that the chapter on control and insecticides has been brought up to date, newly important pests have been added to the list, new or improved tables provided, and the chapter on classification has been expanded by including the material in the corresponding chapter in the out-of-print *Fundamentals of Insect Life,* Metcalf and Flint, 1932. Also, the chapter on development is improved. We find here an amazingly condensed account of embryology, with information from descriptive, experimental, and developmental studies, as well as an expanded treatment of later development, diapause, and metamorphosis.

The chapter on morphology, physiology, and biochemistry covers a tremendous area of knowledge. Within a brief 50 pages (including e.g., 6 pages on nutrition, 3 on circulation and the blood, 3 on excretion, 3 on respiration) the material is

greatly condensed, but one is given at least a glimpse of much of what has been or is being done in insect physiology. And even if space does not permit discussion sufficient to provide a real comprehension of all these topics, yet it is important that they be included in a book that aims to give a general introduction to these aspects of entomology. This more sophisticated approach to the study of insect problems may also serve to attract superior students to become seriously interested in entomology.

The purely morphological material has not been so carefully modernized and revised but has often been taken verbatim from the first edition, and its style and language, often wordy and repetitious, does not harmonize with the other parts. After being told that the insect head is made up of six primitive segments and that the antennae are homologous to a pair of legs, one is astonished to find Dr. Snodgrass' familiar figure of the lateral aspect of a grasshopper head with the lines indicating an arrangement of a prostomium plus four post-oral segments, labelled as in the original, but here supplied with the legend "suggests the origin of the head from six primitive segments." Our bewilderment grows as we read in the text that there are 3 pre-oral segments (represented respectively by the eyes, the antennae, and the labrum!), and when we add these to the four post-oral ones of the Snodgrass figure and arrive at a total of seven!

In spite of the much greater content, the size of this book, if not the price, has been kept within reasonable bounds by the more frequent use of a smaller type face for many subsidiary paragraphs. Unfortunately, McGraw-Hill, usually concerned about the good appearance of their books, has re-used many of the old line cuts which are so badly worn that the insects depicted, when compared with earlier editions, may have some of their body hairs worn off, and tarsal claws either worn down or else become spatulate; in general these illustrations look like antique wood cuts rather than zinc etchings.

We like this book because as a text and reference volume in economic entomology it is unique in that it provides also a real introduction to the morphology, physiology, development, and classification of insects. Only if he has a truly broad understanding of insects and their physiology, as is here provided, will the college graduate be able to provide more intelligent direction for control practices than the local hardware and supply dealer who sells insecticides and knows what to squirt at which insects. —R. G. SCHMIEDER.

THE EVOLUTIONARY RELATIONSHIPS OF 17-YEAR AND 13-YEAR CICADAS, AND THREE NEW SPECIES (Homoptera, Cicadidae, Magicicada) by **Richard D. Alexander** and **Thomas E. Moore.** Pp. 1–59, maps, tables and 1 color plate. Museum of Zoology, University of Michigan, Miscellaneous Publications, No. 121. Ann Arbor, Mich., 1962. Price: $1.50 (paper).

The authors recognize six species, three with a 17-year and three with a 13-year cycle.

EXPERIMENTS IN GENETICS WITH DROSOPHILA by **Monroe W. Strickberger.** Pp. ix + 144, 18 figs. John Wiley and Sons, Inc., New York, 1962. Price: $3.95 (Ring binding).

The Future of Entomological News

A class of membership called Patrons of the American Entomological Society was recently set up (see February issue) to help ENTOMOLOGICAL NEWS avoid further increases in subscription rates and to make possible a larger and better NEWS for the prompt publication of entomological research.

One of our Members, Mrs. Margaret M. Cary, the distinguished lepidopterist, immediately became a patron, and we hope that there will be others. In addition, we anticipate that commercial companies concerned with insect control, or in the manufacture of pesticide materials and equipment will also become patrons. In recent years a number of far-sighted and progressive companies have provided financial support for entomological research. But the journals, such as ENTOMOLOGICAL NEWS, that publish the results of research are still largely forgotten, although they too need help.

The NEWS would like to ask its subscribers and friends who are in a position to do so to call this need to the attention of individuals and of companies that should enlist as patrons. The rate is a modest $50 annually, and the names of patrons will appear regularly in the NEWS.

Entomologist's Market Place

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Notices of wants and exchanges not exceeding three lines are free to subscribers.

All insertions are continued from month to month, the new ones are added at the end of the column, and, when necessary, the older ones at the top are discontinued.

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

Cockroaches (Blattoidea) of Japan, Okinawa, Formosa (Taiwan), and the Philippines are being studied in cooperation with Dr. K. Princis. Loans of specimens from that area are desired. A. B. Gurney, U. S. National Museum, Washington 25, D. C.

Orthoptera. Gryllinae (except domestic sp.) and **Pyrgomorphinae** of the world wanted in any quantity for work in morphology, taxonomy, cytology, and experimental biology; dry, or in fluid, or living. Write D. K. Kevan and R. S. Bigelow, Dept. of Entomology, McGill University, Macdonald College, Quebec, Canada.

Beetles of the world wanted, all species in exchange for American beetles, moths and butterflies. James K. Lawton (age 18), 7118 Grand Parkway, Wauwatosa 13, Wisconsin.

Acanthomyops (Citronella ants) wanted for revisionary study. Will sort from yellow *Lasius*. M. W. Wing, State University College, Cortland, N. Y.

Cicindelidae of the World wanted in exchange for North American Coleoptera or in purchase. Carl Farr Moxey, 414 Woodland Ave., Wayne, Pennsylvania.

"New York Weevil" Larvae (*Ithycerus noveboracensis*) **urgently required.** Anyone having larvae, or knowing where they may be obtained, please inform Elwood C. Zimmerman, R.F.D. 2, Peterboro, New Hampshire.

Insects

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ENTOMOLOGICAL NEWS

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Some Spring Fleas from Northeast Tanganyika

C. ANDRESEN HUBBARD, Tigard 23, Oregon

To a person from Oregon there seem to be no seasons in Tanganyika, only dry weather and wet weather. At the moment (January 15), however, there are frog and toad eggs and their tadpoles in all the pools; the weaver birds are building nests by the hundreds and some nests have eggs in them; the game birds are running around with their chicks and the mice are having their families. To an Oregonian all these signs mean Spring, so the title "Some Spring Fleas from Tanganyika." Spring is a very good time to collect fleas.

On arrival in Amani, Tanganyika, September 1961, everywhere there was drought, the most severe in the memory of man. The huge game animals were dying of thirst by the hundreds, the stench of their decaying bodies carried by the wind for miles. Too dry weather is not at all good for collecting fleas.

Then, in a very few days, the heavens opened up and poured down rain in torrents, in cloud bursts, as much as 6, 8, 10 inches in a day and the great game animals, so thirsty days before, mired and died in the quagmire of mud, drowned in the rushing water on its way to the Indian Ocean or the inland lakes. Elephants and lions were reported drifting out to sea; hippos disported themselves in the once small creek running through Nairobi.

The rains have continued for 4 months to bring to Tanganyika, Kenya and Uganda (East Africa) the most devastating floods of the century. The great game animals suffered, man suffered, but the small rodents, which carry most of the fleas

of any area, suffered most. The rats and mice of the lowlands were either drowned or, managing to escape, moved to higher ground. Those on the higher ground forced out of their homes by the flooding of their burrows also moved to higher levels. All in all, this shifting of the population caused the mice to lose their hitch hikers, the fleas, and many taken were without these insects. After 4 months, rodents taken in these flooded areas had not yet found their natural fleas, and were totally without them.

However, by diligent search, enough sheltered spots could be found to take a fair catch of mice, and during the 4 month period of this report 350 were taken and examined and from them 800 fleas were recovered. For host identification 150 study skins were made and 250 slides of the fleas were set up.

This paper with its records shall act as the semi-annual report to the National Science Foundation for grant G14023 and is the fifth paper of twelve so far written by the author under this grant.

"Funza" The Fleas "Viroboto"

1. **Tunga penetrans** (Linnaeus, 1758)

This is the "Funza" of Swahili. On the second day at Amani the assistant director was pleased to hand in, in alcohol, a specimen which his wife had just extracted from under his toenail. The only thing at hand about this tropical nuisance flea is from Tilman, "Snow on the Equator," 1937, page 11, where in part he says: "There were however, one or two drawbacks to an earth floor. Encouraged by ideal conditions, the jigger flea made its appearance. House boys, hens and dogs are the main source of this flea infection. . . . The jigger is indigenous to South America, and is supposed to have been brought over to the west coast of Africa in the sand ballast of a ship early in the last century. From there, within a short time it spread across Africa to the east coast." Merifeld, "Gorillas Were My Neighbors," Corgi Ed., 1960, page 68, writes: "It may be that only people with experience of chimpanzees will credit Bo-Bo's (Merifield's pet chimp) most remarkable and useful accomplishment, but it is true enough. One of the worst pests of tropical Africa are

the tiny fleas called jiggers, which burrow unnoticed under the skin of one's toes and set up irritation and infection. Native children are often permanently crippled by these parasites, and at the end of each day it is always a wise precaution to have one's feet examined. The usual way of getting them out is with a fine splinter of bamboo, and this can be a painful operation unless performed by an expert. Bo-Bo was as good at it as anyone I knew. You had to sit down beside her, present your feet and a piece of bamboo, and leave the rest to her. With your toes just in front of her nose, so that she had to squint, she would winkle the beastly things out in no time, and she was so skillful at it that the natives would queue up for her attention. Dr. Bo-Bo's evening surgery was a sight to be remembered."

2. **Echidnophaga gallinacea** (Westwood, 1875)

This is the sticktight or tropical hen flea. The tiny insect might easily be overlooked by the investigator for in many cases it buries its head in the skin of the host and fails to be combed or brushed off. It has been seen in large numbers on occasion in north central Oregon imbedded in the head skin of deer mice (Peromyscus) and gray diggers (Citellus). At the moment the only records are, off:

Praomys (*Rattus, Mastomys*) *natalensis microdon* (coucha rat), a female each at Arusha. Oct. 5; at Gonja, Oct. 24.

3. **Echidnophaga aethiops** Jordan and Rothschild, 1906

This tiny flea has taken over most of Africa and usually from bats. The present record is off:

Lavia frons (large-eared hollow-faced bat), Same, 12 miles west from under roof of deserted Masai village hut, Jan. 17, 1962, a male, 3 females from 25 specimens examined.

4. **Pulex irritans** Linnaeus, 1758

The so called "human flea" is well distributed over the world. The Malaria Institute has slides of these fleas, the specimens

being taken out of the "beds of Africans" in the South Pare Mountains adjacent to Gonja, dated February 1959.

5. **Ctenocephalides felis strongylus** (Jordan, 1925)

This is one of the common cat fleas in Africa. It has been reported off a great many domestic and wild animals as well as man. New records are off:

Lepus capensis abbotti (Cape Hare), Same, Oct. 8, 3 pair.
Praomys (Rattus, Mastomys) natalensis microdon (Coucha rat), Gonja, Oct. 24, 1 male.
Tatera robusta vicina (big gerbil), Himo, Oct. 26, 2 males.
Acomys nubilus (spiny mouse), Himo, Oct. 26, 1 female; Same, Oct. 27, 1 female.
Panthera pardus fusca (leopard), Amani, Nov. 7, 5 males, 4 females.
Hyaena hyaena dubbah (hyena), Moshi, Dec. 27, 12 pair.

During the month of January this flea begins to be a nuisance to humans and many Africans make their way to the Institute asking for flea (viroboto) powder with which to powder their dogs. The fleas begin to emerge at this time from the earth floors and board floors of houses to make life miserable to the inhabitants, European and African alike. This is the common nuisance flea of Tanganyika.

6. **Parapulex echinatus** Smit, 1956

This is the true flea of spiny mice but can occasionally be taken off gerbils which use the same range. This genus can always be diagnosed because of the heavy spine-like bristles found on no other known flea and as Smit says in describing this flea, "It is rather amusing that the spiny mouse, *Acomys,* should have such a spiny flea." Records are off:

Acomys nubilus (spiny mouse), 1 each item, Same, Oct. 2, 3 males, 5 females; Oct. 26, 1 male, 2 females; 1 male, 5 females; 1 pair.
Tatera nigricauda spp? (blacktailed gerbil), Same, Oct. 27, 1 female; Jan. 17, 1962, 1 pair.

7. **Xenopsylla brasiliensis** (Baker, 1904)

Collections reveal this flea to be the common rat flea of East Africa. It is found on most rats and rat-like mice. Gerbils and ground squirrels on the same ground carry their own *Xenopsylla.* Records of interest follow. Off:

Rattus rattus kijabius (black rat), Amani, Oct. 12, 2 males, 1 female; Oct. 13, 9 pair; Oct. 27, 1 male; Nov. 2, 1 male; Nov. 3, 2 males, 1 female; Nov. 7, 4 males; Dec. 2, 4 males; Vugiri, Dec. 25, 2 males, 1 female.

Black rats are one of the most common rodents taken here at Amani and vicinity. They are everywhere. Usually they are without fleas, about 2/3rds carry none. Of 50 examined during the period 30 carried no fleas and a nest with 7 young was without a parasite of any kind.

Praomys natalensis microdon (coucha rat), (10), Arusha, (3), Oct. 5, 9 males, 11 females; (1) Oct. 6, 5 pairs; (3), Oct. 7, 14 males, 10 females. Three specimens examined Dec. 30 carried only *D. lypusus.*

Aethomys chrysophilus voi (rock or bush rat), (9), Gonja, (3), Sept. 30, 30 males, 27 females; (3) Oct. 20, 17 males, 6 females; (3), Dec. 25, 12 males, 13 females.

Arvicanthus abyssinicus neumanni (grass mouse), Arusha, Dec. 31, a pair off 1 specimen.

8. **Xenopsylla difficilis** Jordan, 1925

This is the common gerbil flea of northern Tanganyika. Interesting records are, off:

Tatera robusta vicina (big gerbil), (6), Himo, (1), Oct. 26, 12 males, 13 females; Korogwe, (1), Dec. 21, 2 males; Moshi, (1), Dec. 28, 3 pair; Arusha, (3), 13 males, 12 females.

Tatera nigricauda spp? (blacktailed gerbil), (3), Same, (1), Oct. 27, 7 males, 16 females; (1), Nov. 28, 3 pair; (1), Jan. 17, 1962, 2 females.

9. **Xenopsylla humilis** Jordan, 1925

This is the second most common gerbil flea of northern Tanganyika. It seems to prefer the *robusta* gerbils to the *nigricauda* gerbils. Records are, off:

Tatera robusta vicina (big gerbil), (3), Korogwe, (1), six miles south, Dec. 21, 2 males; Moshi, (1), 10 miles south at gravel pit, Dec. 28, 3 pair; Arusha, (1), 6 miles west, Dec. 31, 1 male.

10. **Xenopsylla** near **robertsi** probably new ssp.

This flea, which does not quite follow the pattern of true *robertsi,* has been taken off:

Praomys natalensis microdon (coucha rat), Arusha, 7 miles west from bank of creek running through village Ngaramtoni Juu, Oct. 5, 15 males, 3 females.

11. **Synosternus somalicus** (Jordan and Rothschild, 1908)

This flea has been taken only off the African ground squirrel, *Xerus rutilus saturatus* at Same, Nov. 28, 1 male, 3 females.

12. **Stivalius torvus** (Rothschild, 1908)

In the period of this study only 12 pairs of this flea have been collected and these only at Amani. All are off what seems to be the true host *Praomys delectorum taitae* which has been dubbed "African deer mouse" due to its striking similarity to the American *Peromyscus.* The mouse is usually taken at the base of large jungle trees. This flea was taken on the first day of trapping and has appeared sparingly, and singly but consistently during the 4 months. The 24 fleas were recovered from 45 of the mice.

13. **Stivalius alienus** Smit, 1958

Only one pair of this flea has been taken. They were off a specimen of *Crocidura occidentalis* (shrew) at Amani on Nov. 10. Although 12 other shrews were examined during the period, none carried fleas.

14. **Chimaeropsylla potis potis** Jordan and Rothschild, 1913

This flea was originally collected off an elephant shrew here at Amani in 1904 by a member of the staff of the old German botanical garden. The specimens were sent to the Berlin Museum and later made their way to Tring where they were described. A vial of these fleas was waiting here. It bears the data, off *Petrodromus s. sultan* (elephant shrew), Amani, Feb. 1960. The vial contained 3 males, 11 females.

15. **Dinopsyllus lypusus** Jordan and Rothschild, 1913

This large flea, up to 5 mm, is the common flea of northeast Tanganyika, and is found sooner or later on all mice examined as the following records show. Off:

Tatera robusta vicinia (big gerbil), (1), Arusha, Dec. 31, a female.
Acomys wilsoni (spiny mouse), (1), Korogwe, Dec. 22, a female.
Arvicanthus abyssinicus neumanni (grass mouse), (1), Arusha, Dec. 30, 2 pair.
Lemniscomys griselda rosalia (one strip grass mouse), (1), Korogwe, Dec. 21, 3 pair.
Pelomys fallax iridescens (creek rat), (3), Arusha, (1), Oct. 7, 2 males, 3 females; Amani, (2), Sept. 25, a pair; Oct. 3, 2 females.
Rattus rattus kijabius (black rat), (5), Amani, Sept. and Oct., 3 males, 2 females.
Praomys natalensis microdon (coucha rat), (6), Arusha, (3), Oct. 6, 3 males, 8 females; Korogwe, (1), Dec. 21, a female; Arusha, (2), Dec. 30, 8 males, 3 females.
Lophuromys sikapusi manteufeli ("orange-bellied mouse"), (8), Amani, Oct., Nov., Dec., Jan., 9 males, 17 females.
Praomys delectorum taitae (African deer mouse), 15 at Amani through the 4 months, carried 16 males, 8 females. Specimens taken from this mouse are dwarfed and very pale and it appears that this flea cannot feed on this mouse.
Lophuromys flavopunctatus margarettae (tan-bellied mouse),

seems to be the true host of this common flea. Of the 56 examined through the 4 months, 17 were without fleas, 39 carried 196. On Nov. 2 a specimen examined carried 20 of these giants and on Dec. 20, 14 were taken off another. Totaled, 293 of these fleas were taken off 80 mice of the above types.

16. **Ctenophthalmus** near **calceatus** probably new ssp.

Although 12 types of *Ctenophthalmus,* all described prior to 1939, are listed from adjacent Kenya, only five specimens have been taken off the 350 mice examined. 3 females and 2 males are all off *Lophuromys f. margarettae,* Oct. 18, a female; Dec. 2, a male; Dec. 14, a male, these from Amani; Dec. 28, a female each off 2 mice at Vugiri.

Gazetteer: The location of this study is in northeast Tanganyika and covers an area about 50 miles wide along the Kenya border, extending from the Indian Ocean some 350 miles northwest past Mt. Kilimanjaro to Arusha at the base of Mt. Meru. Located along the main Tanga-Arusha highway (road) at about 50 mile intervals are, beginning with Tanga on the Ocean at sea level, Amani at 3,500 (20 miles northwest off highway), Korogwe at 900 feet, Vugiri at 900 feet (20 miles north off highway), Gonja at 2,700 feet, Same at 2,700 feet, Himo at 2,400 feet, Moshi at 2,500 feet and Arusha at 4,500 feet.

Acknowledgments: Training of the writer in East African rodent taxonomy has been through the kindness of D. H. S. Davis, Johannesburg; J. D. L. Fleetwood, Nairobi; Harry Hopkins, Tring. Verification of determination of fleas through kindness of Frans Smit and Harry Hopkins of Tring. In conjunction with their malaria schemes, E. John Hemmingway and John Raybould of the Malaria Institute have been field companions. Otherwise the writer has worked alone. Thanks is due Dr. Gordon Pringle, Director of the East African Malaria Institute, Amani, Tanga (the writer's present address), for his thoughtfulness in requesting the author's presence here in Tanganyika and giving him every aid as a Fulbright Research Scholar.

The collections herein described are made under Governor's License No. 20/1961, Country of Tanganyika.

A New Elachertus Parasitic on a Pest of Bananas (Hymenoptera, Eulophidae)

B. D. Burks, Entomology Research Division, Agric. Res. Serv., U. S. D. A.

The description of the following species of *Elachertus* has been prepared to make its name available for use in papers by other workers.

Elachertus ceramidiae, new species

This species agrees most closely with *Elachertus scutellatus* Howard, described from the island of St. Vincent, W. I., in that the abdomen is subsessile; the scutellum is lightly sculptured, almost smooth, with the lateral carinae incurved apically, but not meeting on the meson; the pronotum, scapulae, and praescutum are dorsally densely hairy, but the axillae are glabrous; the first funicular segment is longer than the pedicel or any of the following funicular segments; the occiput is ecarinate medially, but obscurely carinate laterally; and the vertex is ecarinate. The two species differ greatly in color, *scutellatus* being predominantly black, while *ceramidiae* is mostly yellow. Structurally, the median carina of the propodeum in *ceramidiae* is double, while it is single in *scutellatus;* the postmarginal vein in *ceramidiae* is shorter than in *scutellatus;* and the eyes have fewer, shorter hairs in *ceramidiae* than in *scutellatus.*

Female.—Length 1.0–1.2 mm. Yellow, with dark-brown shading in scrobe cavity, on axillae, scutellum, postscutellum, and on gastral terga 2 to 4; vertex, occiput, pronotum, apical segment of each tarsus, and fifth gastral tergum usually faintly shaded with brown; wings hyaline, veins tan.

Antennae inserted at level of ventral margins of eyes, a transverse ridge extending across face just ventral to antennal bases; eyes with scattered, short hairs, eye height $1\frac{4}{5}$ times width of malar space; relative lengths of parts of antenna—scape 34, pedicel 12, funicular segments 14, 12, 12, 12, club 22; upper area of front and vertex hairy; postocellar line $1\frac{1}{2}$ times as long as ocellocular line.

Pronotum, praescutum, and scapulae densely hairy, 1 pair of long bristles at posterolateral angles of pronotum, 2 pairs of slightly weaker bristles located mesad of these, on posterior pronotal margin; praescutum with 1 pair of stout bristles near posterolateral angles; each scapula with 2 bristles near lateral margin, above tegula, and 1 long bristle near posteromedian angle; axillae faintly sculptured, almost smooth, without hair; scutellum faintly sculptured, almost smooth, 2 pairs of bristles present, lateral grooves broad, distinctly bimarginate, posterior apices of grooves incurved, but not meeting on meson; median lobe of metanotum smooth; submarginal vein of forewing with 5 or 6 dorsal bristles; relative lengths of veins of forewing—submarginal 30, marginal 40, stigmal 10, postmarginal 15; stigmal vein with a prominent, slender, dorsoapical spur; hindwing with 3 bristles at humeral angle, 1 straight and 2 hooked hamuli present; hind coxa smooth, with 1 bristle near apex, all tibiae and tarsi clothed with bristly hair, inner, ventroapical angle of fore and mid femora each with 1 bristle.

Propodeum smooth, glabrous medially, 1 weak spiracular bristle present and 6 to 8 bristles on callus lateral to each spiracle; lateral propodeal carinae absent, median carina double, with a narrow projecting ledge near base; petiole short, broader than long, a transverse, dorsal carina present; gaster as long as thorax (without propodeum), first gastral tergum glabrous, comprising almost or quite half the dorsal length of gaster; terga 2 to 4 short, with a transverse row of bristles laterally on each, tergum 5 with lateral rows of bristles almost meeting on meson, tergum 6 with row of bristles extending completely across dorsum; apex of tergum 7 short-acuminate, each cercus bearing 1 long and 3 shorter bristles.

Male.—Length 0.8–1.0 mm. Head and body generally darker than in female, gaster with a round, yellow spot dorsally at base. Scape expanded near apex, and flagellar segments more slender than in female, antenna otherwise as in female; gaster shorter than thorax.

Type locality.—Coto, Costa Rica.

Types.—U.S.N.M. No. 66026.

Described from 65 ♀♀ and 5 ♂♂ specimens, as follows: Type ♀, 2 ♀♀ paratypes, Coto, C. R., reared April 15, 1958 from larva of *Ceramidia butleri* (Möschler) by J. O. Harrison; allotype ♂ and 16 ♀♀ paratypes, same data, but reared July 1, 1960; 1 ♀ paratype, La Lima, Honduras, Nov. 10, 1959, host and collector the same; 18 ♀♀ and 3 ♂♂ paratypes, same data, but reared Nov. 17, 1961; 25 ♀♀ and 1 ♂ paratypes, Changuinola, Panama, reared Aug. 14, 1961, same host and collecter; 2 ♀♀ paratypes, Almirante, Panama, April 1956, reared from *Ceramidia butleri* by Roig.

Host relationships.—This species is a primary parasite of the larva of the syntomid (or amatid) moth *Ceramidia butleri* (Möschler) feeding on banana.

Lectotype Designation of E. scutellatus

The species *Elachertus scutellatus* Howard, with which *ceramidiae* was compared above, was described in *Jour. Linn. Soc. London, Zool.*, v. 25, p. 107, 1894, from 2 ♀♀ cotypes from St. Vincent. One of these specimens is in the U.S.N.M. collection, and I here designate it lectotype. It is labeled, "St. Vincent, W. I., H. H. Smith, 209, Cotype no. 2741, U.S.N.M., Elachistus scutellatus Type How."

A Second Specimen of Clematodina (Orthoptera; Acridoidea; Acrididae)

James A. G. Rehn, Department of Insects, Academy of Natural Sciences of Philadelphia

In 1940 Dr. Klaus Günther described a very distinctive genus and species of Acrididae as *Clematodina eckardtiana,* from a single male specimen taken at São Paulo de Olivença, Amazonas, Brazil.[1] In his opinion it was related to the North American genus *Clematodes* Scudder, hence the name. To those familiar with the North American genus, the facts that it is desert-inhabiting, and that Günther's figures lack resemblance to it at once raised doubts as to the assumed relationship.

[1] Archiv für Naturg., n.f. IX, p. 479, Figures 8 and 9.

In 1961, when critically analyzing the genus *Clematodes* preparatory to its placement in the "Monograph of the Orthoptera of North America," volume 2, Rehn and Eades were extended the courtesy of the loan of the unique type of *Clematodina* by the Zoologisches Sammlung des Bayerischen Staats in Dresden, Germany.

It was at once apparent that *Clematodina* was in no way related to *Clematodes,* all the members of which latter genus were available to Rehn and Eades. Further, the dissection of the internal genitalia of the type made evident that *Clematodina* represented a distinct tribe of the Acrididae, which was named (Clematodinini), discussed, analyzed and the type refigured, as well as its internal genitalia, by Rehn and Eades.[2]

The type was promptly returned to Dresden, together with certain material not in their collection as an expression of appreciation of their valued cooperation.

Shortly after the return of the type, in the check-over of certain unstudied collections at the Academy, we found apparently the second known specimen of the genus. It is a male, taken at Teffé (Tefé), Amazonas, Brazil, January 28, 1920, by the late H. S. Parish, all of whose Amazonian Orthoptera collections are now in the Academy series. Teffé is approximately 280 miles (air-line) east of the type locality, down the Amazon from the latter, but in essentially similar Amazonian conditions.

When compared with the description of the type the only noteworthy features of difference are the slightly larger size, and the definitely longer, though equally slip-like, tegmina. The comparable dimensions (those given by Günther for the type included in parentheses) are: length of body, 29.0 mm (25.5); length of pronotum, 6.1 (5.4); greatest breadth of pronotum, 3.7 (3.3); length of tegmina, 6.5 (3); greatest breadth of tegmina, 1.79 (1.7); length of caudal femur, 16.3 (15).

The difference in tegminal length is not infrequent in individuals of those numerous forms that have greatly reduced slip-like and depauperate tegmina, and is frequently evident, to a similar degree, in extensive series from the same locality.

[2] Notulae Naturae, no. 347, pp. 1–4, Figures 1–9 (1961).

Collembola from Oregon

HAROLD GEORGE SCOTT [1]

The 11 species of springtail insects recorded in this paper were collected by Mr. Gerald F. Kraft (Department of Entomology, Oregon State University, Corvallis, Oregon) in connection with a U. S. Public Health Service grant study of the ecology of Berry Creek, Benton County, 9 miles north of Corvallis. Of these species only *Tomocerus flavescens* has been recorded previously from Oregon. Most specimens will be retained by Dr. Kraft, but examples will be deposited with the Academy of Natural Sciences, Philadelphia, Pennsylvania.

Hypogastrura promatro Wray, 1950.

OREGON RECORD. Berry Creek, Nov. 1960, G. F. Kraft.
DISTRIBUTION. Idaho, N. M., Ore., Utah.

Genus **XENYLLA** Tullberg, 1869

Xenylla humicola (Fabricius, 1780).

OREGON RECORDS. Berry Creek, Nov.–Dec. 1960, G. F. Kraft.
DISTRIBUTION. Mass., N. M., N. Y., Ore., Ontario (Canada), Europe.

Genus **SPINACHORUTES** gen. nov.

TYPE SPECIES. *Spinachorutes krafti* gen. et sp. nov.

DESCRIPTION. Subfamily Hypogastrurinae. Body elongate, segmented; Ant III sense organ with rods only; postantennal organ with 4 lobate tubercles; eyes 8 and 8, on dark eyepatches; mandible with molar surface; prothorax well developed; unguiculus present; furcula present, not reaching beyond collophore; anal spines 4.

DISCUSSION. The following combination of characters distinguishes *Spinachorutes* from all other known genera of Hypo-

[1] Training Branch, Communicable Disease Center, Public Health Service, U. S. Department of Health, Education, and Welfare, Atlanta 22, Georgia.

gastrurinae: (1) furcula and unguiculus present; (2) postantennal organ with 4 lobes; (3) anal spines 4; (4) eyes 8 and 8.

KEY TO GENERA OF NEARCTIC HYPOGASTRURINAE

1. Eyes and eyespots absent.....2
   Eyes and eyespots present.....3
2. Postantennal organ with 4–12 tubercles.....
   .....**Willemia** Borner, 1901
   Postantennal organ with 1 tubercle.....
   .....**Stachiomella** Wray, 1957
3. Postantennal organ present; eyes 2 and 2 to 8 and 8.....4
   Postantennal organ absent; eyes 5 and 5.....
   .....**Xenylla** Tullberg, 1869
4. Postantennal organ with 4–8 tubercles.....5
   Postantennal organ with 1 tubercle.....7
5. Eyes and 2 and 2; anal spines 2; postantennal organ with 7 tubercles.....**Mesachorutes** Absolon, 1900
   Eyes 8 and 8; anal spines 0–4; postantennal organ with 4–7 tubercles.....6
6. Anal spines 4.....**Spinachorutes** gen. nov.
   Anal spines 0–2.....**Hypogastrura** Bourlet, 1839
7. Anal spines present; furcula absent.....
   .....**Knowltonella** Wray, 1958
   Anal spines absent; furcula present.....
   .....**Neobeckerella** Wray, 1952

Spinachorutes krafti gen. et sp. nov. Figure 1.

TYPE LOCALITY. Holotype and 4 paratypes, Berry Creek, 9 mi N of Corvallis, Benton County, OREGON, October 1960, by G. F. Kraft. Holotype will be deposited with the Academy of Natural Sciences, Philadelphia, Pennsylvania; paratypes are in the Oregon State University collection.

DESCRIPTION. Body elongate, segmented; background color white with heavy speckling of gray to black pigment giving a generally dark gray appearance; antenna subequal to head in length, set low on face; Ant III sense organ with rods, no cones; Ant IV with sensory papillae at tips; postantennal organ with 4 lobate tubercles, 2 large and 2 small; eyes 8 and 8 on dark eyepatches; mandible with molar surface; pronotum well devel-

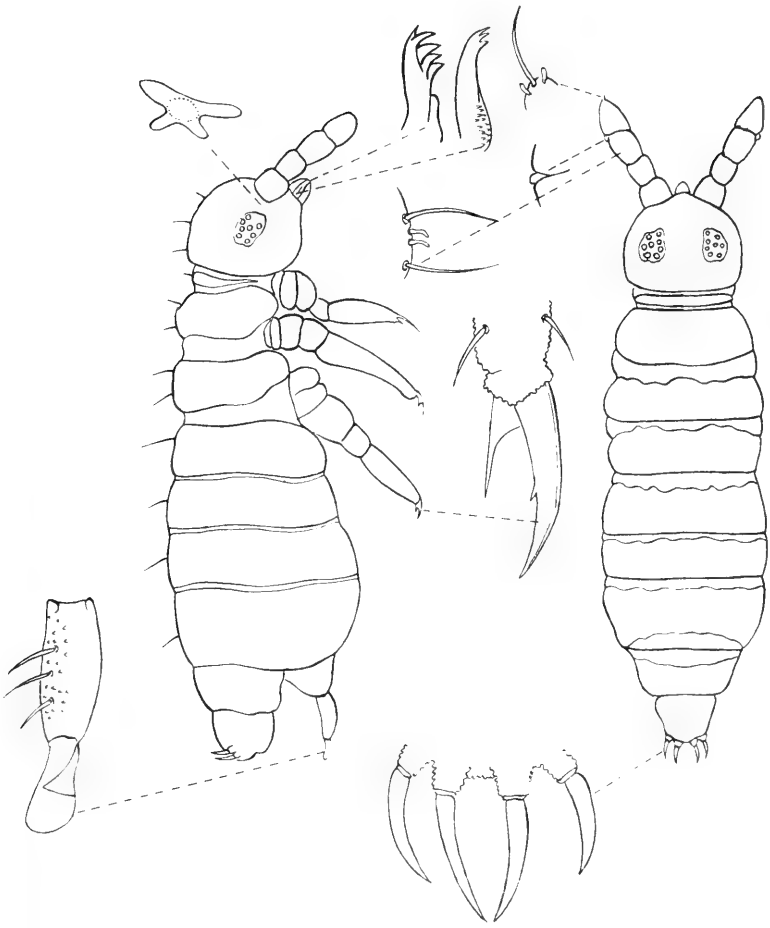

FIG. 1. *Spinachorutes krafti* gen. et sp. nov.

oped, setaceous, of same texture as other nota; unguis with 1 internal tooth; unguiculus about $\frac{3}{5}$ unguis, without teeth; furcula present, reaching to caudal margin of Abd II; mucro spoon shaped, with large mid-dorsal lobe; anal spines 4, in a row across Abd VI; anal papillae non-contiguous; length about 1.3 mm.

Isotoma louisiana Scott, 1962. Figure 2.

OREGON RECORDS. Berry Creek, Feb. and Nov.–Dec. 1960, G. F. Kraft.

DISTRIBUTION. La., Ore.

Isotoma sensibilis (Tullberg, 1876).

OREGON RECORD. Berry Creek, Dec. 1959, G. F. Kraft.

DISTRIBUTION. Fla., Ill., La., Mass., Minn., N. M., N. Y., N. C., Ohio, Ore., Ontario (Canada), Europe.

Entomobrya triangularis Schott, 1896.

OREGON RECORDS. Berry Creek, Jan., Feb., Mar., Apr., May, Jul., Aug., Oct., Nov., Dec., 1960, G. F. Kraft.

DISTRIBUTION. Cal., N. M., Ore., Wash., South America.

Entomobrya marginata (Tullberg, 1871).

OREGON RECORDS. Berry Creek, Oct. 1960, G. F. Kraft.

DISTRIBUTION. Colo., Ill., Iowa, Mass., N. M., N. Y., Ohio, Ore., Tenn., Utah, Wash., Ontario (Canada), Europe, Australasia.

Tomocerus flavescens (Tullberg, 1871).

ADDITIONAL OREGON RECORDS. Berry Creek, June 1959, Feb. and Nov. 1960, G. F. Kraft.

DISTRIBUTION. Alaska, Cal., Colo., D. C., Ga., Ill., Ind., Iowa, La., Me., Md., Mass., Mich., Minn., Miss., Mo., N. H., N. J., N. M., N. Y., N. C., Ohio, Ore., Pa., Tenn., Texas, Utah, Va., Wash., Northwest Territories (Canada), Europe, Asia.

NOTE: This species was first recorded from Oregon by Folsom (1913) from Siskiyou (Sept. 6); Benton County (Aug. 21); Mt. Chintimini (no date); and Corvallis (Dec. 24).

Sminthurides pumilis (Krausbauer, 1898).

OREGON RECORDS. Berry Creek, Dec. 1959; Jan., Feb., Oct., Nov., Dec. 1960, G. F. Kraft.

DISTRIBUTION. Iowa, Ga., La., Mo., N. M., N. C., Ore., Utah, Manitoba (Canada), South America, Europe, Australasia.

Sminthurinus radiculus Maynard, 1951.

OREGON RECORDS. Berry Creek, Mar. 1960, G. F. Kraft.
DISTRIBUTION. N. Y., Ore.

Ptenothrix maculosa (Schott, 1891).

OREGON RECORDS. Berry Creek, Jan., Feb., Mar., Apr., and Nov. 1960, G. F. Kraft.

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A New Species of Thyopsella (Acarina: Hydryphantidae) from Oregon [1]

Clive D. Jorgensen [2]

Cook (1955) established the genus *Thyopsella* to include the new species *dictyophora.* Later (Cook, 1959), he added another species (*occidentalis*) to the genus. This is a description of a third species in this yet small genus.

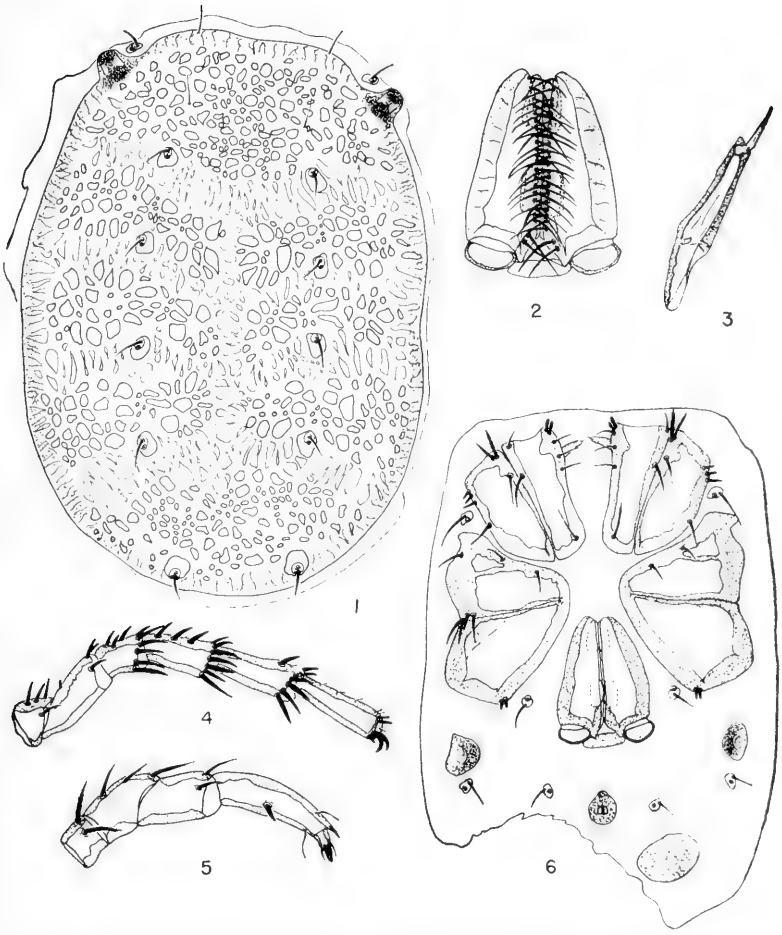
Thyopsella haplodoxa new species

Female. Length of dorsal shield 1.17–1.31 mm, width of dorsal shield 0.81–0.97 mm. Dorsal shield elliptical with anterior margin truncate; lateral eyes form anteriolateral angles with distinctly projected capsules; median eye indistinct and non-pigmented; frontal plate consists of pre- and postfrontalia, dorsocentralia and dorsolateralia 1, and postocularia; preocularia on anterior margin of dorsal shield; dorsocentralia 2–4 fused with their respective dorsolateralia; dorsocentralia 5 fused medially and enlarged into a single plate; dorsoglandularia 2 not incorporated into the dorsal shield (Fig. 1); dorsoglandularia 3–7 in clear non-sclerotized areas; dorsoglandularia 3 just posterior to frontal plate; dorsoglandularia 4–6 just posterior to fusion of dorsocentralia and -lateralia 2–4, and dorsoglandularia 7 on posterior margin of dorsal shield; plates indistinct, being distinguished by coarser reticulations; entire dorsal shield highly reticulate, even so as to possess fine reticulations within coarser reticulations.

Soft venter finely and extensively papillate (Fig. 6) genital flaps 0.23–0.24 mm long on the median margin; medioposterior angles of genital flaps extend posteriorly into distinct cones extending one-half the width of genital acetabula 3 (Fig. 2); median margin of genital flaps with 22–25 strong overlapping setae; genital acetabula elliptical, second being posterior of

[1] Gratitude is expressed to David R. Cook, Wayne University for the loan of paratypes of *dictyophora* and *occidentalis.*

[2] Radiation Ecology Project, Brigham Young University, Mercury, Nevada.



FIGS. 1–6. *Thyopsella haplodoxa* new species, female: 1, dorsal shield; 2, genital area; 3, chelicera; 4, second leg; 5, palp; 6, venter.

median transverse line; genital acetabula 1 and 2 covered by closed genital flaps, third occupies posteriolateral corners of genital flaps.

Legs typically thyasin with strong setae and no swimming hairs (Fig. 4); claws simple; palps chelate and with strong

spine midway on P-IV (Fig. 5); P-IV extends anteriorly beyond insertion of P-V by means of a dorsal extension which terminates with a strong spine; P-V chelate, the dorsal being movable; dorsal palpal segment measurements are: P-I, 0.046–0.052 mm; P-II, 0.098–0.105 mm; P-III, 0.058–0.062 mm; P-IV, 0.154–0.168 mm; P-V, 0.040–0.41 mm; capitulum, 0.240 mm long.

Male. Unknown.

Diagnosis. Thyopsella haplodoxa is distinguished from *dictyophora* by the second dorsoglandularia which are not incorporated into the dorsal shield. Also, *haplodoxa* has the medioposterior angles of the genital flaps projected posteriorly into cones at least one-half the width of genital acetabula 3. It is separated from *occidentalis* by its lateral eyes which are incorporated into the dorsal shield.

Locality and type material. Holotype adult female collected from slow running water, Bear Springs camp grounds, Wasco County, Oregon, May 21, 1959; holotype will be deposited in the United States National Museum, Washington, D. C. One paratype with the same data is retained in the author's collection.

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Supplementary Bibliography of North American Tarantulas, 1939–1959 (Araneida, Suborder Mygalomorphae)

Beatrice Vogel, University of Colorado Museum, Boulder, Colorado

The need for bibliographies in the field of spiders is perhaps greater than in some other fields, since there is no special organ of publication for araneologists. Pierre Bonnet's *Bibliographia Araneorum* (I–III, Toulouse, 1945–1961), which is an alphabetical list of species of the entire order complete through 1939, and the *Catalogue of American Spiders, suborder Mygalomorphae,* by Harriet Exline and Alexander Petrunkevitch (1939, *Trans. Conn. Acad. Arts Sci.,* 33: 191–338), a systematic list of the suborder, reflect the great need for bibliographies. Since the publication of the *Catalogue of American Spiders,* numerous species of mygalomorphs have been added to our fauna, and many new localities have been reported for previously existing species.

The following is a complete (to the best of the author's knowledge) bibliography of mygalomorphs in North America including Mexico from 1939–1959. The families are in the same order as in the *Catalogue of American Spiders,* and the genera and species are in alphabetical order within the families. No attempt has been made to list synonyms, except when it has been done by the author cited. A state name included in the reference indicates a new locality not listed in the *Catalogue.*

Ctenizidae

Antrodiaetus hageni (Chamberlin), Gertsch, W. J. & Jellison, W. L., 1939, Am. Mus. Novit. 1032: 1. *Brachybothrium hageni* Chamberlin. Montana.

Antrodiaetus montanus (Chamberlin & Ivie), Chamberlin, R. V. & Ivie, W., 1945, Ann. Ent. Soc. Am. 38(4): 549. *Brachybothrium hageni* Chamberlin & Ivie, 1933, Bull. Univ. Utah 26(4): 4. (Not *hageni* Chamb.). Utah, Idaho.

Antrodiaetus pacificus (Simon), Chamberlin, R. V. & Ivie, W., 1941, Bull. Univ. Utah 31(8): 3. *Brachybothrium pacificum* Simon. California.

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Pachylomerides audounini (Lucas), [sic], Barnes, R. D., 1953, Ecol. Monographs 23: 321. North Carolina.

Pachylomerides adouinii (Lucas), [sic], Minton, S. A., Jr., 1955, Proc. Ind. Acad. Sci. 64: 255. Indiana.

Pachylomerides beatulus Gertsch & Mulaik, (n. sp.), 1940, Bull. Am. Mus. Nat. Hist. 77, art. 6: 312. Texas.

Pachylomerides celsus Gertsch & Mulaik, (n. sp.), 1940, Bull. Am. Mus. Nat. Hist. 77, art. 6: 313. Texas.

Pachylomerides funereus Gertsch & Mulaik, (n. sp.), 1940, Bull. Am. Mus. Nat. Hist. 77, art. 6: 312. Texas.

Pachylomerides pygmaeus Chamberlin & Ivie, (n. sp.), 1945, Ann. Ent. Soc. Am. 38(4): 558. Oklahoma.

Pachylomerides tuobitus (Chamberlin), Chamberlin, R. V. & Ivie, W., 1945, Ann. Ent. Soc. Am. 38(4): 556. Arkansas, Missouri.

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Euagrus chisoseus Gertsch, (n. sp.), 1939, Contr. Baylor Univ. Mus., 24: 21. Texas. Gertsch, W. J. & Mulaik, S., 1940, Bull. Am. Mus. Nat. Hist. 77, art. 6: 308.
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Aphonopelma baergi Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13): 19. Arkansas.
Aphonopelma behlei Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30 (13): 26. Arizona, New Mexico.
Aphonopelma brunnius Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13): 11. California.
Aphonopelma chalcodes Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13): 7. *Eurypelma californica* Gertsch (not Ausserer), 1935, Am. Mus. Novit. 792: 4. Arizona.
Aphonopelma clarum Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13): 10. California.
Aphonopelma cratius Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13): 18. California?
Aphonopelma cryptethus Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13): 16. California.
Aphonopelma eutylenum Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13): 9. California.
Aphonopelma griseum Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13): 13. Baja California.

Aphonopelma heterops Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13) : 29. Texas.

Aphonopelma lithodomum Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13) : 14. Arizona.

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Aphonopelma nayaritum Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13) : 23. Baja California.

Aphonopelma nevadanum Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13) : 12. Baja California.

Aphonopelma orthonops Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13) : 29. Arizona.

Aphonopelma phanus Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13) : 24. California.

Aphonopelma phasmus Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13) : 28. Arizona.

Aphonopelma prosoicus Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13) : 13. Baja California.

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Aphonopelma reversum Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13) : 8. California.

Aphonopelma ruedanum Chamberlin, (n. sp.), 1940, Bull. Univ. Utah 30(13) : 25. Mexico.

Aphonopelma rusticum (Simon), Chamberlin, R. V., 1940, Bull. Univ. Utah 30(13) : 14. Arizona.

Aphonopelma simulatum (Chamberlin & Ivie), Chamberlin, R. V., 1940, Bull. Univ. Utah 30(13) : 26. New Mexico, Utah. Gertsch, W. J., & Mulaik, S., 1940, Bull. Am. Mus. Nat Hist. 77, art. 6: 314. *Delopelma simulatum* Chamberlin & Ivie. *Eurypelma marxi* Gertsch. Texas.

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Delopelma iodius Chamberlin & Ivie, (n. sp.), 1939, Bull. Univ. Utah 29(11): 6. Utah.

Delopelma melanius Chamberlin & Ivie, (n. sp.), 1939, Bull. Univ. Utah 29(11): 5. Utah.

Delopelma moderatum Chamberlin & Ivie, (n. sp.), 1939, Bull. Univ. Utah 29(11): 9. Texas.

Delopelma radinum Chamberlin & Ivie, (n. sp.). 1939, Bull. Univ. Utah 29(11): 4. California.

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A Note on Techniques

During the course of investigation of an insect group, it is often necessary to compare minute parts of several different specimens at one time. I find that the shallow white plastic snap-on caps from medicine bottles when inverted make excellent small dishes in which to temporarily store preparations of genitalia, legs, antennae, etc. for critical comparison. About ten caps 1 inch in diameter can be stored in a covered 4-inch petri dish. The caps are filled with glycerin and each is associated with the dissected specimen from which the parts are taken by means of duplicated letter or number combinations typed on bond paper, one tag being placed in the glycerin dish and the other on the pin of the specimen or vial of preservative. The pure white inner surface of the cap provides an excellent reflecting surface for gross microscopic examination. I have stored as many as 125 preparations of weevil genitalia at one time with this system without confusion.

The larger sizes of plastic caps make good substitutes for watch glasses although they are not as deep as the glass dishes.

JOHN M. KINGSOLVER

Entomological News Gets Around

In the April issue of **Entomological News** Dr. C. A. Hubbard, who is now in Tanganyika, published a note on the parasitic earwig of the African Swahili giant rat, and incidentally offered specimens of the parasite to interested parties. Dr. Hubbard writes us that he has filled requests from

California Academy of Sciences, San Francisco.
North Dakota State University, Fargo.
University of Colorado Museum, Boulder.
University of Kansas, Lawrence.
Eastern Illinois University, Charleston.
Academy of Natural Sciences of Philadelphia.
Bishop Museum, Honolulu.
McGill University, Quebec, Canada.
University Museum, Oxford, England.
University of Queensland, Brisbane, Australia.

Entomologist's Market Place

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All insertions are continued from month to month, the new ones are added at the end of the column, and, when necessary, the older ones at the top are discontinued.

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

Cockroaches (Blattoidea) of Japan, Okinawa, Formosa (Taiwan), and the Philippines are being studied in cooperation with Dr. K. Princis. Loans of specimens from that area are desired. A. B. Gurney, U. S. National Museum, Washington 25, D. C.

Orthoptera. Gryllinae (except domestic sp.) and **Pyrgomorphinae** of the world wanted in any quantity for work in morphology, taxonomy, cytology, and experimental biology; dry, or in fluid, or living. Write D. K. Kevan and R. S. Bigelow, Dept. of Entomology, McGill University, Macdonald College, Quebec, Canada.

Beetles of the world wanted, all species in exchange for American beetles, moths and butterflies. James K. Lawton (age 18), 7118 Grand Parkway, Wauwatosa 13, Wisconsin.

Acanthomyops (Citronella ants) wanted for revisionary study. Will sort from yellow *Lasius*. M. W. Wing, State University College, Cortland, N. Y.

Cicindelidae of the World wanted in exchange for North American Coleoptera or in purchase. Carl Farr Moxey, 414 Woodland Ave., Wayne, Pennsylvania.

"New York Weevil" Larvae (*Ithycerus noveboracensis*) **urgently required.** Anyone having larvae, or knowing where they may be obtained, please inform Elwood C. Zimmerman, R.F.D. 2, Peterboro, New Hampshire.

Insects

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ENTOMOLOGICAL NEWS

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The Male Adult and Immature Stages of Pentaneura pilosella (Loew), (Diptera; Tendipedidae; Pelopiinae)

SELWYN S. ROBACK, Associate Curator, Department of Limnology, Academy of Natural Sciences of Philadelphia

Pentaneura pilosella was described by Loew in 1866 on the basis of a female from Washington, D. C. Malloch in 1915 described the male and provisionally associated a larva and pupa with it. Johannsen (1946) also described the male and female of this species. Neither of these latter two workers figured the genitalia or the details of the leg spines and spurs. Hauber (1945) figured the genitalia in outline.

On November 13, 1961, the author collected two larvae and a pupa from willow roots in the Savannah River (Georgia side). The male emerged from the pupa on December 1, 1961, and was preserved in alcohol as were the larvae. While the association of these larvae with the pupa and adult is not indisputable, the larvae were ready to pupate (swollen thoracic segments and adult eye spots formed) and the faint pupa respiratory organs which could be initially discerned appeared to agree with those of the pupa.

I have compared the reared male with specimens of *P. pilosella* from Plummer's Island and the District of Columbia and with the genitalia of one of Malloch's specimens of this species and all appear to be conspecific. The measurements and ratios are in close agreement with Johannsen's (1946) description except that the middle leg ratio of the Georgia specimen was

1.0 rather than 1.12. The middle leg ratio of one of the specimens from Plummer's Island was 0.97 (see Table 1).

A comparison of Malloch's slides of his larva and pupa from the Illinois River with those from the Georgia specimens indicates that Malloch's tentative association was correct. I have been able to find no significant differences between Malloch's material and that from Georgia. The differences in the shape of the pupal respiratory organ (Figs. 8, 9) may stem from the fact that Malloch's mount is of a whole pupa, rather than just a pupal skin and the respiratory organs are not compressed as they are in the mount of the empty pupal skin. Malloch's (1915) figure (Plate 24, Fig. 14) is not quite accurate.

TABLE 1. Comparison of ratios of tibial and tarsal segments of South Carolina and District of Columbia specimens of *Pentaneura pilosella* (Loew)

	Tib	T_1	T_2	T_3	T_4	T_5	Location	Leg Ratio
I	60	35	26	17	12	8	D. C.	0.58
	60	33	26	18	13	8	S. Car.	0.55
II	65	63	30	15	11	8	D. C.	0.97
	65	65	32	18	12	10	S. Car.	1.00
III	75	67	31	20	13	8	D. C.	0.90
	82	67	31	23	14	9	S. Car.	0.82

I am indebted to Dr. Herbert H. Ross of the Illinois Natural History Survey for the loan of Malloch's slide material of *P. pilosella* and to Dr. Willis W. Wirth for arranging the loan of some specimens of *P. pilosella* from the Washington, D. C., area.

Pentaneura pilosella (Loew)

1866 *Berlin Ent. Zeitschr.* **10**: 5, 6 (*Tanypus*-female)

Male.—Length 3.10 mm; antennal ratio 1.4; antennal pedicel light, some black-brown markings; head light, some black-brown marks behind eyes; pronotum yellow brown; greatly reduced, not visible dorsally; mesonotal vittae distinct, black-brown; median vitta split with an irregular row of acrosticals down this split; acrosticals slightly spread but not strongly divergent

FIGS. 1–6. *Pentaneura pilosella* (Loew)

1. Apex of mesotibia. 2. Apex of mesotarsal segment 1. 3. Apex of mesotarsal segment 2. 4. Apex of metatibia. 5. Apex of foretibia. 6. Aedeagus.

around prescutellar area; foreleg ratio 0.55; tibia with a preapical spine, 0.072 mm long (Fig. 5) and a trifid apical projection, 0.012 mm long; tarsal segments without preapical spines; mesotibia with two preapical spines 0.12 mm long (Fig. 1), and a trifid apical spur 0.019 mm long; tarsal segments 1–4 each with two preapical spines, 0.12 mm long on T_1 to 0.031 mm long on T_4 (Figs. 2, 3); metatibia with a preapical spine 0.072 mm long (Fig. 4), and a comb of five spines, 0.019 mm long; tarsal segments without preapical spines; claws with empodium present but no pulvilli; wing 1.7 mm long; veins light; distance from arculus to base of *m–cu* 0.37 of distance from *m–cu* to wing tip; length of *m–cu* 0.57 of distance from *m–cu* to *r–m*; R_{4+5} just past *Cu*; *M* ends below wing tip; wing tip strongly haired; scutellum and halteres light; postnotum brown; abdomen light with scattered long light hair; basistyle light 0.13 mm long; distyle (Fig. 6), 0.079 mm long; apical spine 0.012 mm long; apical tergite with about 13 spines mesally (Fig. 6); between and above basistyles a pair of quadrate semi-membranous projections (Fig. 6); these laterally haired at base, connected to membranous lobes lying above basistyles (the structure possibly homologous to aedeagal complex of *melanops* group and subgenus *Ablabesmyia*).

Material examined:

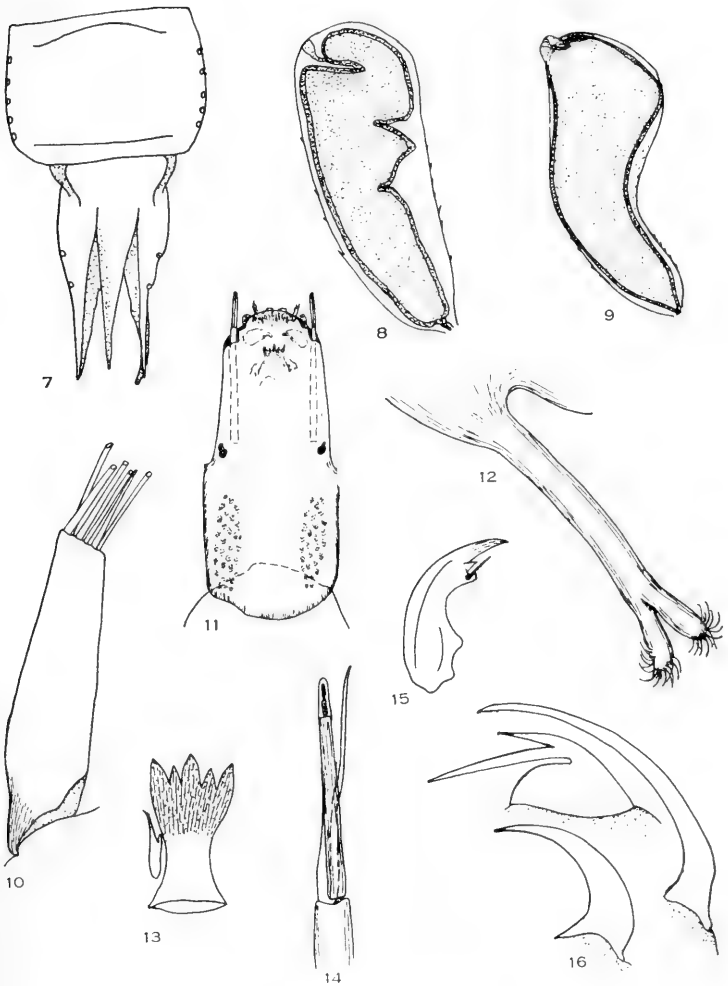
One male, emerged 1 December 1961, Mile 175, Savannah River, Burke County Georgia.

Four males and 7 females. Plummer's Id. Md. and Washington, D. C. Coll. H. Barber and Schwarz, 1902.

Slide 2472. Male genitalia *Tanypus pilosellus* Loew (= pallens Coq.?). Coll. Ill. Natural History Survey.

Larva

Mature larva 3.0 mm long; head (Fig. 11) 0.5 mm long; widened just behind eyes; 2–3 small spines laterally behind eyes; antenna 0.29 mm long; antennal ratio 0.31; sense pit of basal segment 0.64 from base; apical segments (Fig. 14); segment 2 brown, lighter at apex; mandible sharply curved (Fig. 15); 0.067 mm long; lateral tooth sharp; inner shoulder blunt, bears



FIGS. 7–16. *Pentancura pilosella* (Loew)

7. Pupa-eighth abdominal segment and anal fins. 8. Pupal respiratory organ—Georgia. 9. Pupal respiratory organ (Malloch specimen). 10. Anal papilla, larva. 11. Larval head, dorsal view (Malloch specimen). 12. Anterior prolegs, larva. 13. Lingua of hypopharynx, larva. 14. Apex of antenna, larva. 15. Mandible, larva. 16. Claws of posterior proleg, larva.

accessory filament; lingua of hypopharynx as in Fig. 13; maxillary palpus one-segmented, 0.024 mm long by 0.001 mm wide; 2–3 apical projections; anterior proleg 0.47 mm long, divides 0.73 from base (Fig. 12); anal papillae (Fig. 10) 0.10 by 0.02 mm; seven light apical filaments; anal gills (4) 0.22 mm long; posterior prolegs 0.40 mm long; spur of posterior prolegs 0.15 mm long with three fine lateral spines near base; claws narrow and light; one claw bifid apically, with heavy base (Fig. 16).

Pupa

Pupal skin 3.6 mm long; respiratory organ (flattened) 0.25 mm long by 0.095 mm wide at widest point; apical papilla 0.025 mm long; duct widened apically (Figs. 8, 9); eleven spines and a tubercle at the base of each of the respiratory organs; tubercle 0.048 mm wide at base by 0.026 mm high; seventh abdominal segment with four lateral filaments, the first 0.4 from the base; segment eight with five lateral filaments; anal fins (Fig. 7) 0.31 mm long by 0.18 mm wide at base; two lateral filaments at 0.32 and 0.45 from base.

Material examined:

One pupal skin (adult emerged) and two mature larvae, Savannah River, 31 November 1962, Mile 175, Burke County, Georgia (ex. willow roots).

One larval head (slide 2445) and one pupa (slide 2444). Illinois River, Havana, Ill., Illinois Natural History Survey Collection.

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Malloch, J. R. 1915. The Chironomidae or Midges of Illinois with particular reference to the species occurring in the Illinois River. Bull. Ill. Nat. Hist. Surv. X. (6): 372–374; Plate 24, Fig. 14, Plate 25, Fig. 11, Plate 26, Fig. 8, 14.

Three New Species of Paratiphia (Tiphiidae: Hymenoptera) from Mexico

H. W. Allen [1]

The species described below appear to be distinct from any of the species previously described by Peter Cameron. The ownership of the specimens examined is indicated as follows: A.N.S.P., Academy of Natural Sciences of Philadelphia; C.A.S., California Academy of Sciences.

Paratiphia fossata new species

Male.—Unspecialized hairs of head, thorax, and abdominal segments of moderate length and density. Bristles on apices of abdominal terga that are flattened to near their tips are confined to lateral third or less where they are separated by about their average basal thickness; medially they are scarcely differentiated from surrounding hairs.

Front with very coarse, deep punctures contiguous to above level of lowest ocellus except for a small area in front of lowest ocellus; without a polished impunctate ridge bordering inner eye orbit. Clypeus opaque yellowish-white; least distance between eyes 1.8 times clypeal length (three measured were 1.8, 1.8, and 1.8). Mandible opaque yellowish-white at base.

Dorsum with a well-developed fossa behind transverse carina that is traversed by many cross ridges; anterior part with coarse, deep primary punctures largely of first-degree density. Side of pronotum with its disc conspicuously and deeply depressed, the bottom crossed by several coarse rugae which in front diverge widely from parallel; discal sulcus continued prominently to dorsal margin which is elevated abruptly from its front edge; anterior carina produced in a large, acute-angled, tooth-like projection. Tegula slightly longer than wide (three measured were 1.3, 1.2, and 1.4 times as long as wide). Fore wing with mem-

[1] Research Associate, Academy of Natural Sciences of Philadelphia, and Collaborator, Entomology Research Division, U. S. Department of Agriculture, Moorestown, New Jersey.

brane nearly hyaline, its hairs brown, dense, conspicuous; radial cell 2.9 times as long as greatest width (three measured were 3.0, 2.8, and 3.0), its apex rounded or with a bend near middle; second cubital cell elongate with its distal section nearly straight.

Areola completed on the prominent anterior transverse carina; area lateral to areola with anastomosing rugulae, longitudinal carina mediad of spiracle well-developed; transverse fossa with its anterior carina nearly parallel and equal to the posterior one, fossa crossed by about 16 short ridges, enclosed cells strongly sloped toward plane of posterior aspect. Side of propodeum finely rugulose on a relatively even, polished surface. First tergum on dorsum with primary punctures small and generally of third-degree density; secondary punctures not numerous. First sternum with posterior margin of escutcheon a low, short transverse ridge, pygidium with its punctate part 1.25 times as long as wide, limited anteriorly by a vestigial ridge; punctures coarse and uniform; medially with carina on lower half becoming broadly rounded anteriorly.

Length, 6 to 8.5 mm.

Female.—Unknown.

Type.—♂, Guadalajara, Jal., Mex., Sept. 16 (McClendon) (A.N.S.P.).

Paratypes.—131 ♂♂, collected by McClendon at the same locality as the type, Sept. 14, 16, and 18 (A.N.S.P.); 15 ♂♂, Guadalajara, Jal., Mex., late Sept. 1934 (F. X. Williams) (C.A.S.).

P. fossata differs conspicuously from the other two species which were collected by McClendon at the same locality and on the same dates. It lacks the elongate tegula of *scutulata* and the brilliant golden brown pile at the tip of the abdomen of *clypeata* Sm. Because of this multiplicity of species collected from one locality on the same dates, the three females taken at the same time cannot be surely identified. They may be *fossata* or *clypeata* but are almost certainly not *scutulata*. *P. fossata* differs from *rufitarsis* Cam., the only other *Paratiphia* previously described from males from Mexico, in having a broad white opaque mark on the mandible.

Paratiphia scutulata new species

Male.—Unspecialized hairs on head, thorax and abdomen at most moderately dense and long. Bristles on margins of abdominal terga short and nearly absent dorsally; laterally on terga 2 to 4 they are much larger, flattened, and in a nearly contiguous array.

Front with punctures very coarse, deep, and of close first-degree density to above level of lowest ocellus without any intervals as wide as an ocellus; area bordering inner eye orbit lacking a polished ridge. Clypeus with its opaque yellowish-white mark relatively long in respect to its lateral width; least distance between eyes 1.9 times clypeal length (three measured were 1.9, 2.0, and 1.8). Mandible without whitish mark.

Dorsum of pronotum with its transverse carina high, not strongly appressed medially; bordering transverse fossa broad but without cross ridges. Punctures coarse, deep, and closely contiguous except for usual finely punctate apex. Side of pronotum with its anterior projection broad, high, pointed in an obtuse angle, its edge continuous with the dorsal carina and extending to ventral angle; disc with a deep pit near anterior process which shallows out in a narrow transverse course with only a few low cross ridges. Tegula conspicuously elongated, 1.8 times as long as wide (three measured were 1.8, 1.8, and 1.7). Forewing with vaguely defined brownish areas in several of the apical cells; hairs on membrane short, dense, coarse, and darkly pigmented; apical cell with its end rounded without a spur, 3.0 times as long as greatest width (three measured were 3.1, 3.1, 2.8); second cubital cell with its apical section nearly straight.

Dorsum of propodeum with areola well-differentiated; area between it and lateral carina more or less rugulose; anterior transverse carina well developed; area between it and posterior carina strongly sloped toward plane of posterior aspect of propodeum, usually with numerous complete cross-ridges. Abdomen robust; tip in most specimens strongly down curved. Dorsum of first tergum with punctures generally of third-degree density except for a narrow bipunctate apical band.

Second tergum 1.75 as wide as length to crest of anterior carina. Pygidium with punctate part 1.1 times as long as wide; no abrupt depression on anterior margin; punctures coarse, fairly uniform in size and not becoming reticulate; carina rounded and developed on apical two-thirds.

Length, 6 to 8 mm.

Female.—Unknown.

Type.—♂, Guadalajara, Jal., Mex., Sept. 16 (McClendon) (A.N.S.P.).

Paratypes.—♂♂, Guadalajara, Jal., Mex., all collected by McClendon, 14 on Sept. 14, 4 on Sept. 16, and 6 on Sept. 18 (A.N.S.P.).

Previously described species which possess exceptionally elongate tegulae include *smithi* Cam. from Guerrero, Mex., *fuscipennis* Cam. and *iridipennis* Cam. from Nicaragua. It would be impossible from data now available to determine whether *scutulata* is the male of either of the first two named above which were described from the female. It differs from *iridipennis* in having the bristles in the terminal rows of the abdominal terga thicker and closer to each other and in the character of the sculpturing of the anterior process of the side of the pronotum.

Paratiphia cincta new species

Male.—Unspecialized hairs fine, short, erect, conspicuously dense on front, dorsum of pronotum, mesepisternum, medially on first tergum, and the sides of the posterior abdominal terga; principally white. Bristles on apices of abdominal terga form continuous bands on terga 2, 3, and 4 which are conspicuously parted in middle; bristles are short, fine, uniform in length, and not much longer medially than at side; separated generally by less than their average basal thickness.

Front with impunctate spot in front of lower ocellus several times as long and at least twice as wide as diameter of an ocellus; without polished impunctate ridge bordering inner eye orbit. Clypeus with its opaque white spot slightly over twice as wide as long; least diameter between eyes 1.7 times as great as clypeal

length (three measured were 1.8, 1.7, and 1.6). Mandible broadly opaque white.

Dorsum of pronotum with transverse carina not extended medially in posteriorly directed arc, bordered by a shallow fossa having no cross ridges; puncturation unusually fine and shallow; without traces of callosities at the sides. Side of pronotum nearly flat, the punctures and rugulae unusually fine; anterior projection almost absent, bordered by a narrow, shallow groove which is a lateral prolongation of the dorsal transverse groove. Tegula slightly longer than wide. Wings with their membrane hyaline; forewing with hairs on membrane dark but short, sparse, relatively inconspicuous, those in first and second discoidal cells colorless; radial cell 2.8 times as long as greatest width (two measured were 2.6 and 3.1.).

Dorsum of propodeum lateral to areola only weakly sculptured; anterior transverse carina complete, not high nor strongly angulate; area between two transverse carinae steeply sloped toward plane of posterior aspect of propodeum. First sternum with carina at apex of escutcheon subobsolete; disc moderately corticiform.

Length, 8.5 to 10 mm.

Female.—Unknown.

Type.—♂, 20 mi. north of Mesquital, Lower Calif., Mex., Sept. 27, 1941 (Ross and Bohart) (C.A.S.).

Paratypes.—17 ♂♂ of the same series as the type (C.A.S.); 2 ♂♂ Las Pas, Baja Calif., Mex., June 3, 1921 (Van Duzee (C.A.S.); 1 ♂ Las Pas, Baja Calif., Mex., June 4, 1921 (Van Duzee) (C.A.S.).

P. cincta has in the male, the same kind of narrow belts of closely arrayed bristles on the abdominal terga as *claripennis* Cam. and *neomexicana* Cam., but it is more conspicuously pilose and the puncturation of the lateral dorsum of the pronotum is much finer and more shallow.

A New Species of the Genus Sisyphus Latreille (Coleoptera: Scarabaeidae) [1]

Carl Farr Moxey, Wayne, Pennsylvania

This brief paper is offered to make known a new species of beetle of the genus *Sisyphus* Latreille. The description is as follows:

Sisyphus aages Moxey, species novum

Mahogany and feebly shining, with an inconspicuous clothing of erect reddish setae, fairly close upon the pronotum, but leaving a small bare patch upon either side of the anterior part.

Longitudinally elliptical, highly convex, with very long, slender posterior legs. Head strongly punctured; clypeus semicircularly emarginate in front and produced into two blunt teeth on either side of the excision; suture between the clypeus and ocular lobes faintly raised. Pronotum strongly and remotely punctured (that is, the punctures are separated by more than their breadth), each puncture bearing a single seta posteriorly; median groove distinct in basal third; anterior angles acute; lateral margins serrate in anterior third, clothed with setae along entire length. Length of the elytra subequal to their conjoint width; form much as in *Sisyphus neglectus* Gory, strongly narrowed behind, with the elytral intervals flat. Pygidium flat, with very irregular, shallow, setae-bearing punctures. Fore tibiae armed with three strong teeth, occupying rather less than half the outer edge, finely serrate basally. Middle and hind femora shaped much as in *Sisyphus longipes* (Olivier), but slightly more swollen. Metasternum divided from the mesosternum by a faintly curved line, finely, but sparsely, punctured and with a large, round depression behind.

Length, 5.4 mm; breadth, 3.3 mm.

[1] This study has been made possible by a 1962 summer grant from the Jessup Fund Committee at the Academy of Natural Sciences of Philadelphia. I am especially grateful to Dr. Ruth Patrick of the committee, and to Mr. James A. G. Rehn of the Department of Insects at the Academy.

Type: Kurseong, West Bengal, INDIA; Frank R. Mason collection (collection of the Academy of Natural Sciences of Philadelphia, Type number 8345).

Remarks: The unique type of this species appears to be intermediate between *Sisyphus longipes* (Olivier) and *S. neglectus* Gory; the head, vestiture and sculpture of the pronotum, pygidium, and four posterior legs are much as in *S. longipes,* but the shape of the pronotum, form of the elytra, and characters of the fore legs are similar to *neglectus. Sisyphus aages* agrees in many particulars with the description of *S. araneolus* Arrow, but differs primarily in not having the middle femora and tibiae toothed. From *S. dentricus* Fairmaire, this new species differs in coloration and character of the setae, in addition to size.

The name of this species is derived from the Greek ἀαγής, which means strong.

Notes About the Types of Some Species of Butterflies Described by William Henry Edwards

F. MARTIN BROWN, Fountain Valley School,
Colorado Springs, Colo.

In connection with my study of the writings of William Henry Edwards, the Director of the Carnegie Museum, Pittsburgh, Pennsylvania, kindly granted me the privilege of reading and microfilming the letters from Edwards in the files of that institution. The bulk of this correspondence concerns the transfer of Edwards' collection to the Rev. Dr. William Jacob Holland, and progress with the illustration of volume 3 of "Butterflies of North America." Scattered through the letters are many items of interest to current students of butterflies from North America. Of prime interest is the disposition of some of Edwards' types.

It is doubtful that Edwards labelled any particular butterfly as the "type" of a name, in the current meaning of the term, until the late 1880's or early 1890's. Certainly his early use

of "type" is equivalent to the current use of "typical." At the time he transferred that part of his collection sold to Holland to help defray the cost of publishing volume 3 of *Butterflies of North America,* none of Edwards' types were marked. The beginning of the transfer occurred in January, 1886. In a letter addressed to Holland and dated 5 May 1886 is this statement in reply to a request from Holland: "I enclose the word 'type' written about 100 times to cut off and affix to the pins. If more are desired, advise me." With this letter are six slips of paper bearing the word "type" written altogether 110 times. Apparently Holland used none of them. It is interesting to note that on one slip seven of the inscriptions include a tiny subscript "E" after the word "type."

During Edwards' career, material that he shipped was lost or destroyed three times. This is mentioned by Edwards in a note dated 11 December 1885. The first loss involved (among others?) the types of *Lycaena amica* and *Lycaena pembina,* "Both lost according to my recoll^{n} in a box sent to Dr. Behr, for inspection, 18 or 20 years ago. I have not seen either species since."

The second loss is noted: "Hesp. Yuma, 1 ♂, Lost by fire which destroyed the Express car, about 1873 or 74, and burned a large lot of Arizona things I had just rcd. These were in transit to Scudder. Have never seen the species since." The Arizona material was part of that which Edwards had received from the Wheeler Survey Expedition of 1871 (see Brown: 1958, *J. New York Ent. Soc.* 65: 219–234 "1957").

The third catastrophe was the sinking of the "Pomerania" in 1878. Of this Edwards wrote to Holland: "A third time I was unfortunate in shipping insects. One lot of Hesperians sent Dr. Speyer was in the German ship which in a collision was sunk in Br. Channel 8 or 9 years ago." The note in *Lepidopterists' News,* 1: 83, quoting Dr. H. A. Hagen at the meeting of the Cambridge Entomological Society, 13 December 1878, that "the types of 70 rare species of Hesperia" were lost, cannot be true. Through 1878 Edwards had described only 52 species of Skippers. Hagen probably used the word "type" in a loose manner, meaning "typical." Since there are apparent

types of some of Edwards' Skippers described before 1878 the problem before us is to discover just what he sent to Speyer. I am in the process of unravelling that mystery.

There is a frequently met misconception that all of Edwards' types were sold to Dr. Holland and therefore are in the collections at the Carnegie Museum. From Edwards' letters I have gleaned a few notes about material that is not at the Carnegie. The species Edwards described from the collections of Newman and of Ridings remained in the collections of those gentlemen. Since the specimens were not marked "types," in all probability they passed unrecognized to new owners. It is possible that these are in the collections of the Academy of Natural Sciences in Philadelphia, Pennsylvania. Material collected on various government expeditions (Wheeler, Hayden, Dept. of Agriculture, etc.) were turned over to Edwards for safe-keeping. These were to be returned by Edwards to the Smithsonian Institution when that governmental agency established an entomological department. Types from those collections should be in the United States National Museum. Some of the material Edwards received from Kennicott was only loaned to Edwards. This was returned to Kennicott and was destroyed in the great Chicago Fire. I have yet to unravel from Kennicott's and Edwards' letters just what was returned. Material from Reakirt's collection was returned to him and later passed to Strecker. The Strecker collection in the Chicago Museum of Natural History should contain them.

Certain specific types are mentioned in the note of 11 December 1885, referred to above. Three species, *Melitaea sterope, Chrysophanus hermes* and *Lycaena ardea* were described from material loaned by Henry Edwards and should be in the collections of the American Museum of Natural History in New York City. In this note Edwards stated, "Thecla ontario, 1 ♀ taken by E. B. Reed & ret[d] to him." The type of *Lycaena kodiak* was returned to Dr. Behr and presumably it was destroyed in the San Francisco earthquake and fire. The types of *Chrysophanus florus* and *Lycaena afra* were returned to Geddes. I suspect that they may be found in the Canadian National Collection.

In a letter dated 27 January 1886 Edwards stated that of the four specimens of *Megathymus neumoegeni* he had had before him for description he retained one (later sent to Holland) and returned the others to Neumoegen. Four other species of skipper described from single specimens in Neumoegen's collection were returned to him. These are *Pamphila arabus, Pamphila bellus, Pamphila lasus* and *Nominiades tatius.* The Neumoegen collection first went to the Brooklyn Museum and then was transferred to the United States National Museum.

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.

Memoirs of the American Entomological Institute is a new serial, to include book-length monographs on insects. Each memoir is a separate, cloth-bound book and sold at a price approximating three cents per page. Publication is by lithoprinting. The numbers published and in preparation are as follows:

1. A catalogue and reclassification of the Indo-Australian Ichneumonidae. By Henry Townes, Marjorie Townes, and Virendra Gupta. 1961. 522 pages. Price: $14.50.
2. Ichneumon-flies of America north of Mexico: 4. Subfamily Gelinae, tribe Hemigasterini. By Henry Townes and Virendra Gupta. 1962. 305 pages, 162 maps, 116 figures. Price: $9.50.
3. A catalogue and reclassification of the Neotropic Ichneumonidae. By Henry and Marjorie Townes. In preparation. About 400 pages.
4. Ichneumon-flies of America north of Mexico: 5. Subfamily Diplazoninae. By Clement Dasch. In preparation. About 350 pages, with maps and figures.
5. A catalogue and reclassification of the eastern Palearctic Ichneumonidae. By Henry Townes, Setsuya Momoi, and Marjorie Townes. In preparation. About 350 pages.

6. The genera of Ichneumonidae. Part 1: [Introduction and the cocoon-spinning subfamilies, including about 60% of the family]. By Henry Townes. In preparation. About 600 pages and 600 figures.
7. Ichneumon-flies of America north of Mexico: 6. Subfamily Banchinae. By Henry and Marjorie Townes. In preparation. About 800 pages, 350 maps, and 250 figures.

Prices are postpaid and subscribers to the series receive a 10% discount. The size of the editions is governed by the number of subscriptions, plus some for individual purchases. Orders or correspondence should be addressed to The American Entomological Institute, 5950 Warren Road, Ann Arbor, Michigan.

"Biomathematics Training" at North Carolina State College. In 1961 a training program in Biomathematics was initiated in the Institute of Statistics at North Carolina State College. This program, made possible with the aid of a grant from the National Institutes of Health, offers training at both the doctoral and post-doctoral levels. It is the purpose of the Biomathematics program to promote competence in the applications of mathematics to biology and in the development of biological theory by integrated study of biology, mathematics, statistics and the physical sciences.

The program is under the direction of Dr. H. L. Lucas. Recent staff additions are Dr. R. W. Stacy, formerly Professor of Biophysics and Physiology, Ohio State University; Dr. H. R. van der Vaart, formerly Head of the Institute for Theoretical Biology, Leiden, Netherlands; and Dr. J. H. Meade, Jr., formerly Post-doctoral Fellow in Biomathematics. The program is quite flexible and the degree, Doctor of Philosophy, can be granted in any one of several areas. Graduate assistantships and post-doctoral fellowships are available within the program, but persons anticipating support from outside sources are also invited to apply. Information concerning assistantships, post-doctoral fellowships and other aspects of the program may be obtained by writing to: Dr. James H. Meade, Jr., Institute of Statistics, P. O. Box 5457, Raleigh, North Carolina.

Entomologist's Market Place

ADVERTISEMENTS AND EXCHANGES

Advertisements of goods or services for sale are accepted at $1.00 per line, payable in advance to the editor.

Notices of wants and exchanges not exceeding three lines are free to subscribers.

All insertions are continued from month to month, the new ones are added at the end of the column, and, when necessary, the older ones at the top are discontinued.

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

Cockroaches (Blattoidea) of Japan, Okinawa, Formosa (Taiwan), and the Philippines are being studied in cooperation with Dr. K. Princis. Loans of specimens from that area are desired. A. B. Gurney, U. S. National Museum, Washington 25, D. C.

Orthoptera. Gryllinae (except domestic sp.) and **Pyrgomorphinae** of the world wanted in any quantity for work in morphology, taxonomy, cytology, and experimental biology; dry, or in fluid, or living. Write D. K. Kevan and R. S. Bigelow, Dept. of Entomology, McGill University, Macdonald College, Quebec, Canada.

Beetles of the world wanted, all species in exchange for American beetles, moths and butterflies. James K. Lawton (age 18), 7118 Grand Parkway, Wauwatosa 13, Wisconsin.

Acanthomyops (Citronella ants) wanted for revisionary study. Will sort from yellow *Lasius*. M. W. Wing, State University College, Cortland, N. Y.

Cicindelidae of the World wanted in exchange for North American Coleoptera or in purchase. Carl Farr Moxey, 414 Woodland Ave., Wayne, Pennsylvania.

"New York Weevil" Larvae (*Ithycerus noveboracensis*) **urgently required.** Anyone having larvae, or knowing where they may be obtained, please inform Elwood C. Zimmerman, R.F.D. 2, Peterboro, New Hampshire.

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(* Indicates new genera, names, etc.)

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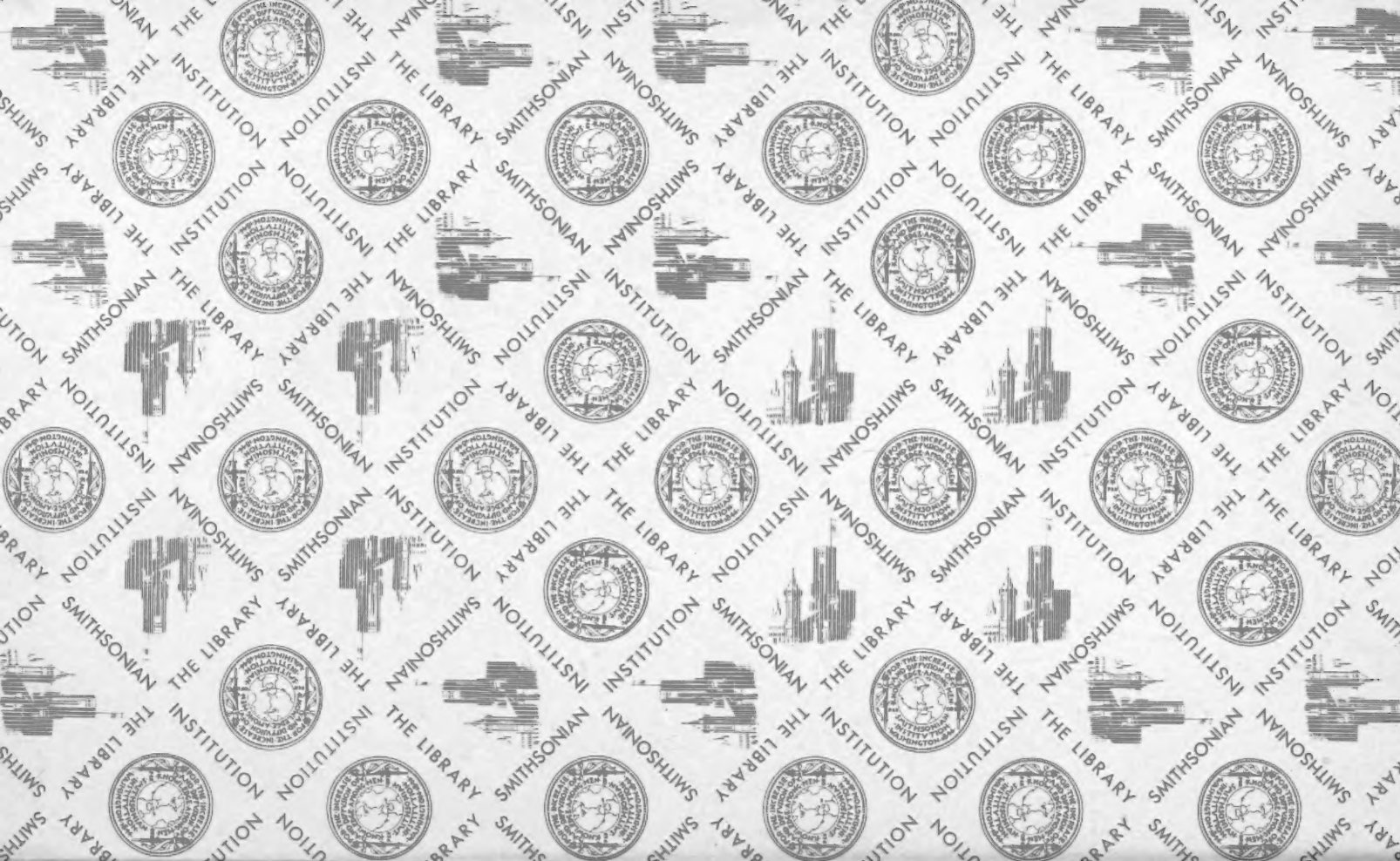
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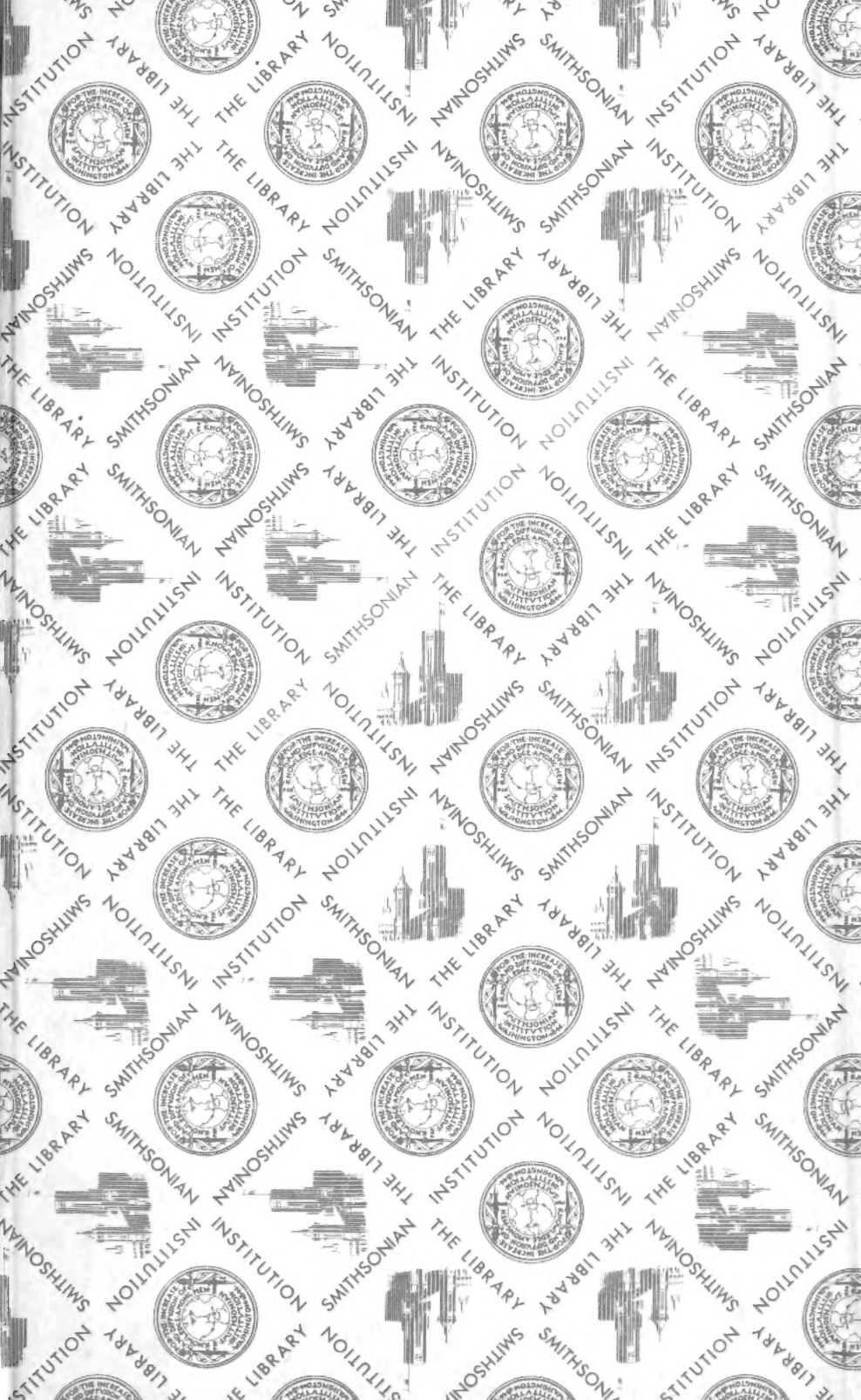
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