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ENTOMOLOGICAL NEWS

JANUARY 1949

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Xiphocentronidae, a New Family of Trichoptera

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

In collections made by Mr. Harry Hoogstraal during his 1940 expedition to Mexico are a few specimens of a most unusual small black caddisfly. This species combines characters which were formerly considered distinctive for three families, the Rhyacophilidae, Philopotamidae, and Psychomyiidae—such a mixture of characters that at first I was unable to place the species at all. Finally it was tracked to Brauer's long lost genus *Xiphocentron* and it now appears necessary to erect a new family for its reception. During the course of preparation of this paper, a second species of the genus from southern China was sent to me by Dr. E. S. Ross.

Xiphocentronidae new family

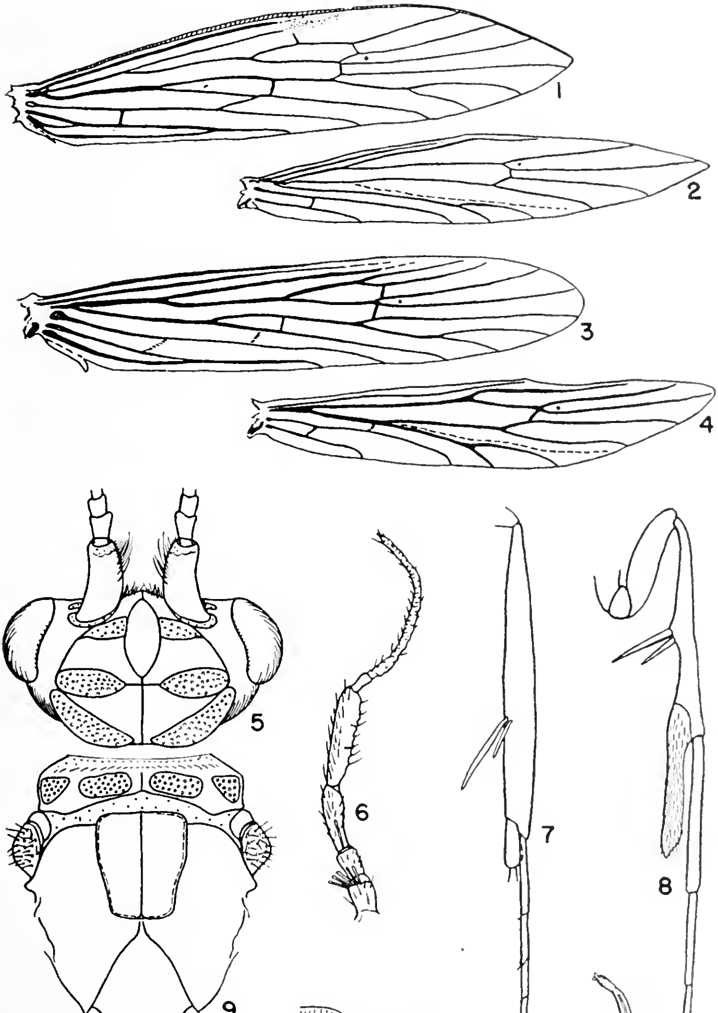
Characteristics.—Size moderate, body fairly slender. Antennae reaching to about end of abdomen. Maxillary palps of both sexes 5-segmented, fig. 6, the two basal segments short, the third subequal to the first two together, the fourth one and a half times the third, the fifth long, whiplike and multi-segmented, as long as the third and fourth combined. Labial palps with two basal segments short, third longer and multi-segmented. Dorsum of head with no ocelli, but with three pairs of prominent warts and sutures as shown in fig. 5. Mesopraescutum well delineated with sutures, elongate, the sides converging posteriad and the posterior margin truncate, fig. 9. Legs elongate, spurs 2-4-3 in the male, 2-4-4 in the female. Wings narrow, the venation reduced, figs. 1-4. Female abdomen ending in an extensile narrow ovipositor, fig. 10. Male genitalia highly developed and complicated, figs. 11, 12.

Familiotype.—*Xiphocentron* Brauer.

The affinities of this family are complicated. The well-developed mesopraescutum and female ovipositor indicate a strong affinity with the Rhyacophilidae; the head sutures and multi-segmented terminal segment of the palps would indicate close relationship with the Philopotamidae; and the lack of ocelli and various characters of the male genitalia, especially the reduced ninth tergite, distinct cerci, and 1-segmented claspers, indicate an alliance with the Psychomyiidae. Looking at these data from the opposite viewpoint we find that the Xiphocentronidae differ from the Rhyacophilidae in having multi-segmented terminal segments of the palps and in lacking ocelli; from the Philopotamidae in lacking ocelli and in having a distinct mesopraescutal sclerite and a female ovipositor; and from the Psychomyiidae in having prominent head sutures, mesopraescutum, and a female ovipositor. The Xiphocentronidae may well be close to the ancestral stock of the Psychomyiidae. If so, this branch must have arisen from the philopotamid stem before the praescutum was lost, and after the division of the two lines the Xiphocentronidae lost their ocelli but preserved the praescutum while the Philopotamidae preserved their ocelli but lost the praescutum. The larvae of the Xiphocentronidae have not yet been found, but will doubtless throw additional light on the relationships of this group.

This new family may be oriented with other families having the multi-segmented terminal segment of the palps by this table:

1. Ocelli present .... **Philopotamidae, Stenopsychidae**
   Ocelli absent 2
2. Mesopraescutum set off by distinct sutures, fig. 9 **Xiphocentronidae**
   Mesopraescutum fused with scutum, its sutures completely obliterated; in Psychomyiidae a small pair of scutal warts present, one on each side of meson just anterior to scutellum .... **Psychomyiidae, Hydropsychidae**



Parts of *Xiphocentron*

X. hawangi: 1, front wing; 2, hind wing.
X. mexico: 3, front wing; 4, hind wing; 5, head, dorsal aspect; 6, maxillary palpus; 7, male hind tibia and tarsi; 9, thorax, dorsal aspect; 10, apex of abdomen, lateral aspect.
X. bilimekii: 8, male hind leg (after Brauer).

Xiphocentron Brauer

Xiphocentron Brauer (1870, Verh. Zool. Bot. Gesell. Wien 20: 66; 1871, *ibid.* 21: 103, pl. 2); Ulmer (1907, Gen. Insect. 60: 176, figs. 217*a*, *b*). Genotype, monobasic.—*Xiphocentron bilimekii* Brauer.

Of the three species considered as belonging to this genus, I have seen specimens of only the two new ones. To my knowledge, the genotype is known only by Brauer's illustrations. These show characters of venation, tibial spurs, and shape of male genitalia so in agreement with these structures in the other two species that there seems no doubt of the relationship and association.

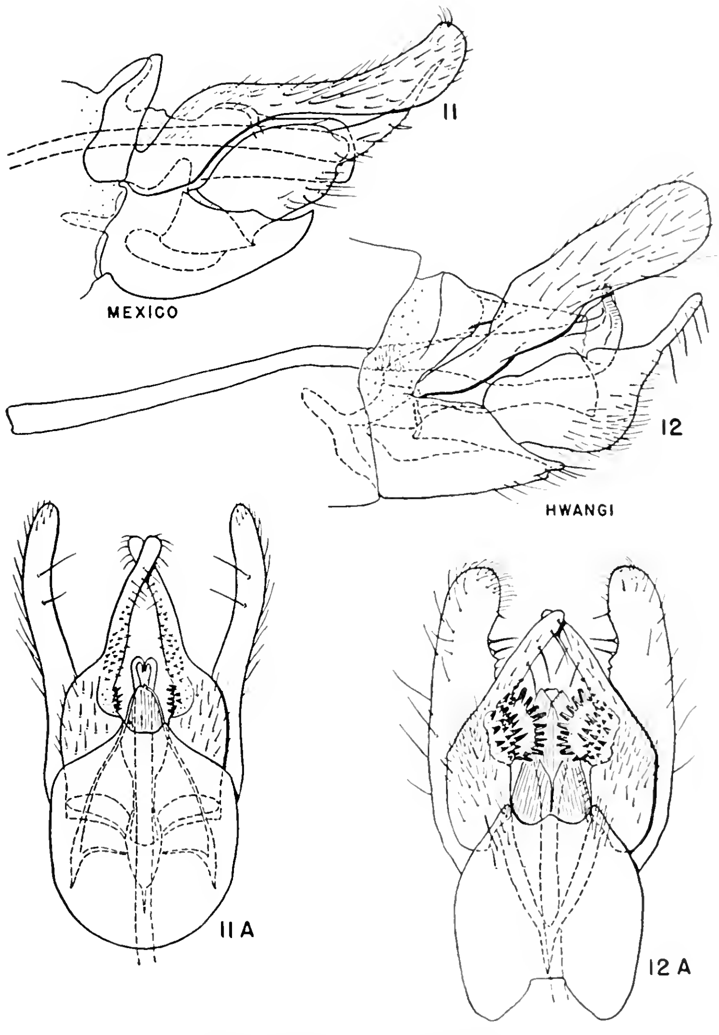
It is interesting that the members of this small, primitive family are widely separated geographically, two from Mexico and one from China. This could indicate a separation of considerable geologic time. As a matter of fact, the Chinese species shows considerable difference from the Mexican in wing venation and male tibial spurs, and the two groups may ultimately be considered as generically distinct. The two show such close affinity in genitalia, however, that I prefer to follow a broader generic concept until more information about the fauna indicates the desirability of a change in status.

Key to species—males

1. Apical spur of hind tibia at least half as long as tibia, fig. 8. Known from Mexico........................**bilimekii**
   Apical spur of hind tibia less than a fourth as long as tibia, fig. 7...2
2. Clasper with a large oval ring of black spines on meson at point of narrowing, the mesal spines flat and truncate and forming a fairly regular comb, fig. 12*A*. Known from China.....................................**hwangi**
   Claspers with only an irregular patch of much shorter spines on meson at point of narrowing, fig. 11*A*. Known from Mexico ....**mexico**

Xiphocentron mexico new species

Male. Length from tip of head to tip of folded wings, 6.5 mm. Color dark brown, lighter along the sutures and on the venter, the wings with light brown membrane and brown pubescence.



Male Genitalia of *Xiphocentron*
X. mexico: 11, lateral aspect; 11A, ventral aspect.
X. hwangi: 12, lateral aspect; 12A, ventral aspect.

General characteristics as described above under family or genus. Hind tibia with apical spur wide and flat, bearing two spines at apex, and only about one-seventh as long as tibia, fig. 7. Wing venation illustrated in figs. 3, 4.

Genitalia as in fig. 11. Ninth tergite forming a high, short, and somewhat hood-like sclerite, ninth sternite long, forming a round sclerite beneath the claspers, narrowed and excavated at apex. Tenth tergite represented by a series of membranous folds above the aedeagus. Cercus long and sinuate, up- and in-curved at apex, only sparsely haired. Clasper 1-segmented, the base large and robust, the apex elongate and ribbon-like; the mesal margin, fig. 11*A*, bears a cluster of short, sharp teeth at base of narrowed portion, the latter bearing a series of scattered, shorter ventro-mesal teeth to slightly beyond the middle. Aedeagus tubular and elongate, extending into the seventh or sixth segment, the apex little modified. Internally there is a series of sclerotized braces connecting cerci, claspers, and aedeagus guides.

Female. Similar in size, color, and general structure to male, differing chiefly in spur count, which is 2–4–4, spurs of front tibia short, hind tibia with outer apical spur twice as long as inner spur. Apex of abdomen simple, fig. 10, the terminal segments forming a slender, extensile tube.

Holotype, male.—Villa Santiago, Nueva Leon, MEXICO, elev. 2,500 ft., June 22, 1940, H. Hoogstraal. *Allotype*, female.—Same data. In the collection of the Illinois Natural History Survey.

Xiphocentron hwangi new species

Male. Length 7.0 mm. Color dark brown, slightly lighter on the venter, the wings covered with dense, matlike, and very dark hair. General structure as for genus. Hind tibia with apical spur elongate and slender, a fifth as long as tibia. Wings, figs. 1, 2, sharply pointed, the front wings with costa greatly thickened, both wings with the venation differing in several details from that of *mexico* as shown in figs. 1–4. Genitalia, fig. 12, with ninth tergite short, produced on each side into an ovate lobe; ninth sternite much larger, the apex incised to form a mesal and a pair of lateral processes, fig. 12*A*. Tenth tergite membranous. Cercus elongate, the base narrow, the apical portion wide, thin, and rounded at apex, sparsely haired. Clasper with broad base, apical portion forming a flattened, finger-like, slender process bearing a ventral row of long, down-pointed setae; the mesal margin at base of "finger" bears an oval membranous area on which is situated an irregular circle of stout, black spines, the lateral ones pointed, the mesal ones truncate and forming a peglike comb. Aedeagus with basal portion very long and slender, this joining a crinkly neck area, the apical portion beyond this enlarging and ending in an up-turned sclerotized portion. Internal connecting rods complex.

Female. Size 6.5 mm. Similar in color and general structure to male. Hind tibia with two apical spurs, the outer one twice length of inner. Apex of abdomen tubular, as in *mexico*.

Holotype, male.—Tung-lu, CHINA, April, 1926, Mrs. Dora E. Wright. In the collection of the California Academy of Science. *Allotype*, female, and 18 ♂ and 2 ♀ *paratypes*.—Same data, deposited in the collections of the California Academy of Science and the Illinois Natural History Survey.

The Present Status of the Distribution of Vespa crabro var. germana Christ in North America [1]

By Prof. M. W. WING, Department of Zoology and Entomology, North Carolina State College, Raleigh, North Carolina

Vespa crabro var. *germana* Christ, the common hornet of Europe, was introduced into North America in the middle of the nineteenth century. H. de Saussure (Ent. News 9: 145, 1898) reported that it was captured in 1854 in the eastern United States. J. Bequaert (Ent. Amer., N.S., 12 (2): 86, 1931) reported that J. Angus, in 1871, stated that this hornet had been common in the vicinity of West Farms, New York, for the past 25 years. It seems probable that southeastern New York State is the focal point from which this powerful wasp has

[1] I wish here to express my thanks to Dr. J. C. Bequaert for his kindness in sending me several records and for critically reading the manuscript and suggesting several improvements.

spread out over a number of the eastern states. In 1931 (J. Bequaert, 1931, *loc. cit.*) this hornet was well established in Long Island, Staten Island, southern New York State, northern New Jersey, and southwestern Connecticut. In addition to this area where the wasp was known to be naturalized, specimens had been taken near Philadelphia, in Maryland, and in Delaware. Dr. Bequaert in this paper also called attention to and discussed several published records, which he considered to be open to question. These records are from the following localities: Illinois, North and South Carolina, and New Orleans.

In 1935, J. Bequaert (Bull. Brooklyn Ent. Soc. 30 (3): 120) reported the spread of this species to southeastern Pennsylvania. In addition to this new area of establishment, a ♂ taken at Norfolk, Virginia, was reported.

In 1941, J. Bequaert (Bull. Brooklyn Ent. Soc. 36 (3): 111) reported the spread of this species to most of New York State, eastern Pennsylvania, Delaware, Maryland and the eastern part of West Virginia. Over and above these additions to the area of establishment, trustworthy records of this wasp from Quebec and North Dakota were given. There was, however, no reason to believe that the last two records indicated anything more than accidental importations.

This species was taken in North Carolina in 1940 (C. S. Brimley, "Supplement to Insects of North Carolina," 1942). Since that time five additional captures have been made in the state. These additional records, based on specimens which I have examined, are: Guilford Co., Sept. 22, 1944, J. A. Harris, 1 ♂ and 3 ♀♀. Greensboro (Guilford Co.), Early Oct., 1946, D. J. Brame, 1 ♀ and a portion of the nest. Reidsville (Rockingham Co.), Sept. 4, 1947, J. E. Foil, 1 ♀. Carthage (Moore Co.), Sept 11, 1947, E. H. Garrison, 1 ♀. Mocksville (Davie Co.), Sept. 15, 1947, J. P. Bowles, 2 ♀♀. The note accompanying these specimens reads "working in hollow tree—busy as a colony of bees."

In considering the 1940 North Carolina Record, a single ♂ taken near the railroad tracks on the State College campus, there appeared to be no reason to believe that this species had become established in the state, for this individual might well have been brought into this area in a box car from a considerable distance. But when the other five records, two of which are definitely correlated with a nest, are considered, it seems evident that this powerful wasp is now in the process of becoming established in the central portions of this state.

In the light of the North Carolina records, and on the assumption that the presence of this species here was the result of a gradual extension of its range southward, I inferred that this wasp was undoubtedly well established in Virginia. I then wrote Dr. Bequaert requesting any additional records of this species which he might have. He very kindly supplied me with the following records: Fredericksburg, Va.: Dr. Karl V. Krombein found this species nesting here in a hollow locust tree. Limeton, Va.: Dr. Bequaert pointed out the paper of Dr. A. H. Clark (Proc. Biol. Soc. Wash. 52: 179, 1939) which I had overlooked; it reported *V. crabro* from the above-mentioned locality. Summit Co., Ohio: 1 ♂ taken in June 1934 by L. J. Lipovsky.

Dr. Bequaert stated in his letter of July 12, 1948, that Virginia and probably Ohio could now be considered a part of the settled range. He further stated that Quebec, North Dakota, Illinois, South Carolina and New Orleans were still considered by him as doubtful or accidental records.

The present established range of *Vespa crabro* covers the following states (all of the state or a part of it): New York, New Jersey, Connecticut, Pennsylvania, Delaware, Maryland, West Virginia, Virginia, Ohio and North Carolina.

In my opinion, it would seem highly probable that the wasp may be found also in eastern Kentucky, western Massachusetts, and southwestern Vermont. In addition to these probable areas of occurrence, it might extend in the not-distant future to northern South Carolina, eastern Tennessee, southwestern New Hampshire and possibly Rhode Island.

The European hornet typically builds large nests in hollow trees, although other sheltered situations are often utilized, for example, under porches and, in fact, under overhanging roofs of all types. Exceptionally underground cavities are utilized as a nesting site. In Europe attics and barns are favorite nesting locations. The degree of completeness of the envelope enclosing the nest varies with the situation. In the more exposed aërial nests, this outer nest covering is usually complete; in cavities, nests either completely or partially lack this outer covering envelope. The paper of which the nest is made is very coarse and brittle; its color is a brownish gray. The longer diagonals of the hexagonal brood cells of a nest in my possession measure about 1 cm. Most of these cells have plugs of dark chocolate brown material in their upper, closed ends. These characteristics make it possible to identify accurately the species in this country from the nest alone.

It is hoped that entomologists in the areas outlying the present distribution of this powerful wasp will be on the watch for it, as only collecting on these constantly moving boundaries will give us an accurate timing of the spread of this hornet.

The prediction of J. Bequaert (1941, *loc. cit.*) that "no doubt this powerful insect will eventually spread over most of eastern North America" will in all probability be fulfilled, since the range of this species is being constantly extended.

The Function of the Spur on the Femur of the Palpus of the Male, Leiobunum calcar (Wood) (Arachnida: Phalangida)

By Sherman C. Bishop, Department of Biology, University of Rochester, Rochester, N. Y.

During July and August 1948, I was fortunate in being able to study at the Edmund Niles Huyck Preserve at Rensselaerville, New York, and, taking advantage of an abundance of materials, spent most of the time in observing and collecting phalangids.

Leiobunum calcar (Wood) is a common and widely distributed species, the males of which are easily recognized because of the presence, on the femur of the palpus, of a large, ventrolateral spur. The male palpus is much stouter than that of the female, especially the femur, patella and tibia. The patella is short, strongly arched above and curved ventrally, the tibia is produced ventrally at the base and curved ventrally on the distal half. The swollen base is armed with short, dark denticles. Because of the shortness of the patella, the spur on the femur may be apposed to the swollen base of the tibia to form an efficient grasping organ.

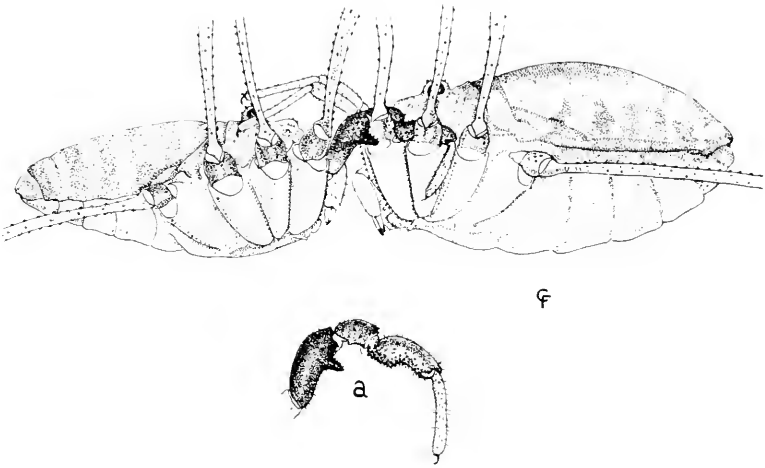


Fig. 1. *Leiobunum calcar*, male (left) and female in mating position. a. Right palpus of male.

Pairs of *L. calcar* may often be seen to mate in the field and when confined continue the practice at frequent intervals. Under the binocular microscope the function of the spur is at once evident. When the male encounters a receptive female, he rushes at her without preliminary courtship and grasps her firmly. The trochanters of the first legs of the female are held between the spurs of the femora and the swollen bases of the tibiae of the male, the curved ventral sides of the patellae of the male fitting the mesal sides of the trochanters of the female. The curved, disto-ventral surfaces of the tibiae of the male fit the mesal sides of the trochanters of the second legs of the female and the tarsi of the male are pressed against the coxae of the second legs of the female.

The drawings were made by Carolyn Fallon.

On Some Centipeds from Northern Alaska

By Ralph V. Chamberlin

The centipeds reported upon in this paper were taken by Dr. Neal A. Weber in August of 1948. One species, Oabius sp., was taken at Whitehorse, Yukon Territory, Canada, and three others from Northern Alaska on the north front of the Brooks range, which, as Dr. Weber notes, "must be a formidable barrier to life coming from the south." The latitude 68°20′ is near the most northerly limit known for chilopods.

Previously reported from localities near or north of the Arctic Circle were the following from the vicinity of the Yenesei River in Siberia, recorded by Stuxberg in 1876.[1]

Lithobius nordenskiöldi Stuxberg (71°40′)
Lithobius vagabundus Stuxberg (66°17′)
Sonibius ostiacorum (Stuxberg) (69°15′)
Nampabius sulcipes (Stuxberg) (66°17′)

From farther east in Siberia at Pitlekay (67°4′ 49″ N. and 173°23′ 2″ W.) on the north shore of the Chukutski peninsula, collectors on the Vega expedition of 1878–79 secured the following two forms.[2]

Monotarsobius crassipes holstii Pocock
Monotarsobius tricalcaratus Attems

Taken at Nanamo, which is also on the Chukutski Peninsula, was:

Arctogeophilus glacialis Attems

Family LITHOBIIDAE

Genus **ESCIMOBIUS** new

Allied to Oabius in having the median and anterior legs with tarsus uniarticulate. It is set apart from Oabius principally in

[1] Stuxberg, Anton. On the Myriopoda from Siberia and Waigatsch Island collected during the Expedition of Prof. Nordenskiold, 1875. Ann. & Mag. of Nat. History, April, 1876.

[2] Attems, Carl Grof Attems. Die Myriopoden der Vega Expedition. Arkiv för Zoologi, 1909, vol. 5, no. 3.

having a definite dorsal keel at the distal end of the fifth joint of the penult legs, with the succeeding two joints abruptly and considerably thinner. Fifth article of penult legs lacking a dorsal spine in the male. Articles of antennae 20. Prosternal teeth 2 + 2. Ocelli few, typically in 2 series.

Generotype: *Escimobius cryophilus* new species.

Escimobius cryophilus new species

Color of dorsum orange or light chestnut, lighter along mid-dorsal area. Antennae orange and legs yellow.

Antennae short, the articles between the second and ultimate especially short; ultimate article longer than the two preceding taken together.

Ocelli 6 in number, in two series; thus 1 + 2,3. The single ocellus largest, pale, while the others are black.

Prosternal teeth 2 + 2.

Ventral spines of first and second legs 0,0,0,1. Ventral spines of penult legs 0,1,3,3,1; dorsal spines 1,0,2,1,0; claws lost from type. Ventral spines of anal legs 0,1,3,2, (?), the joints beyond fourth lost from type; dorsal spines 1,0,2,0,0.

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

In the male the fifth joint of the penult legs bears at distal end on mesodorsal line a low keel which runs out toward middle of joint.

A mutilated female, agreeing in general characters, so far as evident, with the male holotype, has the claw of the genital forceps short, relatively broad and entire; its basal spines 2 + 2, acutely conical from base to apex.

Length, about 6 mm.

Locality: ALASKA 68 20′ N. lat. and 151 30′ W. long. One male taken by Neal A. Weber, August 20, 1948.

Arebius integrior new species

Dorsum brown with a darker, blackish pigment distributed irregularly in a discontinuous median band and along caudal and lateral borders, especially of the more posterior plates. Antennae irregularly infuscate. Legs dilute yellow, those of posterior region in particular irregularly infuscate, the tarsi a brighter yellow.

Antennae short, articles 20.

Ocelli in two series, typically 3,4, the single ocellus the most caudal of the upper series but not distinctly set off.

Prosternal teeth 2 + 2.

Tarsi of all legs distinctly biarticulate. Ventral spines of first and second legs 0,0,0,0,1; dorsal 0,0,0,1,1. Ventral spines of penult legs 0,1,3,2,(1),1; dorsal 0,0,2,1,0. Ventral spines of anal legs 1,0,2,0,0. Claws of anal and penult legs lost. None of coxae laterally armed. Coxal pores small, 3,4,5,5.

Claw of genital forceps of the female entire, acute; basal spines 2 + 2, these relatively short and thick, the outer one of each pair stouter than the inner one, only a short apical part obtusely acuminate.

Length of female holotype, 9.5 mm.

Locality: ALASKA: 68°20′ N., 151°30′ W. Female *holotype*, with a female *paratype* and male *allotype* which have lost their posterior legs, taken August 26, 1948 (Nos. 2309 and 2319).

Differing from other speices of the genus in lacking a lateral spine on coxae of posterior legs and in the reduced number of ventral spines on the anal legs,—0,1,2,0,0 as against from 0,1,3, 2,1 to 0,1,3,3,1 in other species having the claw of the female genital forceps entire.

Oabius sp.

One adult female 6.2 mm. long was taken at Whitehorse, Yukon Terr., Canada, on August 18, 1948 (N. A. Weber No. 2280). Since all the posterior legs are lost from the specimen it is thought unwise to attempt to refer it to a species. It was taken "under loosely buried wood in sandy soil, with second growth pine beside the airport."

Family SCHENDYLIDAE

Escaryus paucipes Chamberlin

Escaryus paucipes Chamberlin, 1946, Ann. Ent. Soc. Amer., 39: 179; *3,4.

This species was previously known only from the male holotype which was taken by J. C. Chamberlin in August, 1945, at Haines, Alaska. The female here recorded agrees with the male in having the number of pairs of legs 33 and in all other essential features. The cephalic plate, however, differs somewhat in having the sides beyond the caudal third nearly straight or slightly concave instead of more evenly convex.

Locality: ALASKA: 68°20′N., 151°30′ W. One male taken August 30, 1948, by Neal A. Weber (No. 2317).

Haunts and Habits of the Dragonfly Oplonaeschna armata

By ERNEST R. TINKHAM, Box 123, Indio, California

We present here, with the author's permission, some field observations of an interesting dragonfly from the canyons of southeastern Arizona; also an account of a successful shipment of two of its nymphs for a long distance without water. These are extracts from three letters written by Dr. Tinkham to Dr. James G. Needham of Cornell University, to whom the living nymphs were sent. The first letter was written in reply to inquiries concerning *Oplonaeschna*.

Benson, Arizona, October 16th, 1947.

On June 14th, 1940, I found two larvae (naiads) of *Oplonaeschna armata* clinging to the under side of a water-logged piece of bark. These were the only ones found. The canyon pools are at the upper edge of what I call the Live Oak Zone of the Upper Sonoran. These pools are formed below big rock boulders and are usually lined with fallen leaves. Some pools are several feet deep and are fed with running water.

After finding the naiads I still had to find a way to transport them safely across the hot desert to Tucson. Years previously in the Big Bend Region of Trans-Pecos Texas I had learned that water in jars soon heats up and kills the specimens. By 1940 I had conceived a new idea (which may have been used before): I carried them from the Canyon to my car in a wet hankerchief, and transferred them to a waterbag with cool water. They were still in cool water when I reached Tucson the following night. I put a one or two short twigs about 5–6 inches long in the bag to brace the side walls apart, and some days later my two naiads transformed perfectly to adults. I have used this method to transport frogs and fish on the desert, with equal success.

Tucson, Arizona, July 22nd, 1948.

Two days ago I got off for the Huachucas, fortunately, just on the eve of our rainy season. You will be pleased to learn that I have obtained six or seven naiads of *Oplonaeschna* from the upper end of Ramsay Canyon. I used a Chinese wire rake for raking the leaves out of the small pools. On the whole, Oplonaeschnas were very rare. With the exception of finding one larva under a big flat rock at the mouth of a pool, all were taken in small pools that were almost dried up. In one almost dry pool two naiads were clinging to a rock at the mouth end, not near any water. There was a basinful of water in the deep part of the pool but no *Oplonaeschna* naiads were there; there were many Cordulegasters † there. In another completely dried up pool I found three Oplonaeschnas in a mass of leaves at the mouth of the pool where leaves had collected. I believe that these naiads can remain in such places and undergo desiccation for some time.

The naiads play opossum by curling up. I took two photos of this pose.

I am air-mailing to you a pint cardboard carton with two live naiads in it, placed in damp leaves that I took from the pool. I hope they may reach you alive.*

* The two were very much alive on arrival in Ithaca. When I opened the carton on my desk one fell out, ran over the edge and fell into my wastebasket, where I had to chase it around among scraps of loose paper to get it again. J. G. N.

† *Cordulegaster diadema.*

Indio, California, December 5, 1948.

On July 26, 1948, I took off on my expedition to the Great Basin Desert. On the front of my army carry-all hung a desert water bag containing two living half-grown naiads of *Oplonaeschna armata*. I took these along with me in hopes that one or both might mature and emerge during my study trip. Between July 26 and August 22, I travelled 3,100 miles through the deserts of southeastern Utah, Great Salt Lake Basin northwest of Great Salt Lake, northern Nevada, and back to Tucson; and the naiads were as lively at the end of the ardous journey as at the commencement a month before. During this period they had no food. Unfortunately on September 11–12 I had to make a bus trip to southern California and upon my return discovered that the water bag had dried out from lack of attention and my two *Oplonaeschna* naiads were dead and desiccated. On several other occasions the water was gone in the bag but the naiads survived but this time the bag dried out completely and they perished. However these facts show that they are unusually well adapted to the vicissitudes of life in the wooded canyons of southeastern Arizona. There almost any summer they must hide amongst the clumps of damp leaves in drying out pools awaiting the summer rains that will send water running down again.

New Ant Hosts of the Fungus, Laboulbenia formicarum Thaxter

M. R. Smith (*Proc. Ent. Soc. Wash.*, vol. 48, 1946: 29–31) published a list of 18 different forms of ants known to be hosts of *Laboulbenia formicarum* Thaxter in the United States. I have seen the fungus on two additional forms, namely *Lasius niger* var. *sitkaensis* Pergande (all castes, collected at Logan, Utah by G. F. Knowlton) and *Formica parcipappa* Cole (collected at Nampa, Idaho by the writer).

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Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1948 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Anon.—Obituaries: Benjamin G. Pratt. [34] 41: 840–41. Arthur Gordon Ruggles. *Ibid.:* 841–42. **Aitken, T. H. G.**—Recovery of Anopheline eggs from natural habitats, an aid to rapid survey work. [5] 41: 327–29. **Atkins, E. L., Jr.**—Mimicry between the drone-fly, Eristalis tenax, and the honeybee, Apis mellifera. Its significance in ancient mythology and present-day thought. [5] 41: 387–92. **Arthur, D. R.**—Some aspects of the ecology of the tick, Ixodes ricinus L., in Wales. [19] 39: 321–37. **Cross, H. F.**—Use of powders on clothing for protection against chiggers. [37] 41: 731–34. **Eichler, W.**—Evolutionsfragen der Wirtsspezifität. [Biol. Zentralbl.] 67: 373–406. **Essig, E. O.**—Insect surveys in relation to quarantine and control of insect pests. [37] 41: 673–77. **Finney, G. L.**—Culturing Chrysopa californica and obtaining eggs for field distribution. [37] 41: 719–21. **Hafez, M.**—A simple method for breeding the house-fly Musca domestica in the laboratory. [19] 39: 385–86. **Hartzell, F. Z.**—Obituary: Hugh Glasgow. [34] 41: 837–38. Samuel Willard Harman. *Ibid.:* 838–39. **Jucci, C.**—Francesco Pio Pomini (1915–1941) (Obituary). [Sci., Genetica, Torino, Italy] 2: 103–07, 1942. **Kennedy, C. H.**—Myrmecological technique. III. DDT too perfect an ant killer for the collectors' use. [58] 48: 248–49. **Knowlton and Nye**—Insect food of the vesper sparrow. [37] 41: 821. **Linduska and Morton**—Tests of the permeability of fabrics to biting by mosquitoes. [37] 41: 788–94. **Osborn, H.**—Recent insect invasions of Ohio. [Ohio Biol. Surv.] Bull. 40 (vol. 7): 357–58. **Phil-**

lips, M. E.—A brief history of Academy (Nat. Sci. Phila.) publications. [62] C: i–xl. **Satterthwait, A. F.**—Important sunflower insects and their insect enemies. [37] 41: 725–31. **Schwanwitsch, B. N.**—Evolution of the wing-pattern in Palaearctic Sytyridae. IV. Polymorphic radiation and parallelism. [Acta Zool.] 29: 1–61. **Smith, R. C.**—The doctor's degree. [34] 41: 843–45. **Steiner, H.**—Die Bindung der Hochmoorlibelle Leucorrhinia dubia an ihren Biotop. [Zool. Jahrb., Abt. System.] 78: 65–96. **Swezey, O. H.**—Insect invaders in Hawaii during and since World War II. [37] 41: 669–72. **Timofeeff-Ressowsky, N. W.**—Sulla questione dell'isolamento territoriale entro popolazioni specifiche. [Sci. Genetica] 1: 76–85, 1939. Genetica ed evoluzione. *Ibid.:* 278–81. Sulla questione dell'isolamento biologico entro popolazioni specifiche. *Ibid.:* 317–25. **Vogt, G. B.**—Dermestes and Saprinus as predators and pests in fleshfly rearing. [37] 41: 826–27.

ANATOMY, PHYSIOLOGY, MEDICAL—Bateman, A. J.—Intra-sexual selection in Drosophila. [Heredity] 2: 349–68. **Beament, J. W. L.**—The penetration of the insect egg-shells. I. Penetration of the chorion of Rhodnius prolixus. [19] 39: 359–83. **Becker, G.**—Über Kastenbildung und Umwelteinfluss bei Termiten. [Biol., Zentralbl.] 67: 407–44. **Bick, G. H.**—Resistance of Culex quinquefasciatus larvae and pupa to experimental drought. [5] 41: 360–68. **Blumel and Kirby**—Amino acid constituents of tissue and isolated chromosomes of Drosophila. [67] 34: 561–66. **Bonnemaison, L.**—Determination du stade auquel se produit de déclenchement de la diapause chez un hémiptère: Eurydema ornatum L. [C. R. Acad. Sci., Paris] 227: 1054–54. Remarques sur la diapause chez un hemiptere: Eurydema ornatum. *Ibid.:* 985–86. **Broadbent, L.**—Aphis migration and the efficiency of the trapping method. [4] 35: 379–94. **Bruce, W. N.**—Studies on the biological requirements of the cat flea. [5] 41: 346–52. **Browning, H. C., F. C. Fraser, S. K. Shapiro, I. Glickman and M. Dubrule**—The biological activity of DDT and related compounds. [24] 26: 282–300. **Browning, H. C., S. K. Shapiro and M. Dubrule**—The insecticidal activity of DDT and related compounds. [24] 26: 301–06. **Bucher, G. E.**—The anatomy of Monodontomerus dentipes, an entomophagus chalcid. [24] 26: 230–81, ill. **Buzzati-Traverso, A.**—Genetica di popolazioni in Drosophila. I, II, III. [Sci., Genetica] 2: 190–251. 1942. **Cavalconti, A. G. L.**—Geographic variation of chromosome structure in Drosophila prosaltans. [Genetics]

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Proof of operation of natural selection in wild populations of Drosophila pseudoobscura. [Genetics] 33: 537–47. **Duewell, H., J. P. E. Human, A. W. Johnson, S. F. MacDonald and A. R. Todd**—Colouring matters of the Aphididae. [53] 162: 759–61. **Emmel und Jakob**—Über den Feinbau einiger Schuppen von Culiciden. [Zool. Jahrb., Abt. Anat.] 69: 435–42. **Frings, H., E. Goldberg and J. C. Arentzen**—Antibacterial action of the blood of the large milkweed bug (Oncopeltis). [80] 108: 689–90. **Frizzi, G.**—Cromosomi salivari in Anopheles maculipennis. [Sci., Genetica] 3: 67–79, 1947. Determinazione del sesso nel genere Anopheles. *Ibid.:* 80–88. **Hirschler, J.**—Gesetzmässigkeiten in den Ei-Nährzellenverbänden. [Zool. Jahrb., Abt. Physiol.] 61: 141–236 & Pl. 7 & 8, 1945. **Jucci, C.**—Possibilita di genetica di popolazioni in Anopheles. [Sci., Genetica] 3: 1–13, 1947. **Kästner, A.**—Zur Entwicklungsgeschichte von Thelyphonus caudatus (Pedipalpi). 1 Teil. Die Ausbildung der Körperform. 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NOTICE. The December 1948 issue of ENTOMOLOGICAL NEWS was mailed at the Post Office at Lancaster, Pa., on February 17, 1949.

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

1. American Midland Naturalist. Notre Dame, Indiana.
2. American Museum Novitates. New York, N. Y.
3. American Naturalist. Garrison-on-Hudson, New York.
4. Annals of Applied Biology. London.
5. Annals of the Entomological Society of America. Columbus, Ohio.
6. Annals and Magazine of Natural History. London.
7. Annales Academia Brasileira Sciencias. Rio de Janeiro.
8. Anales del Instituto de Biologia Mexico. Mexico City.
9. Anatomical Record. Philadelphia.
10. Arkiv för Zoologie. K. Svenska Vetenkapsakademien i. Stockholm.
11. Arquivos de Higiene e Saude Publica. São Paulo.
12. Biological Bulletin. Woods Hole, Massachusetts.
13. Bios, Rivista Biol. Geneva.
14. Boletin de Entomologia Venezolana. Caracas.
15. Boletin del Museo de Historia Natural "Javier Prado." Lima, Peru
16. Boletin do Museu Nacional do Rio de Janeiro. Brasil.
17. Bull. Acad. Sci. (Izvestia Akad. nauk) U S S R (S. biol.).
18. Bulletin of the Brooklyn Entomological Society. New York.
19. Bulletin of Entomological Research. London.
20. Bulletin of the Museum of Comparative Zoology. Cambridge, Mass.
21. Bulletin of the Southern California Acad. of Sciences. Los Angeles.
22. C. r. Acad. Sci. (Doklady Akad. nauk) U S S R. Leningrad.
23. Canadian Entomologist. Guelph, Canada.
24. Canadian Journal of Research. Ottawa, Canada.
25. Ecological Monographs. Durham, North Carolina.
26. Ecology. Durham, North Carolina.
27. Entomologica Americana. Brooklyn Ent. Society, New York.
28. Entomological Monthly Magazine. London.
29. Entomological Record and Journal of Variations. London.
30. The Entomologist. London.
31. Florida Entomologist. Gainesville, Florida.
32. Frontiers. Philadelphia, Pennsylvania.
33. Great Basin Naturalist. Provo, Utah.
34. Iowa State College Journal of Science. Ames, Iowa.
35. Journal of Agricultural Research. Washington, D. C.
36. Journal of Animal Ecology. London.
37. Journal of Economic Entomology. Geneva, New York.
38. Journal of the Elisha Mitchell Science Society. Chapel Hill, N. C.
39. Journal of Entomology and Zoology. Claremont, California.
40. Journal of Experimental Biology. London.
41. Journal of Experimental Zoology. Philadelphia, Pennsylvania.
42. Journal of Heredity. Baltimore, Maryland.
43. Journal of the Kansas Entomological Society. Lawrence, Kansas.
44. Journal of Morphology. Philadelphia, Pennsylvania.
45. Journal of the New York Entomological Society. New York.
46. Journal of Parasitology. New York.
47. Journal of the Tennessee Academy of Sciences. Nashville, Tenn.
48. Journal of the Washington Academy of Sciences. Washington, D. C.
49. Memorias do Instituto Oswaldo Cruz. Rio de Janeiro.
50. Microentomology. Stanford University, California.
51. The Microscope and Entomological Monthly. London.
52. Mosquito News. Albany, New York.
53. Nature. London.
54. Nature. Washington, D. C.
55. La Naturaliste Canadien. Quebec.
56. Natural History. New York.

57. Occasional Papers, Mus. of Zool., Univ. of Michigan. Ann Arbor.
58. Ohio Journal of Science. Columbus, Ohio.
59. Opinions and Declarations. Intern. Com. Zool. Nomencl. London.
60. Pan-Pacific Entomologist. San Francisco, California.
61. Parasitology. London.
62. Proceedings of the Academy of Natural Sciences. Philadelphia.
63. Proceedings of the Biological Society of Washington. Washington, D. C.
64. Proceedings of the California Academy of Science. San Francisco
65. Proceedings of the Entom. Soc. of Washington. Washington, D. C
66. Proceedings of the Hawaiian Entomological Society. Honolulu.
67. Proceedings of the National Acad. of Sciences. Washington, D. C.
68. Proceedings of the Royal Entomological Society of London. Ser. A.
69. Proceedings of the Royal Entomological Society of London. Ser. B.
70. Proceedings of the Royal Entomological Society of London. Ser. C.
71. Proceedings of the U. S. National Museum. Washington, D. C.
72. Proceedings of the Zoological Society of London. London.
73. Psyche, A Journal of Entomology. Boston, Massachusetts.
74. Quarterly Journal of Microscopical Science. London.
75. Quarterly Review of Biology. Baltimore, Maryland.
76. Revista Academia Columbiana de Cien Exact. Fis. y Nat. Bogotá.
77. Revista Chilena de Historia Natural. Valparaiso, Chile.
78. Revista Instituto Salubridad y Enfermedades Tropicales. Mexico.
79. Revista Sociedad Mexicana de Historia Natural. Mexico City.
80. Science. Washington, D. C.
81. Scientific Monthly. New York.
82. Smithsonian Miscellaneous Collections. Washington, D. C.
83. Transactions of the American Entomological Society. Philadelphia.
84. Transactions of the Amer. Micros. Soc. Menasha, Wisconsin.
85. Transactions of the Illinois State Academy of Sciences. Springfield.
86. Transactions of the Kansas Acad. of Sci. Manhattan, Kansas.
87. Transactions of the Royal Canadian Institute. Toronto.
88. Transactions of the Royal Entomological Society. London.
89. U. S. Dept. of Agric., Farmer's Bulletins. Washington, D. C.
90. U. S. Dept. of Agric., Technical Bulletins. Washington, D. C.
91. University of California Publications in Entomology. Berkeley.
92. University of California Publications in Zoology. Berkeley.
93. University of Kansas, Science Bulletins. Lawrence, Kansas.
94. Ward's Natural Science Bulletin. Rochester, New York.
95. Zoologica. New York.
96. American Journal of Public Health. Boston.
97. American Journal of Tropical Medicine. Baltimore.
98. Annals of Tropical Medicine and Parasitology. Liverpool.
99. Canadian Journal of Research. Section E, Medical Sciences, Ottawa.
100. Evolution. New York.
101. Mitteilungen der schweitzerischen entomologischen Gesellschaft, Bern.
102. Revue de Entomologie. Rio de Janeiro, Brasil.
103. Proceedings of the Royal Society of London.
104. Anales de la Escuela Nacional de Ciencias Biologicas. Mexico.
105. Journal of Cellular and Comparative Physiology. Philadelphia.
106. Redia. Florence, Italy.
107. Annales de la Société Entomologique de France. Paris.
108. Bulletin de la Société Entomologique de France. Paris.
109. Notulae Naturae. Philadelphia.
110. L'Entomologiste. Paris.
111. Revista Brasiliera de Biologie. Rio de Janeiro.
112. Eos, Revista Española de Entomologia. Madrid.
113. Minist. de Agri. de la Nación, Inst. Sanidad Vegetal, Buenos Aires.

EXCHANGES

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

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

Meliponidae—Wanted, information on the bionomics, culture, and economic importance of the stingless bees, particularly of the Old World. P. Nogueira Neto, Av Cicade Jardim 170, S. Paulo, Brasil.

Wasps (Vespoidea, Sphecoidea, Chrysidoidea) of the world by exchange or purchase. Will collect other orders in exchange. D. G. Shappirio, 4811 17th St., N.W., Washington 11, D. C.

Lepidoptera—Large quantities of Plexippus, Colias, Cardui, Vanillae wanted for cash or exchange for tropical butterflies. G. MacBean, 710 Miller Rd., Sea Island, Vancouver, B. C.

Ants of the tribe Dacetini (*Strumigenys, Rhopalothrix* and related genera) wanted for world revision. W. L. Brown, Jr., Harvard University Biological Laboratories, Cambridge 38, Mass.

Mallophaga (on which immediate determination is not necessary) wanted for study and determination. R. L. Edwards, Dept. Biology, Harvard University, Cambridge 38, Mass.

Tingidae (Heteroptera) of the world wanted, in alcohol, with host and other ecological data. Will collect other orders in exchange. N. S. Bailey, 16 Neponset Ave., Hyde Park 36, Mass.

Bombidae, nearctic and neotropical, wanted for exchange, identification, or purchase. Will exchange in other groups for bumblebees. Barth Maina, Dept. Zool., Univ. of Chicago, Chicago 37, Ill.

Saturnidae of the world. Will purchase individual specimens or cocoons. F. E. Rutkowski, St. Bede College, Peru, Illinois, U. S. A.

Butterflies of New England, principally from New Haven, Conn., for exchange. Louis Clarke, 28 W. Elm St., New Haven 15, Conn.

Wanted—Proc. Ent. Soc. Phila., vols. 1–6; Proc. Cal. Acad. (Nat.) Sci., 1–7; Proc. Acad. Nat. Sci. Phila., 1–20; Trans. Amer. Ent. Soc., 1–10; Bull. Buff. Soc. Nat. Sci., 1–5; Psyche, 11, 13, 15; Ent. Amer. n.s., 7–26. C. F. dos Passos, Mendham, N. J.

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Frederick B Isely (1873–1947)

One of the leaders in the investigation of the ecology of the orthoptera, Frederick B Isely, died December 30, 1947, at San Antonio, Texas. Professor Isely was born of Kansas pioneer stock June 20, 1873, at Fairview, Kansas. After education at Fairmount College and at the University of Chicago and a varied teaching experience in high schools and colleges, he became a college administrator in 1920, serving as dean, first of Culver-Stockton College and, later, Texas Woman's College. He returned to full-time teaching in 1931, at Trinity University, and was associated with this institution until his death, though his nominal retirement came in 1946. On the occasion of his retirement, Trinity awarded him the honorary Sc.D. degree.

The first important research engaged in by Dr. Isely concerned the orthoptera of Kansas, but this interest was replaced for a time by his studies of the distribution and migration of fresh-water mussels, this investigation being sponsored by the U. S. Bureau of Fisheries. After an interval in which teaching and administrative work eliminated research, Dr. Isely returned to his first interest, orthoptera. From the time he gave up administrative responsibilities until his death he was engaged in a continuous program of research on the ecology of the Acrididae and Tettigoniidae.

Among the important achievements coming from this series of studies was the clear experimental demonstration that many orthoptera have highly specific food habits. Associated with this was the rather detailed correlation between mandibular morphology and food habits. Incidental to major investigations, but creating a great deal of discussion at the time of publication, was the experimental demonstration of the advantage of concealing coloration in protecting grasshoppers from predation by birds. At the time of his death Professor Isely was organizing in manuscript form his notes on the food habits of the Conocephalinae. This material clearly suggests that the carnivorous feeding of the meadow-grasshoppers, previously considered abnormal, is a part of the normal behavior of these insects.

That such a research program was carried out in a college where every instructor had a heavy teaching load, and Professor Isely was the only teacher of biology during most of these years, suggests a remarkable achievement. It is fortunate that recognition by both the National Research Council and the American Philosophical Society provided the necessary financial support, but the success of the program was certainly due primarily to a dominating curiosity about nature and a remarkable innate faculty for research.

GORDON ALEXANDER

Occurrence of a European Chalcidoid Hemitrichus rufipes Thomson in North America

By GEORGE E. WALLACE, Carnegie Museum, Pittsburgh, Pa.

In 1938, among some chalcidoid material taken to the U. S. National Museum for determination, Mr. A. B. Gahan identified a number of pteromalids for me as *Hemitrichus rufipes* Thomson, until then known only from Europe. The specimens had been collected from windows of the Carnegie Museum as early as 1908. Other specimens were taken later—two in 1939 and one in 1940—also on windows of the Carnegie Museum. Subsequent attempts to collect the insect on the museum grounds and in nearby Schenley Park have been unsuccessful. However, the span of time covered by the records indicates that the species probably is established in North America.

A European specimen of *H. rufipes* in the collection of the U. S. National Museum bears the doubtful host record of "? Ex bruchus?". This is the only host record known to me.

Some New Species of the Genus Volucella

By F. M. Hull, University of Mississippi

Recent studies of American Syrphid flies have disclosed a number of species of *Volucella* which appear to be undescribed. This paper presents the descriptions of these species. The types are in the author's collection.

Volucella belinda n. sp.

A greenish to bluish black species. Related to *pinkusi* Curran but distinct in the reddish brown ground color of the face and the black first abdominal segment. The mesonotal pile is chiefly black in front of the suture. Length 10 mm.

Male. *Head:* the face and cheeks are reddish brown, separated by a distinct black stripe. The upper part of the face is black, bearing yellowish white pollen. Pile of face yellowish white; front black with black pile; vertical pile black. The antennae are reddish brown, the elongate third segment gradually and uniformly tapering until it is distinctly narrow apically; it is faintly darker dorsally and apically. The arista is yellowish basally, black apically, with twenty-four long rays. Eyes not flattened, the upper facets but little enlarged. Ocular pile light reddish brown to brownish yellow, quite thick and abundant above and extending nearly to the bottom of the eye. *Thorax:* the mesonotum and scutellum are black with extremely strong opalescent greenish reflection which becomes coppery to purple where the light strikes it. The pile of the mesonotum is chiefly black and very fine and abundant. There is considerable pale pile however, just behind and medial to the humeri and viewed from the rear there is an obscure but rather broad stripe of scattered yellowish white hairs mixed in with black along the lateral margin of the mesonotum. There may be discerned in some specimens slender linear stripes of pale pile, three in number lying anteriorly on the middle of the mesonotum. There is some short pale pile on the posterior half of the mesonotum mixed in with the long black pile. Notopleura shining black, the upper wing margins and the lateral margin just medial to the notopleura also shining black. Humeri brown, post calli brown, the scutellum with a distinct, complete, preapical depression but no basal flattened areas. The depression is granulate. The pleura are shining black and black pilose. The bristles of the thorax are black; there is one on the mesopleura, four on the notopleura, three above wing, three on post calli, none in front of the scutellum and from eight to ten upon the scutellar margin. The ventral scutellar fringe is black; squamae dark brown, the fringe and border similar. *Legs:* quite black, only the extreme apex of the anterior and middle femora and extreme base of their tibiae dark brown; pile of legs black. *Wings:* strongly tinged with brown, fading away into a lighter brown along the posterior margin. There is a slight trace of yellowish color mingled with the brown in the costal cell, the first basal cell and the stigmal portion of the subcostal cell which is broken by a minute, diagonal, brown line. Marginal cell narrowly closed. *Abdomen:* first segment quite black, the remaining segments bright shining bluish or green; the pile is thick, abundant and yellowish white, except narrowly along the posterior margin of the second segment, more widely along the posterior margin of the third segment, and, except for a few black hairs on the apex of the fourth segment. Hypopygium black and black pilose. All the sternites metallic bluish cell widely open.

Female. Similar to the male, the front polished shining black with shallow concave depression across the middle. Marginal cell widely open.

Holotype: male, *allotype,* female, one male paratype and four female paratypes all from Nova Teutonia, Brasil, collected by Fritz Plaumann, Jan.–April, 1948.

Volucella opeostoma n. sp.

Very similar to *pica* Schiner but distinct in the direction of the conical epistoma which points downward and not forward; also in the lack of black vittae upon the thorax, the absence of the wide black bands upon the abdomen and with a differently shaped antennae. Length 10.3 mm.

Female. *Head:* face pointed downward and a little forward into a very long narrow cone. The face is light brownish yellow in color with a diffuse brown stripe proceeding from the eye margin about the middle of the face nearly to the apex of the cone. Front pale yellow and narrow with black pile and the pile of the vertex black. The short sparse facial pile is golden. The antennae are pale orange, the third segment elongate, concave dorsally just beyond the middle and the apex swollen and slightly bulbous. The arista is yellow becoming blackish towards the apex with about sixteen dorsal rays. Pile of eyes distinctly yellow. *Thorax:* mesonotum pale reddish to brownish yellow with four subopaque reddish stripes of about the same color as the remainder of the mesonotum. The scutellum is concolorous with mesonotum and both subtranslucent. The pile of the scutellum dense and short and black on the disc with a few longer hairs and with a wide band of thick golden pile on the base. Scutellar margin three pairs of strong but long and slender black bristles. Post calli with three pairs of black bristles, base of wing with three, ontopleura with two, mesopleura with one black bristle. The anterior margin of the mesopleura is blackish on half the width except at the upper portion. The sternopleura and hypopleura are black except for the anterior portion of the hypopleura and the upper margin of the sternopleura. The coxae are dark brown on the anterior pair, black upon the remaining pairs and their trochanters, and black pilose. Squamae pale yellow with yellow fringe. *Legs:* femora and tibiae pale yellow, the tarsi orange. The hind tibiae with a distinct, rather wide, black annulus in the middle. This ring is blackish pilose and the femora and tibiae are of a deeper and more reddish color than in *pica*. *Wings:* tinged with brown on the anterior border including the costal and basal cells. *Abdomen:* entire abdomen a bright clear, rich, brownish orange and subtranslucent without any black borders upon the posterior margins of the segments but with a wide band of thick black pile on the posterior margin of the second segment, a still wider one on the posterior margin of the third segment which expands into a triangle in the middle of the segment, reaching almost to the base, and which expands narrowly along the side margin almost to the base. Fourth segment with a large, triangular patch of black pile in the middle posteriorly reaching almost to the base, but none upon the lateral margins. This black pile is subappressed and the remaining pile elsewhere is bright golden red and subappressed.

Holotype: female, Bambito, Volcan, Chiriqui, PANAMA, Dec. 1946, collected by N. H. L. Krauss and presented to the author.

Volucella sappho n. sp.

A reddish brown species related to *correcta* Curran but distinguished by the pale brownish yellow to yellowish white pile of the eyes in both sexes. In both sexes of *correcta* the ocular pile is described as black. Length 8.5 mm.

Male. *Head:* face short, dark shining brownish red with yellowish pollen confined to the region beneath the antennae but reaching the eyes. Face with a few reddish brown or yellowish hairs on the side. The facial tubercle is low and scarcely darker in the middle. The front is very small and very dark brown with a few pale yellow hairs. The vertex is also reduced until it is practically non-existent in front of the anterior ocellus and behind the posterior ocellus; its pile is black. Eyes enormously developed, flattened from vertex to front with greatly enlarged facets and with moderately long pale brownish to yellowish white pile. Antennae reddish brown throughout, the third segment very slightly concave. Arista yellowish brown basally, dark brown to nearly black apically with twenty-one long rays above. *Thorax:* mesonotum and scutellum deep dark reddish brown, the margin of the scutellum perhaps slightly darker. The humeri, notoplura and the anterior margin of the pleura and the hypopleura, metapleura and posterior pteropleura only slightly lighter in shade. Disc of scutellum opaque with sparse, fine black pile and three pairs of strong marginal black bristles. Ventral fringe blackish. Squamae very dark brown with similar fringe and border; halteres yellowish with an opaque, quite white knob. Pile of mesonotum distinctly yellow on the anterior two-thirds, becoming dark reddish brown above the wing; it is black in front of the scutellum. There are no prescutellar bristles but the pile is a little longer and coarser before the scutellum. There are three black bristles on the post calli, three supraalae, two notopleura and one mesopleura. Pleural pile narrowly blackish above becoming dark brown and then reddish brown below. *Legs:* reddish brown, made darker by the very dark brown pile, which is brown rather than black. The tarsal segments are extremely dark brown but not black. The hind basitarsi and the middle basitarsi are more reddish brown. *Wings:* uniformly tinged with pale yellowish brown, the costal cell more yellowish and the stigmal area yellowish with elongate, diffuse, brown basal stigmal spot. Marginal cell closed at the costa. Radial sector with seven long black bristles. *Abdomen:* first and second segments translucent light brownish yellow, the second becoming narrowly and diffusely darker or more reddish brown along the posterior margin, but the difference in shade is slight. Third segment obscurely yellowish on either side at the base and extending diffusely down nearly half the length of the segment except at the sides and the middle where somewhat darker brown prevails. Fourth segment similar to the third. Pile of the abdomen everywhere dark brownish black except upon the first segment where it is yellow and upon the anterior corners of the second where it is reddish. First and second sternites and the third sternite narrowly along the base on either side of the middle light translucent yellow; remainder reddish brown.

Female. Similar to the male in general. The front is black with a shallow, transverse depression upon the lower part of the front; there are longitudinal depressions along the eye margin, above the transverse depression, and there is an extremely faint medial depression on the upper part of the front. There is a more evident, medial, somewhat groove-like depression in the middle of the preantennal callus; this groove separates two slightly convex, low bullate eminences. Below these swellings there is on either side a diagonal crease immediately in front of the antennae. Scutellum more distinctly yellowish brown basally, darker posteriorly. First and second segments of the abdomen, their sternites, and the narrow anterior border of the third sternite very pale translucent yellow. Posterior half of the second tergite widely black with opalescent bluish reflection, a little wider sublaterally and then diminishing to the sides where the black does not actually reach the posterior corners. Third tergite entirely of the same opalescent bluish black. Fourth and fifth similar except that there are a pair of obscure, elongate, large, yellowish brown, transverse spots on the basal margin.

Holotype: male, Summit, PANAMA, Canal Zone, Oct. 1946, *allotype,* female, Barro Colorado Island, PANAMA, Jan. 1947, presented to the author by N. L. H. Krauss.

Volucella vitrea n. sp.

A black species with opalescent reflections which are somewhat faint; face yellow with distinct reddish to brownish tinge. Related to *vitripennis* Curran. The scutellum is quite black, not dark red in ground color. The scutellum has three pairs of marginals instead of four and there are six prescutellars instead of twelve. Finally the basal halves of the abdominal tergites are not reddish in ground color; the whole abdomen is black. Length 10 mm.

Female. *Head:* the cheeks are light reddish brown becoming black behind at the lowest part of the eye. The face is light brownish yellow with a large low tubercle; it is black pilose on the tubercle, with abundant yellow pile and yellow pubescence on the sides and beneath the antennae. This pubescence and pile extends narrowly up the sides of the polished black front. The front is distinctly convex from posterior or anterior view. The vertex and occiput are black, their pile pale yellow, except for a single row of short, sharp, stiff black hairs upon the upper third of the occiput. Occipital pollen light brownish yellow. All frontal pile yellow except a few black hairs. Ocular pile dense, fine, distinctly yellow and rather short. Antennae orange brown on the first, second and the basal half of the elongate third segment. Third segment much narrowed on the outer two-fifths. This section of the antenna has nearly parallel sides and rounded apex and is dark smoky brown. The arista is nearly black with dark brown base and thirty-one long rays.

Thorax: mesonotum black with faint opalescent bluish reflections and coppery reflections where light strikes it directly. The scutellum is concolorous with the mesonotum, the humeri very dark brown. There are three heavy, stiff, black bristles on the notopleura, three above the wing base, three on the postcalli and three pairs on the scutellar margin, one upon the mesopleura and six before the scutellum. The pile of the mesonotum and of the pleura except the pteropleura and sternopleura is pale yellow. The sternopleural and pteropleural pile is black. Squamae pale yellow with yellow border and orange brown fringe. Plumulae orange brown. Halteres with orange stalk and nearly white knob. *Legs:* quite black with black pile. *Wings:* hyaline, the basal half of the stigmal area light yellow, the marginal cell closed and stalked, the remainder of the wings except the first section of the costal cell quite hyaline without clouding. The wing may have been denuded but there are villi only upon the apex of the marginal cell and the subcostal cell. *Abdomen:* quite black with very faint milky bluish reflections but no coppery or reddish or metallic bluish reflections. The pile is short and yellow upon the basal half of the second, third, fourth and fifth segments. Sternites shining black with long yellow pile, the only black pile being on the posterior margin of the fourth and fifth sternites.

Holotype: female, Pucallpa, PERU, Nov. 12, 1947, Jose Schunke.

Volucella nigroviridis n. sp.

A large black species with orange brown face and bluish green abdomen. Related to *bassleri* Curran. The scutellum is jet black with green reflection on the disc, and not brown in color. Mesonotum entirely deep black pilose. Eyes with reddish pile instead of greyish yellow pile. Length 14 mm.

Male. *Head:* the face and cheeks and front are light orange brown; the pile of the face is thick and short and reddish yellow about the tubercle with some black pile upon the tubercle itself and a narrow row of black pile close to the eye margin. The frontal pile is entirely black. The vertex is black with black pile. The eyes are densely reddish or orange brown pilose. The upper facets are only slightly enlarged and the eyes touch for a considerable distance. There is a band of distinctly yellow pollen running from each eye margin beneath the antennae. The antennae are yellowish brown, the elongate third segment tapering to a rounded point apically and concave in the middle dorsally. The arista is pale yellow but black on the apical half. There are about thirty-five dorsal rays. *Thorax:* mesonotum black throughout except the humeri which are yellowish brown. All over the disc of the mesonotum and on the jet black scutellum there is a bluish green reflection which is coppery in certain lights. There are about fifteen prescutellar black bristles and eight pairs of long black marginal bristles; there are seven upon the postcalli, three above the wing and four on the notopleura; one upon the mesopleura. Pleura quite black with equally black pile; the squamae are translucent smoky grey with black fringe. The halteres are yellowish with opaque white knob. *Legs:* entirely black with black pile. *Wings:* hyaline but made distinctly grey by the very dense blackish villi. There is a large, blackish sepia quadrate spot in the middle of the wing and beyond it the basal portion of the stigmal area is yellow. The brown spot includes the apex of the costal cell. *Abdomen:* first segment black, the second black with the posterior margin and the whole of the lateral margin metallic bluish green in places with a golden or brassy reflection; where the green meets the black there is a purple reflection. The first segment is white pilose in the middle, black pilose laterally, and the second segment is white pilose on the anterior half throughout the middle but the black posterior pile encroaches laterally almost to the anterior corner. Third and fourth segments entirely metallic blue green with occasional brassy reflection and entirely black pilose. Sternites blue green; second sternite densely long white pilose except on the lateral third. Third and fourth sternites black pilose except for a small patch of yellowish pile anterio-medially.

Holotype: male. Pucallpa, PERU, Nov. 8, 1947, Jose Schunke.

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

By Charles P. Alexander, University of Massachusetts, Amherst, Massachusetts

The preceding part under this general title was published in Entomological News 59: 207–214. The crane-flies considered herewith are from various far western states where they were collected in part by myself, in part by my good friends, George F. Knowlton and Peder Nielsen, as mentioned under the individual species concerned. The types of the novelties are preserved in my personal collection of these flies.

Limonia (Dicranomyia) nielseniana new species

Mesonotal praescutum yellowish gray with three darker stripes, the median one broader and more deeply colored; rostrum and basal palpal segments yellow; antennae black throughout, the flagellar segments moderately elongate; wings whitish subhyaline, stigma dark brown, conspicuous; a restricted dark pattern, chiefly evident as a seam along vein *Cu;* vein Sc_1 long, approximately three-fifths *Rs;* male hypopygium with the caudal margin of the tergite nearly truncate, the lateral lobes very low and inconspicuous; ventromesal lobe of basistyle blackened, long and conspicuous, bearing a small lateral tubercle; ventral dististyle small, the rostral prolongation compressed-flattened, more or less cleaver-shaped, the lower outer angle produced into a point; rostral spines widely separated, the outer one curved, the inner spine straight; aedeagus unusually slender.

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

♀. Length about 7.5 mm.; wing 8 mm.

Rostrum obscure yellow, palpi black, the basal two segments yellow. Antennae black throughout; flagellar segments oval, the outer ones more elongate, the terminal about one-third longer than the penultimate. Head gray, the center of vertex a little more brownish yellow; anterior vertex broad, approximately three times the diameter of scape.

Pronotum above dark brown, paler on sides. Mesonotal praescutum yellowish gray, with three brown stripes, the median one broader and more deeply colored, brownish black; sides of praescutum more pruinose; scutum and scutellum broadly obscure yellow, the sides brownish gray; mediotergite dark brown, sparsely pruinose, pleurotergite yellowish gray. Pleura chiefly yellowish gray, the ventral sternopleurite more or less darkened, especially behind. Halteres with stem pale, knob infuscated. Legs elongate; fore coxae infuscated, remaining coxae and trochanters yellow; femora obscure yellow, the tips narrowly infuscated; remainder of legs brownish yellow, the outer tarsal segments brownish black. Wings whitish subhyaline, the prearcular and costal fields a little more yellowed; stigma small, oval, dark brown, conspicuous; very narrow and inconspicuous brown seams over cord and outer end of cell *1st* M_2, vein *Cu* more evidently darkened; veins chiefly brown, more yellowed in the brightened fields. Venation: Sc_1 ending opposite or shortly beyond the origin of *Rs*, Sc_1 long, approximately three-fifths to three-fourths *Rs;* free tip of Sc_2 and R_2 in transverse alignment, the latter more than two times the former; cell *1st* M_2 subequal in length to vein M_4; *m–cu* shortly before the fork of *M*.

Abdominal tergites dark brown, their posterior borders narrowly pale; basal sternites chiefly yellow, the outer ones more brownish gray; hypopygium with the ventral dististyle yellow, the remainder more darkened. Male hypopygium with the tergite pale, transverse, the lateral lobes very low and inconspicuous; setae in three more or less distinct marginal groups, the median one concentrated. Basistyle blackened, relatively large, especially the conspicuous elongated ventromesal lobe, the latter bearing a small lateral tubercle on basal half, this provided with several long setae. Dorsal dististyle a gently curved pale rod, narrowed very gradually to an acute point. Ventral dististyle small, fleshy, its area a little less than that of the main body of the basistyle, the disk provided with unusually long setae, including a small brush or pencil on mesal face beyond base; rostral prolongation compressed-flattened, more or less cleaver-shaped, the lower outer angle an acute weakly sclerotized point;

two rostral spines, widely separated, the outer curved, the inner spine straight, the two separated by a distance nearly as long as the outer spine. Gonapophysis with the mesal-apical lobe slender, its tip acute. Aedeagus unusually slender, the tip with two appressed lobes that are separated only by a linear split.

Habitat. WYOMING. *Holotype:* ♂, Sunlight Valley, Shoshone National Forest, altitude 6,800 feet, September 6, 1948 (Peder Nielsen). *Allotopotype:* ♀, September 4, 1948. *Paratopotypes:* 8 ♂♀, September 4–6, 1948. The type series was secured in a marshy area.

I take unusual pleasure in naming this very distinct fly for my longtime friend and co-worker on the Tipulidae, Librarian Peder Nielsen, of Silkeborg, Denmark. Mr. Nielsen visited America in 1948 and spent nearly two weeks collecting in Wyoming. I am much indebted to Mr. Nielsen for the privilege of retaining the types of this fly. Superficially the species suggests *Limonia (Dicranomyia) ctenopyga* Alexander and *L. (D.) melleicauda* Alexander, but has the male hypopygium very distinct from these and from all other members of the subgenus. The fly was associated in nature with *L. (D.) vulgata* (Bergroth) which it superficially resembles, being readily separated by the closed cell *1st* M_2 and the entirely different male hypopygium.

Pedicia (Tricyphona) ampla euryptera new subspecies

♂. Length about 16–17 mm.; wing 15.5–16 mm.; antenna 1.8–1.9 mm.

Characters as in *ampla truncata* Alexander, differing in slight details of coloration and hypopygial structure. Head and thorax clear gray, the praescutum with four narrow brownish gray stripes; scutellum obscure yellow, infuscated medially; dorsopleural region broadly pale yellow. Wings fully-developed, as shown by the measurements, the venation normal; membrane light gray, the prearcular and costal fields more yellowed; veins brown, much darker than in *truncata*. Male hypopygium with the tergal lobe broader than in *truncata*, the caudal margin very gently emarginate, the lateral lobes thus formed low and inconspicuous. In *truncata* the caudal margin is truncate, without lateral lobes.

Habitat. ARIZONA. *Holotype:* ♂, White Mountains, Alpine, altitude 8,400 feet, June 23, 1947 (C. P. Alexander). *Paratype:* 1 ♂, Greer, on the Little Colorado River, altitude 8,800 feet, June 22, 1947 (C. P. Alexander).

Erioptera (Empeda) exilistyla new species

General coloration of entire body dark brownish gray; rostrum, palpi, antennae and legs black; wings whitish subhyaline, the prearcular and costal fields more whitened; stigma pale brown, inconspicuous; veins beyond cord with macrotrichia; vein R_3 oblique, shorter than vein R_{3+4}; cell *1st* M_2 rectangular, shorter than vein M_4; male hypopygium with the tergite large, its caudal margin very gently concave; both dististyles unusually slender, both simple, the outer style a long slender yellow rod that narrows gradually to an acute point; gonapophyses arising close together at the midline, each terminating in an elongate blackened terminal spine.

♂. Length about 3.8 mm.; wing 4.3 mm.

Rostrum and palpi black. Antennae 16-segmented, black throughout; flagellar segments long-oval; verticils relatively short and inconspicuous. Head dark brownish gray; anterior vertex broad.

Pronotum large, brownish gray. Mesonotum brownish gray, the praescutum with a poorly indicated darker median stripe; both the tuberculate pits and pseudosutural foveae black, the former placed close together at near mid-distance between the anterior margin of the praescutum and the pseudosutural foveae. Pleura, including the dorsopleural membrane, blackened, heavily gray pruinose. Halteres with stem very light brown, knob light yellow. Legs with the coxae black, pruinose; remainder of legs black. Wings whitish subhyaline, the prearcular and costal fields even more whitened; stigma pale brown, relatively inconspicuous; veins light brown, more brownish yellow in the whitened fields. Veins beyond cord with macrotrichia. Venation: Sc_1 ending nearly opposite fork of Rs, Sc_2 some distance from its tip, Sc_1 alone only a little shorter than R_{2+3+4}; vein R_{3+4} longer than the oblique vein R_3; distance on costa between veins R_{1+2} and R_3 exceeding two-thirds the length of the latter; cell *1st* M_2 closed, rectangular, shorter than vein M_4; *m-cu* about one-third its length beyond the fork of *M*; vein *2nd A* nearly straight. In the unique type, the venation of the right wing, mounted in balsam, is abnormal in the medial field.

Abdomen, including hypopygium, black, more or less pruinose. Male hypopygium with the tergite large, its caudal margin very gently concave. Basistyle not produced beyond origin of dististyles. Both dististyles unusually slender, simple; outer style a long yellow rod that narrows gradually into an acute point; inner style a little shorter and stouter, dark-colored, the tip obtuse. Gonapophyses arising close together at the midline, on either side of base of the shorter aedeagus, each apophysis expanded very slightly before narrowing into an elongate blackened terminal spine.

Habitat. WASHINGTON. *Holotype:* ♂, Stevens Pass, Snoqualmie National Forest, altitude 4,000 feet, July 8, 1948; swept from mountain hemlock (C. P. Alexander).

Although the male hypopygium is quite different from that of other described species, the present generic and subgeneric assignment seems correct. The fly is most like *Erioptera* (*Empeda*) *tristimonia* Alexander yet is very distinct. In its general appearance, especially the venation, the fly much resembles certain of the small species of the genus *Rhabdomastix*.

Erioptera (Psiloconopa) ecalcar new species

♂. Length about 4–4.5 mm.; wing 4.5–5 mm.

♀. Length about 4.5–4.8 mm.; wing 5–5.2 mm.

Closely allied to *margarita* Alexander, differing in the structure of the male hypopygium. General coloration of body yellow, the disk of the head and thoracic dorsum a trifle more brownish yellow. Antennae pale basally, the outer segments pale brown. Halteres pale yellow. Legs obscure yellow or brownish yellow, the outer tarsal segments infuscated. Abdominal tergites brown, the incisures, sternites and hypopygium yellow. Male hypopygium with the outer dististyle bifid, lacking the third or intermediate arm or point that is found in *margarita*. Lateral gonapophyses appearing as straight, entirely pale rods that narrow to the simple tips. In *margarita* these rods are broader, the tips conspicuously blackened and spinulose.

Habitat. UTAH. *Holotype:* ♂, Zion National Park, Weeping Rock, altitude 4,500 feet, June 21, 1942 (C. P. Alexander). *Allotopotype:* ♀, with the type. *Paratopotypes:* 5 ♂♀, May 5 and September 7, 1943 (G. F. Knowlton).

Erioptera (Erioptera) hohensis new species

Allied to *villosa;* thoracic dorsum medium brown, gray pruinose, the lateral praescutal borders broadly yellow; rostrum light yellow; thoracic pleura chiefly infuscated; legs obscure yellow; wings with a strong fulvous tinge, the costal field more yellowed, veins yellow; abdomen brown, the hypopygium a trifle more yellowed; male hypopygium with the outer dististyle a flattened paddle, its tip narrowly obtuse, blackened; tip of inner dististyle an acute blackened spine; gonapophyses slender, each terminating in a long slender spine, the subterminal part with abundant microscopic spicules.

♂. Length about 5.5 mm.; wing 5.8 mm.

Rostrum light yellow; palpi brownish black. Antennae with scape and pedicel obscure yellow, flagellum brown; flagellar segments with long conspicuous verticils. Head light fulvous yellow, the center of vertex very weakly darkened and sparsely pruinose.

Pronotum light yellow. Mesonotal praescutum with the disk medium brown, gray pruinose, the margins broadly yellow; scutal lobes brownish gray, the lateral margins clear light yellow; scutellum reddish yellow; mediotergite reddish brown, sparsely pruinose, the anterolateral border yellow; pleurotergite chiefly yellow, more darkened ventrally. Pleura chiefly infuscated, the dorsopleural region broadly light yellow. Halteres yellow, the knobs moderately darkened. Legs obscure yellow, the outer tarsal segments darkened. Wings with a strong fulvous tinge, the prearcular and costal fields somewhat more yellowed; veins yellow. Venation: Outer half of vein *2nd A* strongly sinuous.

Abdomen brown, the hypopygium a trifle more brightened. Male hypopygium with the outer dististyle a flattened paddle, the narrowly obtuse tip blackened. Inner dististyle a little shorter, a trifle expanded on the outer fourth and here produced into an acute spine on outer margin, the longer apex narrowed to an acute blackened spine. Gonapophysis narrow, blackened apically, terminating in a long slender spine, the subterminal part with abundant microscopic spicules.

In *villosa,* male hypopygium with the outer dististyle slender; inner style with apex obtuse; gonapophysis appearing as a flattened dark-colored blade that does not terminate in a spine, the entire outer end provided with microscopic spinules.

Habitat. WASHINGTON. *Holotype:* ♂, Hoh River, Jackson Ranger Campground, Olympic National Park, Jefferson Co., altitude 580 feet, July 22, 1948; swept from sparse vegetation on river bars (C. P. Alexander).

The closest relative of the present fly is *Erioptera* (*Erioptera*) *villosa* Osten Sacken, especially the western Nearctic race of this, *dilatata* Alexander. The present insect is readily told by the coloration of the body, legs and wings, and especially by the structure of the male hypopygium, as compared above.

A. D. Imms

According to a news item from Sidmouth, England, **Dr. Augustus Daniel Imms** died April 3, 1949, at the age of 68 years. He was formerly Forest Zoologist to the Government of India, and later, Chief Entomologist of the Rothamsted Experimental Station, Harpenden, England. Dr. Imms has written on a wide variety of entomological subjects and is known also through his: "A general textbook of entomology," one of the really outstanding books in its field, of which the seventh edition is to appear May twelfth of this year.

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1949 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

Papers published in ENTOMOLOGICAL NEWS are not listed.

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Reviews

CATALOGUE OF THE ODONATA OF CANADA, NEWFOUNDLAND AND ALASKA, by Francis C. Whitehouse. Transactions, Royal Canadian Institute, xxvii (57): 3–56, Oct., 1948. Published Nov. 26, 1948.

This catologue lists 186 species for the areas indicated in the title. Where two or more forms, or subspecies, are recognized as occurring therein, each is given the same number, but is distinguished by a different letter, thus *Sympetrum semicinctum semicinctum* (Say) is 169a and *S. s. occidentale* Bartenef is 169b. This treatment raises the number of forms catalogued from 186 to 196. Incidentally, it is of interest to note that the recognition of two or more subspecies of the same species is confined to the genera *Agrion* (our old lamented, but unmentioned, friend *Calopteryx*), *Aeschna* (with the *c*), *Ophiogomphus, Somatochlora, Tetragoneuria, Erythemis* and *Sympetrum*. Genera with many species, but no Canadian subspecies, are *Argia, Enallagma, Gomphus, Lestes, Leucorrhinia* and *Libellula*.

For each species and subspecies are given: a sequence number of this catalogue, just discussed; the number under which it appears in Muttkowski's Catalogue of the Odonata of North America of 1910; its name and that of its original describer; its distribution by political provinces within the area of the title (in the case of British Columbia further differentiated into mainland, m, Vancouver Island and Queen Charlotte Islands); flight period; Merriam's life zone(s) (here capital letters "are used when the species finds optimum conditions in the zone indicated, lower case where the species extends only part way into the zone or is scarce there"); references to "the larger standard works of more recent issue (where the figures are suitable)," in preference "to earlier papers, which may be no longer obtainable or not possessed by the later workers in the field"—"for full bibliographies of species described prior to 1910, the reader is referred to the indispensable pages of Muttkowski's Catalogue," even in most cases for the original description; finally, references to descriptions and figures of the nymph. All this information is compactly given in usually ten or fewer lines for each species or subspecies, clearly spaced and printed.

The sequence of the families is Agrionidae, Lestidae, Coenagrionidae, Aeschnidae, Petaluridae, Gomphidae, Cordulegastridae, Corduliidae and Libellulidae. No subfamilies or other divisions of the families, and no subdivisions of the genus

Gomphus in the Selysian sense other than *Lanthus* Needham, are mentioned. A reference list, arranged alphabetically by authors, occupies pages 44–53, index pages 55–56.

The author justly remarks in his Introduction: "In Canada our knowledge of the distribution of the species has increased very considerably, largely due to the indefatigable zeal of Dr. E. M. Walker . . . the writer desires to make it clear that at least 80 per cent (probably more) of the information given [here] represents the work of one man: Dr. E. M. Walker. The groundwork of the study of dragonflies in Canada is all his, with some other of us, first and last, helping out by hunting in the corners." Nay more. Dr. Walker's monographs of the genera *Aeshna* and *Somatochlora,* based so largely on the Canadian fauna, stand out as the finest works of their kind on Odonata of any part of the world.

Mr. Whitehouse has given us a most valuable summary of the Odonata of America north of the 49th parallel, the Great Lakes and New England. Cataloguers of other groups of animals also will obtain useful suggestions for arrangement of their works by looking over his pages.

PHILIP P. CALVERT

COLEOPTERA OR BEETLES EAST OF THE GREAT PLAINS, by J. Gordon Edwards, 186 pages including 23 plates, cloth 8½ x 11. Lithoprinted by Edwards Brothers, Inc., Ann Arbor, Michigan, January 1949. Price $3.50 postpaid, order from J. Gordon Edwards, 392 Prairie Avenue, Wilmington, Ohio.

In 1930, "A Manual of the Genera of Beetles of America" by Dr. J. Chester Bradley, appeared and filled a long felt need among coleopterists and would be coleopterists. Long since out of print and increasingly difficult and expensive to secure, it left a need for a book covering a wider area than just a small section or state. In the reviewer's opinion, this new book with its key to all the families of beetles east of the Great Plains and other features to be commented upon, fills in great part, at least, this need, and in some respects goes further. It provides a text which not only will prove of great help to the beginning coleopterist, but will also be very useful to those more advanced.

The first nine pages are devoted to such introductory material as size of the order Coleoptera, the function of the book, a very brief and elementary discussion of nomenclature, an explanation of what a beetle is, and of the parts used in identification, a paragraph on how to use the key, a page of some general

Coleoptera references, and finally an alphabetical tabulation of the families of Coleoptera, giving for each family the number of species and varieties in the United States, and also east of the Mississippi River.

The key to the families follows and is illustrated by 449 original line drawings on 23 plates, so arranged that the drawings are opposite the pertinent pages. The key itself without the plates occupies 21 solid pages with no break between the couplets. Had space allotted to the figures on the plates been used less generously and devoted instead to improving the typography of the keys, it would have made their use much easier. One further criticism of the keys, which may well be a personal idiosyncrasy: A 21 page key is in itself formidable. Broken up into smaller units or series, it would be much easier to handle and follow.

The rest of the book, with the exception of an adequate glossary, index and phylogenetic list of the families of Coleoptera for the region treated, is devoted to a discussion of each of the 136 families, arranged alphabetically. A surprisingly large amount of information is furnished regarding each family. General characters are given of adult and larval stages, together with remarks on habits and habitat. Reference is frequently made to the most common genera and species in such a way that at least tentative identification may be made. In fact, in a few instances, even keys to the species are included.

Concluding each family discussion are extremely helpful and quite extensive references to additional taxonomic and biologic literature with citations including 1948.

All in all the book should find a wide field of usefulness to anyone interested in Coleoptera, be he beginner or advanced student.

Edward J. F. Marx

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The Status of the Genus Antineura Melander (Diptera, Agromyzidae)

By A. L. MELANDER, Riverside, California

Mr. Kenneth E. Frick, a student of the Agromyzidae, of the University of California, Berkeley, has referred to me a problem in nomenclature. I am grateful to him for furnishing some of the following data not available at Riverside.

In 1913 (Jour. New York Ent. Soc., XXI: 249) I erected the genus *Antineura* for three American species of Agromyzidae (*togata* n. sp., *chlamydata* n. sp., and *Phytomyza palliata* Coquillett), designating *togata* as the type of the genus.

In 1914 (Ent. Mitteil., III: 73) in an article dealing with Namensänderungen Friedrich Hendel called attention to the prior use of the name *Antineura* by Osten Sacken, in 1881, for a genus of Platystominae, and proposed the name *Haplomyza* to replace the homonym, without citation of the genotype, though mentioning that he knew an European species of the genus.

In 1918 (Arch. f. Naturges., 84A: 114, published in 1920) in the prodomus to his monograph of the palaearctic Agromyzidae Hendel separated *Haplomyza* from *Liriomyza* by the absence of the posterior crossvein. Disregarding the usual custom of retaining the genotype of the homonym, Hendel designated the European *xanthaspis* Loew as the type of *Haplomyza*. In this paper (page 145) Hendel gave a synoptic key to *atronitens* Hendel (? *heteroptera* Loew), *xanthaspis* Loew and *latigenis* Hendel, as the European species of *Haplomyza*. Based on their descriptions he mentioned the possible inclusion of *H. balonica* Strobl and *H. Tiefii* Strobl.

In 1927 (Zool. Anz., LXIX: 250) in Beiträge zur Systematik der Agromyziden Hendel thought that *Haplomyza* was polyphyletic and dismembered the genus, assigning *xanthaspis* and *latigenis* "without contraint" to *Liriomyza,* and *atronitens* to *Cerodontha.* Strobl's two species Hendel later placed in the subsequently erected genus *Xeniomyza.* Thus *Haplomyza* is left for the forgotten American species alone.

In 1932 (Flieg. pal. Reg., Agromyzidae, 59: 198) Hendel revived *Haplomyza,* this time as a subgenus of *Liriomyza,* again citing *xanthaspis* as the type. Six additional species were tabulated, but as all of them possess the posterior crossvein Hendel's concept of *Haplomyza* had completely changed.

In 1934 (Tijdschr. Ent., *77*: 288–290) in Die Larven der Agromyziden, zweiter Nachtrag, deMeijere described a larva and puparium under the name *Xeniomyza* Hering, n. g. in litt; *X. ilicitensis* Hering, n. sp. in litt. He stated that the adult is the smallest known Agromyzid, and would be described later by Hering.

In 1936 (the concluding part of the Agromyzidae of the Fliegen der palaearktischen Region, p. 516) Hendel described the adult of *Xeniomyza,* citing it as *Xeniomyza,* n.g., Hering in litt, with genotype *X. ilicitensis,* n. sp., Hering in litt. Disregarding his former use of the name *Haplomyza,* Hendel stated that *Xeniomyza* is the same as the preoccupied *Antineura* Melander. According to nomenclatorial convention *Xeniomyza* should be credited to deMeijere, 1934, and not to Hendel, 1936, nor to Hering, because (1) the earlier description of a larva has priority over the later description of the adult, and (2) an author is held responsible for the names and descriptions he publishes and cannot convey authorship merely by citing "in litt."

Antineura Melander was originally characterized as differing from *Agromyza* by the absence of the posterior crossvein, while it differs from *Phytomyza* in that the costa extends to the fourth vein. The species have yellow humeri and nearly all of the head is also yellow. The postvertical bristles are strong. The base of the anal vein is distinct and the fifth vein is widely divergent.

In togata the fourth vein ends plainly before the tip of the wing; in *chlamydata* the end of the fourth vein bends back to terminate at the apex of the wing.

The European *Haplomyza,* as used in the Fliegen der palaearktischen Region, was separated from *Liriomyza* by having the humeri wholly brown to black, the head mostly black, only partly on the front and the cheeks yellowish brown, and the frontal orbits about one-third the width of the front. With this characterization the American species do not fully conform. Of the seven species placed in 1931 in *Haplomyza* only *xanthaspis* lacks the posterior crossvein, so at that time Hendel relied more on color and the structure of the front than on the incomplete venation.

Xeniomyza was defined as differing from *Liriomyza* mainly in the absence of the postvertical bristles, the termination of the fourth vein plainly before the tip of the wing with the costa extending a little beyond the fourth vein, the posterior crossvein completely lacking and the anal vein represented only as a fold. Again the American species do not concur.

Although many of the generic distinctions in the Agromyzidae are subject to wide variation, it appears that at least three lines of descent are represented here. Therefore the names *Antineura* Melander, *Haplomyza* as later construed by Hendel, and *Xeniomyza* deMeijere-Hendel-Hering do not all apply to only a single genus, i.e. the original homonym *Antineura*. Under the rules of nomenclature, *Antineura* Melander is definitely a homonym and is to be replaced by *Haplomyza* Hendel, 1914, which is a valid name published to take over the species placed in the preoccupied genus *Antineura*. But the genotype is still *togatus* Melander. If taxonomically the European species placed in the modified concept of *Haplomyza* are not congeneric with the three American species then they require a new generic, or subgeneric, name, for nomenclatively *Haplomyza* belongs irrevocably to *togatus* and its two related American species. The genus *Xeniomyza* has no direct relationship to *Antineura* Melander, and Hendel's citation of the synonymy is in error.

Mr. Frick has investigated the life cycle of *Haplomyza togata* from a long series of material, and has records of the larva, puparia, type of mine and adult genitalia. He informs me that the genitalia are very different from those of either *Liriomyza* or *Phytomyza*.

An Unnoticed Character in the Saturnioidea (Lepidoptera)

By Eugene G. Munroe, Institute of Parasitology, Macdonald College, Quebec, Canada

The conspicuous armature of spines or warts which characterizes the larvae of most of the Saturnioidea has attracted the attention of all workers who have studied this group. The characters presented by the more dorsal rows of spines are so striking that the less prominent but equally interesting subventral series (corresponding to primary setae vii in Forbes' system) appears heretofore to have been neglected.

It may be assumed that the primitive condition is that in which the subventral row is complete, being represented on each of the segments from thoracic 1 to abdominal 9. This complete distribution is seldom realized, in most genera the subventral spines being absent from some segments, while in a few forms the whole series is suppressed. The resulting distribution patterns appear to characterize major groups, and may some day prove useful in a definitive study of the classification of the superfamily.

Thanks principally to the magnificent illustrations in Packard's (1905; 1914) monograph, supplemented by descriptions and illustrations in Jordan (1922; 1924), Forbes (1923), Kirby (1907), and South (1920), and to a very limited extent by my own examination of preserved material, I have been able to ascertain the segmental distribution of the spines of this series in a fairly representative, though not very numerous, array of species. Elements of uncertainty have of course arisen due to the necessity for dependence upon illustrations. In many figures the spines could not be seen, because of the position of the larva, lack of contrast in the coloration, or plain omission by the artist of spines which ought to have been visible. Packard almost never mentions the subventral spines in his descriptions. The paintings by Joutel and the photographs by Watson, however, proved to be particularly useful, and the only major gap in the data is the absence of information concerning the earlier instars of *Aglia* or any of the *Arsenura*-like forms, illustrations of which were not readily available to me, while Packard's descriptions are valueless from this standpoint.

The following table, summarizing the distribution of the subventral spines in the various forms, tends to err on the side of conservatism, spines which were not clearly visible in the illustrations or specimens, or specifically mentioned in descriptions, being omitted. In general I have simply avoided reference to any figure in which the distribution of the spines seemed doubtful. In the case of abdominal segment 9, however, many figures which were otherwise entirely satisfactory broke down; accordingly, in a number of forms in which no subventral tubercle is listed for segment 9 one will actually be found to be present. This does not apply, I think, to any of the Saturniinae (as here listed); I believe that all of these will prove to lack the subventral spine on that segment. I am not altogether satisfied as to the accuracy of the data for abdominal segments 7 and 8 in a few of the Hemileucinae, but I have followed the quite unequivocal illustrations, trusting to better informed students to correct any inaccuracies.

The later instars of the larvae of *Aglia,* the *Arsenura* complex, the Cercophanidae, and the Oxytenidae all have the armature greatly modified or suppressed, and the subventral tubercles are not recognizable. The earlier instars of *Arsenura,* and perhaps of other genera in these groups, have a more complete armature, but I have no information as to the arrangement of the subventral tubercles. Their disposition in the *Arsenura* group should be of particular interest.

Fragmentary as the data are, a characteristic segmental distribution of the subventral spines stands out clearly for each subfamily. A complete series is found only in the African *Bunaea* complex, where, however, it is of uniform occurrence,

Segmental Distribution of Subventral Spines in Certain Saturnioid Larvae

Subfamily Species	Instar	Subventral spines present on	
		thoracic segments	abdominal segments
Citheroniinae			
Adelocephala isias	V	1 to 3	1 and 2; 7 to 9
bicolor	II	1 to 3	1 and 2; 7 to 9
Anisota rubicunda	V	1 to 3	1 and 2; 7 to 9
virginiensis	I, II, V	1 to 3	1 and 2; 7 to 9
Eacles imperialis	I	1 to 3	1 and 2; 7 to 9
	II	1 to 3	7 to 9
Citheronia splendens	?	1 to 3	1 and 2; 7 to 9
laocoon	?	1 to 3	1 and 2; 7 to 9
sepulchralis	I to V	1 to 3	1 and 2; 7 to 9
regalis	V	1 to 3	1, 2, and 9
Hemileucinae			
Automeris pamina	IV	1 to 3	1 and 2; 7 to 9
io	I	1 to 3	1 and 2; 7 to 9
coresus	?	1 to 3	1 and 2; 7 to 9
viridescens	?	1 to 3	1 and 2; 7 and 8
Eudyaria venata	?	1 to 3	1, 2, and 7
Hemileuca maia	I	1 to 3	9
nevadensis	?	1 to 3	1 and 2; 7 and 8
juno	?	1 to 3	1 and 2
oliviae	?	1 to 3	1 and 2
Pseudohazis eglanterina	?	1 to 3	1, 2, and 7
hera	?	1 to 3	1 and 2; 7 and 8
Ludiinae			
Holocera smilax	last	1 to 3	none
Pseudoludia suavis	last	1 to 3	none
Ludia delegorguei	last	2 and 3	none
Bunaeinae			
Micragone herilla	?	1 to 3	1 to 9
Eudaemonia brachyura	?	1 to 3	1 to 8
argiphontes	?	1 to 3	1 to 8
Usta terpsichore	?	at least on abd. 3 to 6	
Urota sinope	last	1 to 3	1 to 8
Nudaurelia dione	last	1 to 3	1 to 8
wahlbergi	last	1 to 3	1 to 8
Acanthocampa belina	last	1 to 3	1 to 8
Gonimbrasia tyrrhea	last	1 to 3	1 to 8
Gynanisa isis	last	1 to 3	1 to 8
Bunaea alcinoe	last	1 to 3	1 to 9
Lobobunaea phaedusa	last	all tubercles suppressed	
Pseudobunaea tyrrhena	last	all tubercles suppressed	

Segmental Distribution of Subventral Spines in Certain Saturnioid Larvae—*Continued*

Subfamily Species	Instar	Subventral spines present on thoracic segments	Subventral spines present on abdominal segments
Saturniinae			
Saturnia pavonia-major	last	1 to 3	1 and 2
Copaxa multifenestrata	I	1 to 3	1 to 5
Tropaea luna	V	1 to 3	1 and 2
Telea polyphemus	last	1 to 3	1 and 2
Antheraea yama-mai	I	1 to 3	1 and 2
	III	1 to 3	none
pernyi	I to IV	1 to 3	1 or none
Rhodinia fugax	I	1 to 3	1 and 2 or none
	II to IV	none	none
	V	all tubercles suppressed	
Dictyoploca japonica	I	1 to 3	none
	IV	1 to 3	none
Cricula trifenestrata	V	1 to 3	none
Attacus atlas	V	1 to 3	1 and 2
Callosamia promethea	III	1 to 3	none
	V	1 to 3	1 and 2
angulifera	IV	1 to 3	none
Eupackardia calleta	I to V	1 to 3	none
Rothschildia jorulla	I	1 to 3	none
	II to V	none	none
orizaba	III	none	none
Platysamia spp.	II to V	1 to 3	1 and 2, or 1, or none
Archaeoattacus edwardsii	?	1 to 3	none
Philosamia cynthia	I to V	none	none

except in the *Lobobunaca* group, in which the whole armature is lost. This would argue for a primitive position for the Bunaeinae, also indicated by the retention of distinct maxillary rudiments in some of the genera (*Eudaemonia, Micragone*). In the Citheroniinae, the other group in which distinct (and sometimes functional) maxillary rudiments are retained, the subventral spines have been lost from the segments which bear the mid-abdominal prolegs. A similar pattern is evident in the Hemileucinae, with the addition of a tendency for the loss of the spines from the posterior three segments.

In the otherwise very dissimilar Ludiinae and Saturniinae, the larvae agree in having lost all the subventral tubercles behind the second abdominal segment. There is also a tendency toward suppression of these tubercles on the anterior segments, to an extent which varies, sometimes in the same instar of the same species. One, and perhaps a very significant, exception is found in the first instar larva of *Copaxa multifenestrata,* as depicted by Joutel in Packard (1914). It is doubtless dangerous to base a general conclusion on a single drawing, but the suggestion is strong that in the Saturniinae the posterior subventral tubercles were lost before the middle ones. This would preclude any direct relationship with the Hemileucinae, whose affinities would on the contrary appear to be with the Citheroniinae. The *Copaxa* larva is also primitive in showing no trace of a displacement mesad of the dorsal tubercles of the eighth abdominal segment, and of course South America is a well known asylum for primitive forms.

The Saturniinae and Bunaeinae are at opposite extremes in the number of subventral tubercles, a fact which provides additional support for their separation, proposed by Packard long ago on the basis of differences in the early stages. In spite of the close similarity of the adults, we can hardly derive the Saturniinae directly from the Bunaeinae, for the latter are more specialized than *Copaxa* and other primitive Saturniines not only in having the dorsal tubercles of the eighth abdominal segment fused in the mid-line, but also in the general exaggeration of the larval armature and in having lost the faculty of spinning a cocoon. It is easier to assume that both groups arose from a common ancestor which spun a cocoon, and in which the subventral series of tubercles was complete and the dorsal pair on the eighth abdominal segment separate.

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A New Species of Andrena from Texas, with Descriptive and Synonymical Notes on Andrena belfragei Cresson (Hymenoptera: Apoidea)

By U. N. LANHAM, Department of Zoology, University of Michigan

The new species described herein is based on a series in the United States National Museum which had been given a manuscript name by Viereck. The unusual color pattern of the female in this species, approached by only one other species in the United States, makes it easily recognizable in our fauna.

Andrena dolomellea new species

Female. Integument mostly ferruginous, with details of coloration as follows: clypeus, adjacent areas of face, base of mandibles, scape, pedicel, first flagellar segment, and lower one-half of cheeks ferruginous, rest of head black; mesoscutellum, metanotum, lower one-third of pleura, and dorsal surface of propodeum with strong feruginous markings and tints, rest of thorax black, legs entirely ferruginous; anterior terga feruginous, posterior terga becoming blackish; all pubescence rich fulvous. Clypeus closely, irregularly, and rather weakly punctate, the lower half slightly shining, with a poorly developed median ridge; facial fovea wide above, occupying more than three-fourths distance between eye and lateral ocellus, terminating at about level of clypeal margin; process of labrum large, broadly truncate, truncature slightly concave; mandibles ordinary, with ventral membraneous flange short; antennae with segment 3 about equal to 4 + 5. Mesoscutum with moderately short pubescence, not nearly dense enough to obscure integument, integument reticulate, with dense, large, but rather weak punctures; mesoscutellum reticulate, with sparse punctures; metanotum strongly protuberant; enclosure of propodeum reticulate, with a few weak, irregular wrinkles above; propodeal corbiculum with dorsal fringe well developed, no anterior fringe, but hairs of anterior portion branched, interior with dorsal one-half hairy; tibial scopa copious, hairs of outer face simple, trochanteral floccus imperfect, middle basitarsus not conspicuously widened at middle; wings uniformly and strongly darkened, stigma black, moderately slender, first recurrent nervure ending slightly before middle of second submarginal cell. Terga strongly punctate, first tergum with few punctures on elevated portion, closely punctate on depressed posterior margin, remaining terga closely and evently punctate, with punctures of fourth tergum becoming indistinct; caudal fimbria bright fulvous; pygidium broadly rounded at apex.

Length 13 mm., forewing 11 mm.

Holotype female: Willis, TEXAS, April, 1903 (Bridwell).

Male. Black, except legs and most of terga ferruginous; pubescence fulvous. Head with pubescence of face rather short; cheeks somewhat wider than eyes, broadly rounded; mandibles moderately long, decussate; antennae with segment 3 about equal to 4. Wings lighter than in female, but still well darkened, especially apically. Tergal sculpture about as in female. Genitalia with tips of parameres long, slender, parapenial lobes moderately produced, broad; sagitta with sides not excavated, widened for about half its length; tip of eighth sternite moderately and evenly expanded, apical margin slightly concave.

Length 11 mm., forewing 9 mm.

Allotype male: same data as holotype. *Paratypes:* 2 females, same data as holotype, one bearing an additional label "*Crataegus*"; one female, Fedor, Texas (Birkman): 1 female, Mound, Louisiana, 2 April 1907 (F. C. Bishopp) and one male, same locality, 7 March 1907, on turnip (Bishopp).

In spite of its bizarre appearance, produced by the ferruginous markings of the face, thorax and abdomen, this species is structurally a normal member of the *vicina-hilaris* series, as shown by the imperfect trochanteral floccus, simple hairs of the scopa, and slender parameres of the male genitalia. It is most like *hilaris* Smith, differing in the much more closely punctured terga and the larger size. *A. mellea* Cresson, the only other North American *Andrena* known to me to have ferruginous markings on the thorax, has the posterior spur of the hind tibia strongly bent and flattened basally (linear in *dolomellea*), and has the pleura coarsely sculptured, therefore belonging to the group of *A. argemonis* Ckll. and *A. prunorum* Cockerell, a group not at all related to the present species.

A. dolomellea is another example of ferruginous members of an otherwise black series of bees occurring in the southern United States. The subgenus *Pterandrena,* elsewhere a group of black bees, has at least one reddened species in Southern Kansas and Texas.

Andrena belfragei Cresson

Andrena belfragei Cresson, 1872, Trans. Amer. Ent. Soc. 4: 256, female.

Andrena brunniventris Cresson, 1872, Trans. Amer. Ent. Soc. 4: 258, male. (New synonym.)

Andrena texana Howard (not Cresson), 1901, Insect Book, plate 4, fig. 7.

In order to eliminate the possibility that *A. dolomellea* might be the same as *A. brunniventris,* described very briefly by Cresson from a single male, Dr. Karl V. Krombein compared the allotype of *dolomellea* with Cresson's type for me, and found them to be distinct. Mr. P. H. Timberlake further investigated the matter, and found in the collection of the U. S. National Museum a male specimen from Texas ("Collection Belfrage") which had been determined by Ashmead as *A. belfragei* Cresson; Mr. Timberlake compared it with the type of *brunniventris* and thought them to be the same. This male specimen is the one figured by Howard in the Insect Book, plate 4, figure 7, as *A. texana.* Comparison of the specimen with a female *belfragei* loaned by the U. S. National Museum (from "Tex., Collection Belfrage") leaves little doubt that it is actually the male of this species. *A. belfragei* belongs to a group of species related to *Andrena carlini* Cockerell, characterized by the perfect trochanteral floccus of the female and the expanded tips of the parameres in the male genitalia; otherwise, the group closely resembles the *vicina* series. The species is characterized in this group by the densely and strongly punctured abdominal terga; it agrees with *A. viburnella* Graenicher in this respect, and further study may show *viburnella* to be only a darker (black instead of slightly reddened) northern race of *belfragei.*

Monarch Butterfly Migrating in Botetourt County, Virginia

By John H. Fales, U. S. D. A., Agr. Res. Admin., Bureau of Entomology and Plant Quarantine

At noon on September 28, 1941, while driving north on Route 11 about 5 miles from Roanoke, Virginia, we noted monarch butterflies (*Danaus plexippus* L.) flying across the highway to the south. It was a clear day with a temperature of 90° F., and a southerly breeze was blowing. When we stopped we saw 25 butterflies in several minutes and in one 60-second period noted 6 crossing the roadway. Nine more crossed the highway in less than a minute. These insects flew at an altitude of 2 to 20 feet, crossing the highway at about 7 per minute at this point. This was at the rate of 420 per hour. A heavy migration was definitely in progress.

As we continued our journey we saw numbers of dead monarchs on the highway. At Troutville, Virginia, we counted 9 monarchs lying on the highway within a quarter of a mile.

Proceeding northward to Natural Bridge and Lexington, Virginia, we saw other monarchs in flight and on the highway. We saw several on Blue Ridge Mountain and on Mt. Long at an elevation of 2,000 feet or more.

Some Observations on Megarhyssa (Hymenoptera, Ichneumonidae)

By P. W. Fattig, Emory University,
Emory University, Georgia

On June 25, 1947, Professor J. T. Darlington took me about two miles from the Emory University campus to a beech tree on which he and Richard Smith had found two *Megarhyssa macrurus* (Linn.) and one *M. atrata* (Fabr.) ovipositing on May 20th. Mr. Smith returned to this tree on May 30th and found four *M. macrurus* and one *M. atrata* ovipositing.

This tree was heavily infested with *Megarhyssa* and *Tremex columba* (Linn.). I counted 217 emergence holes on the exposed, decayed portion, which was about three feet high, thirty inches wide at the ground and twelve inches wide at the top.

On July 27th I observed a specimen emerge with the ovipositor separated into three pieces for nearly an inch. I was under the impression that there were only two sheaths and an ovipositor, not knowing that the ovipositor itself was made up of three valves. After this discovery, I worked about twenty hours trying to separate the ovipositors of nine specimens. I succeeded in getting three specimens separated entirely, and two more almost entirely separated when one of the valves broke off.

On August 4th I began marking the wings of twelve *Megarhyssa atrata* females with white duco paint. All of the marked specimens returned to the tree and oviposited at least twice, number 5 ovipositing twelve times, and number 8 nine times. Number 5 oviposited three times within three hours.

Two large decayed roots about six inches apart, extending out from the base of the tree, gave a good chance to get many close-up views of the position and operation of the membrane within the sixth and seventh tergite in relation to the sheaths and ovipositor while the insects were inserting and withdrawing the ovipositor. I was able to get my eyes within six inches of the extended membrane, since *Megarhyssa* practically always oviposited with the head downward. The looped ovipositor extends the membrane, with the two sheaths within the membrane during the drilling or inserting process; then as the drilling nears completion, the circle formed by the sheaths becomes smaller and smaller until very little can be seen, when they give a sort of flip and appear on the outside of the membrane, with one sheath on either side. Thus, when the ovipositor is being inserted, the sheaths are on the inside of the membrane, but when withdrawing, the sheaths are on the outside.

On April 30th, 1948, I painted twelve male and seven female *M. atrata,* and continued painting female *M. atrata* until May 12th, when I painted the eighteenth female. I saw all of the marked females return and oviposit except numbers 8 and 15. Number 2 oviposited only four times, while number 6 oviposited fifteen times until June 1st, when the observations were discontinued. I do not know how many times these marked specimens returned and oviposited while I was not observing the tree.

On May 1st I observed three male *M. atrata* with about one-half inch of their abdomens inserted in one hole, with several other males trying to insert the end of their abdomens. About every 10 to 12 seconds the three males would give their wings and abdomen a quivering jerk. After fifteen minutes the three males withdrew their abdomens, and in two minutes a female *M. atrata* appeared at the entrance of the hole and crawled out; thereupon one of the males mated with her at once. While this was going on there was another group of male *M. atrata* about one foot farther down on the tree, going through the same movements. The second female appeared twelve minutes later. I counted 32 males in the two groups, all being *M. atrata*, except 3 *M. macrurus,* and 2 *M. greenei* Vier. The males had become so tame that I was able to get within a foot or two of the tree without disturbing them.

On May 2nd one male *M. atrata* began trying to insert its abdomen into a small hole in the wood at 7:50 A.M., a second at 7:53, and a third at 7:58; one male withdrew his abdomen at 9:00, a second at 9:20, and a third at 9:22; the head of a female *M. atrata* appeared at 9:24, and she crawled out at 9:28 and mated as soon as she was out of the hole, and apparently mated twice while crawling up the tree. There was great confusion amongst the 12 to 15 male *M. atrata* present.

At 9:30 A.M., May 3rd, number 3 male *M. atrata* was observed with its entire body inserted in a hole with only the white painted tip of the wing exposed. He withdrew at 9:47, and a female *M. atrata* crawled out of the hole at 9:54, when another male mated with her. I also observed three other males with only the tip of the wing extending out the hole. I presume that these males were trying to enlarge the holes so that the females could emerge.

At 12:30, May 3rd, I observed number 3 female *M. atrata* with her entire body inserted in a hole, with only about half of her wings protruding. The abdomen was withdrawn at 12:48, and the sheaths at 12:53, the abdomen was again almost entirely inserted at 1:16, and was not withdrawn at 2:00, when I had to leave the tree. At 3:00, when I returned, the abdomen was again withdrawn, and at 3:15 she inserted her abdomen for the third time. I also observed number 7 and number 10 with their entire bodies inserted with only the tips of their wings exposed; and number 6 and number 9 with their entire bodies inserted with the sheaths and the tips of their wings exposed.

During 1948 *Megarhyssa atrata* (Fabr.) was the predominant *Megarhyssa* at the beech tree. During July 1947 I collected 36 specimens of *M. atrata,* 32 of *M. macrurus* (Linn.) = *M. lunator* (Fabr.), and 18 of *M. greenei* Vier. From July 20th to August 22nd, I collected 28 specimens of *Tremex columba* Linn. and saw many more while observing the *Megarhyssa.* They would emerge and drop to the ground amongst the beech leaves, and then almost at once they were off in a flash. I observed only one *Tremex* ovipositing, and this was at 6:00 A.M.; possibly I was late in getting out to the beech tree.

Sometimes there were as many as fifteen female *Megarhyssa* on this tree at a time, with as many as nine ovipositing at one time.

I wish to thank Dr. H. K. Townes for determining the *Megarhyssa* and *Tremex*, and for criticizing the manuscript.

Notes on Two West Indian Mutillidae (Hymenoptera)

By Karl V. Krombein, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, United States Department of Agriculture

Some years ago Mickel (Psyche, 35: 27, 1928), in a list of West Indian Mutillidae, assigned the Jamaican *Sphaerophthalma cargilli* Cockerell (Psyche (suppl.), 7: 16, 1895; ♀) to *Dasymutilla*. A recent study of the type, in connection with the identification of two females submitted by C. Bernard Lewis, curator of the Science Museum of the Institute of Jamaica, shows that the species is more properly referrable to *Pseudomethoca* (new combination), because of the large quadrate head, elongate first flagellar segment, and absence of carinae delimiting a pygidial area. The erroneous assignment to *Dasymutilla* was undoubtedly due to the character of the first abdominal tergite, the apex of which has a somewhat diskiform appearance as in certain *Dasymutilla*.

The species was omitted from Schuster's key (Bul. Brook. Ent. Soc., 40: 7, 1945) to West Indian *Pseudomethoca* because of the erroneous generic assignment. The species is apparently closest to *P. olgae* Schuster from St. Croix, but is immediately separated from it and the other West Indian species by the broad ferruginous stripes laterally on the posterior part of the dorsum of the thorax, and by the almost totally ferruginous first abdominal segment.

Ephutopsis trinidadensis Ashmead is also omitted from Mickel's list of West Indian species, presumably because he argues (Bul. 143, U. S. Natl. Mus., p. 32, 1928) that it is invalid since it was never described. I cannot agree with this interpretation, for Ashmead states (Canad. Ent., 36: 6, 1904), "Metathorax with the hind angles dentate, clothed with a dense silvery-white pubescence; scutellum bispined. (North and South America) . . . *Ephutopsis* Ashm., gen. nov. (Types *E. trinidadensis* Ashm., and *M. odontophora* Cam.)." These characters serve as the specific as well as the generic description. The type, a male from Trinidad, West Indies, July 1899 (F. W. Urich), is before me, and is herewith placed in the genus *Ephuta* (new combination). Schuster (Rev. de Ent., 16: 190, 1945) considers *Ephutopsis* to be at most a subgenus of *Ephuta*. If the former is valid, it must be used for the group containing *odontophora,* its genotype, whereas *trinidadensis* belongs to the group containing *furcillata* Mickel and *forceps* Schuster.

The following brief notes will serve to amplify Ashmead's description of *trinidadensis* and aid in its identification. It appears closest to the Cuban *furcillata* Mickel, agreeing with that species in the hyaline wings with infumated apical margins, the absence of black pubescence and the presence of a pair of teeth on the scutellum and a median tooth on lateral margin of dorsum of propodeum. The following points of difference from *furcillata* are apparent from Mickel's description of that species (Psyche, 35: 25–6, 1928): Length 6.2 mm.; seventh sternite creamy on basal half; second sternite without an apical band of silvery hairs, these present only laterally; first segment of flagellum three-fourths the length of second (almost equal in *furcillata*); front and vertex with coarse, contiguous punctures (moderate scattered ones with granular interspaces in *furcillata*); second tergite with circular, subcontiguous punctures (elongate ones in *furcillata*).

Review

INTROGRESSIVE HYBRIDIZATION. By Edgar Anderson. John Wiley & Sons, Inc., New York. Chapman & Hall, Limited, London. 1949. Pp. ix + 109. Price, $3.00.

A good new name for an old concept often serves both to advertise and to integrate the idea. "Introgressive hybridization" has been practiced by plant and animal breeders and has been recognized as at least a partial explanation for variation in natural species since early times. It was not until 1938 that the name was given in an article by Anderson and Hubricht

(Am. J. Botany, 25:396–402) in which the process was specifically discussed.

As an example drawn from animal breeding, a dominant trait occurring in one breed may be transferred to a second breed by crossing followed by grading. The first generation hybrids are backcrossed to the second breed, their progeny showing the desired trait are selected and again backcrossed, and this process is continued until the mongrels come more and more to resemble the "recurrent" parental breed, except for the desired trait which is retained each generation by selection. In poultry, colors may be thus transferred from one breed to another.

As a natural process, white spotting or other markings may thus infiltrate into a wolf population after crossing with dogs and the recessives blue eyes or red hair of white human stock may be transferred to the negro race, cropping out after many generations, as if by mutation.

Dr. Anderson's book deals with plant material under "natural conditions," that is outside the laboratory and the breeding plot. These conditions include not only normal habitats to which the organisms are adapted and which tend to keep races or species distinct, but also abnormal environments due to fires, floods or hurricanes or to human activities producing clearings, dumps and garbage piles, as niches in which "hybrid swarms" may develop with new combinations of characters segregating after crossing.

As a typical example of introgression, a summary is given (Chapter 1) of the results of intensive studies of variation in Irises in the Mississippi delta after natural crossing of two widely distinct species. Man has there "hybridized the habitat" giving an opportunity for an appreciable number of segregating types to survive.

The Ecological Basis (Chapter 2) and The Genetic Basis (Chapter 3) of Introgression are discussed. Normal environment and normal heredity tend toward keeping races and species distinct but permitting a small amount of genic flow after crossing. Several pages are devoted to the cohesive effect of genetic linkage. Here the reader will find some rather obscure mathematics, which, in the opinion of the reviewer, might better have been either more fully elaborated or else omitted. As it stands, it appears somewhat unconvincing since some of the premises are apparently made up to suit the case and there are errors at least of omission in the line of argument. The general thesis that linkage has a cohesive effect, is, however, sound. The author fails to mention several genetic factors other than linkage that may be equally significant as cohesive agents.

The section on Character Association as a Criterion of Hybridity should be of interest and value. Introgression in Finite Populations (Chapter 4) gives us more mathematics, which is here clearly, adequately and convincingly presented. The discussion of Introgression and Evolution (Chapter 5) is sound and critical and is treated in such a way that the ideas may be readily grasped. The general conclusions should be of interest to entomologists and the Special Techniques (Chapter 6) may well find application to a study of introgression among insects and other animals.

The bibliography is mostly botanical. The noteworthy biometrical studies of Alpatov on races of honey bees are cited. These indicate speciation rather than mutation and should furnish the basis for further work of both practical and theoretical importance.

As an Epilogue the author modestly states "How important is introgressive hybridization? I do not know." Bizarre hybrid swarms are probably less significant than the wide dispersal of introgressive genes. He emphasizes the paradox "Introgression is of the greater biological significance, the less is the impact apparent to casual inspection."

The reviewer highly recommends the book to entomologists who are interested in the broad biological aspects of their subject. Those who find the mathematics too difficult can skip it. For those who find it intriguing, an elucidating appendix would have been helpful.

P. W. Whiting

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1949 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Anscombe, F. J.—On estimating the population of aphids in a potato field. [4] 35: 567–71, 1948. **Balduf, W. V.**—Clell Lee Metcalf, 1888–1948. (Obit.) [37] 41: 997–98, ill., 1948. **Beebe, W. y J. Crane**—Ecologia de Rancho Grande, una selva nublada subtropical en el norte de Venezuela. [Bol. Soc. Venez. Cien. Nat.] 11: 217–68. 1948. **Benjamin, A. C.**—On defining science. [81] 68: 192–98. **Borgmeier, T.**—Hermann Schmitz, S.J. (Obituary with portrait.) [102] 19: 587. Alfonso Dampf, 1884–1948. (Obituary with portrait.) *Ibid.*, pp. 588–89. Oscar Monte, 1895–1948. (Obituary.) *Ibid.*, pp. 589–90. **Broadbent, L.**—Methods of recording aphid populations for use in research on potato virus disease. [4] 35: 551–66, 1948. **Eyer, J. R.**—Fabian Garcia, 1871–1948. (Obit.) [37] 41: 1000–01, 1948, ill. **Hood, J. D.**—J. Douglass Hood: Bibliography of scientific papers. [102] 19: 499–508, 1948. **Judd, W. W.**—Insects collected in the Dundas Marsh, Hamilton, Ontario, 1946–47, with observations on their periods of emergence. [23] 81: 1–10. **Isely and Alexander**—Analysis of insect food habits by crop examination. [80] 109: 115–16. **MacNay, C. G.**—A summary of the more important insect infestations and occurrences in Canada in 1947. [78th Ann. Rep. Ent. Soc. Ontario] pp. 71–89, 1948. **Martin, L. M.**—Jeane Daniel Gunder (1888–1948). (Obituary.) [Lep. News] 2: 105, 1948. **M., P. F.**—John William Scott Macfie. (Obituary.) [30] 82: 21. **Reed, L. L.**—Distribution of the European elm disease in Canada in 1947. [78th Ann. Rep. Ent. Soc. Ontario] pp. 8–10, 1948. **Remington, J. E.**—Brief

Biographies. 17. Supplementary notes on John Abbot. [Lep. News] 2: 108, 1948. **R., N. D.**—Otto Bang-Haas. (Obituary.) [30] 82: 22. **Silver, J. C.**—Embedding beetles in plastic. U. S. D. A. Agr. Res. Adm. B.E.P.Q., ET-263, Nov. 1948. **Thorp, J.**—Effects of certain animals that live in soils. [81] 68: 180-91. **Van Dine and Hoyt**—Ulphian Carr Loftin, 1890-1946. (Obit.) [37] 41: 999-1000, 1948, ill. **Vaurie, C. and P. Vaurie**—Insect collecting in Guatemala 65 years after Champion. [45] 57: 1-18. **Weiss, H. B.**—Entomologists as human beings. [45] 57: 50. First scientific bibliography. *Ibid.*: 66. Entomology defined in 1835. *Ibid.*: 66. **Wilhelm, J. O.**—Research organization in Ontario. [78th Ann. Rep. Ent. Soc. Ontario] pp. 6-7, 1948. **M. de W., C. G.**—Benaiah Whitley Adkin. (Obituary.) [30] 82: 22.

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EXCHANGES

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

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

Wasps (Vespoidea, Sphecoidea, Chrysidoidea) of the world by exchange or purchase. Will collect other orders in exchange. D. G. Shappirio, 4811 17th St., N.W., Washington 11, D. C.

Lepidoptera—Large quantities of Plexippus, Colias, Cardui, Vanillae wanted for cash or exchange for tropical butterflies. G. MacBean, 710 Miller Rd., Sea Island, Vancouver, B. C.

Ants of the tribe Dacetini (*Strumigenys, Rhopalothrix* and related genera) wanted for world revision. W. L. Brown, Jr., Harvard University Biological Laboratories, Cambridge 38, Mass.

Mallophaga (on which immediate determination is not necessary) wanted for study and determination. R. L. Edwards, Dept. Biology, Harvard University, Cambridge 38, Mass.

Tingidae (Heteroptera) of the world wanted, in alcohol, with host and other ecological data. Will collect other orders in exchange. N. S. Bailey, 16 Neponset Ave., Hyde Park 36, Mass.

Bombidae, nearctic and neotropical, wanted for exchange, identification, or purchase. Will exchange in other groups for bumblebees. Barth Maina, Dept. Zool., Univ. of Chicago, Chicago 37, Ill.

Saturnidae of the world. Will purchase individual specimens or cocoons. F. E. Rutkowski, St. Bede College, Peru, Illinois, U. S. A.

Butterflies of New England, principally from New Haven, Conn., for exchange. Louis Clarke, 28 W. Elm St., New Haven 15, Conn.

Wanted—Proc. Ent. Soc. Phila., vols. 1–6; Proc. Cal. Acad. (Nat.) Sci., 1–7; Proc. Acad. Nat. Sci. Phila., 1–20; Trans. Amer. Ent. Soc., 1–10; Bull. Buff. Soc. Nat. Sci., 1–5; Psyche, 11, 13, 15; Ent. Amer. n.s., 7–26. C. F. dos Passos, Mendham, N. J.

Miridae (Capsidae)—American species wanted, with locality labels, in exchange for British species. D. Leston, F.R.E.S., 6 Frognal Rise, London N. W. 3, England.

/ ND

ENTOMOLOGICAL NEWS

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Ezra Townsend Cresson, Junior

ENTOMOLOGICAL NEWS

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Ezra Townsend Cresson, Junior

Three members of the Cresson family have won commemoration in ENTOMOLOGICAL NEWS: Ezra Townsend Cresson (1838–1926),[1] hymenopterist and co-founder of the Entomological Society of Philadelphia (name changed to the American Entomological Society in 1867), and his sons, George Bringhurst Cresson (1859–1919),[2] collector of ants, curator of insects at the Academy of Natural Sciences of Philadelphia, 1880–81, 1886–89, and librarian of the Entomological Society, 1892–96, and Ezra Townsend Cresson, Jr. (1876–1948), dipterist, associate curator of insects (1908–47) at the Academy, corresponding secretary (1932–47), librarian (to 1947) and honorary member (October 23, 1947) of the Society.

Ezra Townsend Cresson, Jr., was born in Philadelphia, December 18, 1876, and died at Swarthmore, Pennsylvania, April 8, 1948.

His mother was Mary Ann Ridings, daughter of James Ridings, co-founder of the Entomological Society, an active collector of insects at Philadelphia, in Colorado, Kansas, Georgia and Virginia. Ezra Junior, therefore, could have received entomological genes from both of his parents and his home life could not have lacked environmental encouragement for their activity.

In 1881 the Cresson family moved from Philadelphia to Ardmore, and in 1883 to Swarthmore, both in Pennsylvania. From his home in the latter, Ezra Junior attended successively Hilldale Cottage School (Miss Richard's) near Rutledge, Oakdale

[1] ENT. NEWS 37 (6): 161–3, pl. vi (portrait), June, 1926. Science 54 (321): 8–9, July 2, 1926. Trans. Amer. Ent. Soc. 52, Supplement: i–lxiii, 2 portraits, 1928.

[2] ENT. NEWS 30 (1): 29–30, Jan., 1920.

School, the Friends' School in Media and the Drexel Institute of Technology in Philadelphia. Mrs. Helen J. Tavenner, Registrar of the Institute, has kindly informed us that according to their records "Ezra T. Cresson, Jr., of Swarthmore, Pennsylvania, was enrolled as a student at Drexel Institute from February, 1896, until June, 1897, and from February, 1898, until June, 1898. He pursued courses in mechanical drawing, mechanics, shop work and machine construction. He did not receive a certificate or diploma" (Letter of Jan. 21, 1949).

After leaving the Institute, he was employed by the George V. Cresson[3] Company, power transmitting machinery, general machinery and founders, whose main office and works were at 18th Street and Allegheny Avenue, Philadelphia, and subsequently by the Morse Elevator Works, Morse, Williams & Company, with office at 1105 Frankford Avenue (later West End Trust Building), works at Frankford Avenue, Wildey and Shackamaxon Streets. The Morse Elevator Works were taken over by Otis Brothers & Company, in the same line of manufacture, and Cresson went with them.

He became a life member of the Academy of Natural Sciences of Philadelphia, October 17, 1905, and of the American Entomological Society, December 28, 1905, and was elected librarian of the latter body in 1906. The News for October, 1907 (page 363) has a note that "Mr. E. T. Cresson, Jr., . . . will visit the western part of the United States this fall. He is making a study of the Diptera and is especially interested in Muscidae." In the issue for February, 1908 (page 55) is the further note that he was "working upon the Dipterous family Ephydridae and would like to examine all the material possible, native or exotic. Present address, 141 Locksley Avenue, Oakland, California." He lived also for a time at Berkeley Hills, California. Thanks to Mr. Thomas B. Steel, Registrar of the University of California at Berkeley, we learn "that Ezra Townsend Cresson, Jr., was admitted to the University of California in January, 1908, as a special student in the College of Natural Sciences. He attended until May, 1908, for one semester. His courses

[3] George V. Cresson was a distant relative.

were taken primarily in Entomology" (Letter of Feb. 8, 1949). In 1908 Charles William Woodworth was associate professor of entomology at the University and some of us recall Cresson's speaking of association with him.

After his return from the west, he lived continuously in Swarthmore, his home being at 11 Amherst Avenue in his last years. On October 27, 1910, he was elected associate editor of ENTOMOLOGICAL NEWS and remained on the editorial staff until his death. He edited the Transactions and the Memoirs of the Society from 1926 to 1945.

We do not know whether the same consideration—greater activity in the abandoned field—which led his father to transfer his chief attention from Coleoptera to Hymenoptera, induced the son to devote himself to the Diptera rather than to the Hymenoptera.

Cresson left a typed list of his papers 1906 to 1945, which has been compared with other sources of bibliographic information, resulting in a total of 144 titles. Of these 50 deal with the Ephydridae, 5 are concerned with the Ortalidae, 7 with the Trypetidae, alone or in conjunction with the Mydaidae, Ortalidae, or Sapromyzidae, 1 with the Scenopinidae, 2 with the Pipunculidae, 4 with Bombyliidae, 1 with Scathophagidae, 1 with Sciomyzidae, 6 with Micropezidae, alone or with the Neriidae or Ephydridae, 2 on Asilidae, 1 on Empididae, 1 on Psilidae, 1 on Xanthophagidae. There are 6 papers on Diptera of wider scope, besides 2 on collecting and mounting microdiptera. He wrote obituaries of three dipterists (Coquillett, Kertesz and Aldrich) and 30 reviews of entomological literature in the NEWS.

Outside the Diptera and due to his curatorial position are his list of Bassett's types of Cynipidae (1922) the Introduction to the list of types of Hymenoptera in the Academy's collection other than those of his father (1928), the Lepidoptera Rhopalocera of the George Vanderbilt African Expedition (1934), a note on the occurrence of the curious Ptinid beetle, *Gibbium psylloides,* in Philadelphia (1935), an entomological bibliography of Dr. Henry Skinner, with a list of the genera and species described by him (1926).

Entomologists are deeply indebted to him for many years of compilation of classified lists of entomological literature published in this journal; first in collaboration with James A. G. Rehn (1910–24) alone (1925–35), and subsequently with V. S. L. Pate, Miss Laura S. Mackey and Dr. Elizabeth G. Fisher (1936–39).

Two of Cresson's papers deal with problems of general entomology. One embraces his suggestions on the form (cards) and method of arrangement of a catalogue of, or index to, the literature of the species of insects (Fourth International Congress of Entomology, Trans. 2:484–87, 1929). The other deals with the terminology of types (Ent. News 45:122–26, 1934).

It is thus evident that the family Ephydridae was the chief subject of his research. He had planned a monograph of this group, as was obvious from his conversation and from hints in his published papers. In the last years of his life he realized that failing eye-sight and general health put this hope outside the range of possibility and he concentrated his energies on a series of "systematic annotated arrangements of the genera and species" of the Ephydridae of North America, the Neotropical, Ethiopian and Indo-Australian faunas. At the time of his death he was engaged on such a manuscript and had typewritten 42 pages in evidently final form; this has been completed under the care of his associates at the Academy and has appeared in volume 74 of the Transactions (1949).

His work on the Ephydridae was greatly facilitated by an event which he describes as follows: "Through the kindness of Dr. Carl Zerny of Vienna, I have had the privilege of studying the Ephydridae belonging to the Naturhistorischen Museums in Vienna. . . . The study of this collection has given me considerable additional knowledge, especially of the European species, and as it contains many of the types of Wiedemann, Meigen, Schiner and Becker, it has enabled me to secure first hand information on those species. The Meigen types had been examined and reported upon by Dr. Becker, but he did not select, or designate, any type specimens, which procedure is very necessary in order to establish more firmly the status of the species. By Dr. Zerny's permission I am selecting and indicating the types in all possible cases.

"Through the courtesy of the late Dr. Kertesz, of the Musée National Hongrois, I was granted the privilege of working up a collection from that institution, mostly Oriental in origin . . ." (Trans. Amer. Ent. Soc. li; 227, Oct. 8, 1925).

Four papers in the Transactions (1925, '29, '30, '32) give the results of his study of the Vienna collection and in the fourth he again emphasizes its great importance for his work. "The study of the Meigen types, made possible through the generosity and kindness of Dr. Zerny . . . , has been of inestimable value to me in securing the proper concepts of many of the older European species and the much desired foundation for subsequent work in this genus [*Hydrellia*]." In the course of this study, the types of new species, although derived from the Vienna Museum, are now in the Academy of Natural Sciences of Philadelphia and under the latter's type numbers (Trans. cited, 1932, pp. 2, 18, 19, 20, etc.).

The Ephydridae are small or very small flies (e.g., .88–5.0 mm. in length) and Cresson tells us that in studying them he made "constant use of a Zeiss binocular microscope with a combination giving a maximum of about 45 diameters, with an occasional use of a higher power" (Trans. 44:40). He had much of the technician in his make-up and devoted much time and thought to methods of doing all sorts of things, accumulating many devices for rapid mechanical manipulation. The small flies, and especially the Ephydrids, were not neglected in this respect, as two illustrated articles on Collecting and Mounting Microdiptera in the NEWS for November, 1910, and January, 1913, bear witness. He designed a pinning forceps which was put on the market by a well-known firm furnishing biological and entomological equipment.

His technique, however, stopped short of a study of the genitalia of these minuscules. Writing of the genus *Hydrellia* he remarks: "The male genitalia will probably prove to be of some value in the separation of the species, but I have not yet made any critical study of these organs, leaving this to be done when more material and time are available; furthermore their small size requires special technic which I have not the time now to develop."

Some years before his death he gave a summary of his work on the Ephydridae before the Naturalists' Forum at the Academy. From a memorandum, probably prepared for that occasion, found with other papers, we take the following: "When the study began, in 1908, the Academy's collection contained 5 species, 12 specimens. At the present it contains about 600 species, 340 of which have been described as new, [and] over 8,000 specimens. The North American series contains over 275 species. Over 26,000 specimens have been examined and determined during this study. This collection is the largest in the world and contains about 75 per cent of the known species."

Of Cresson's work as a curator we can not write better than is done in the following letter from the former curator of insects at the Museum of Comparative Zoology at Cambridge, Massachusetts. "The retirement of Ezra T. Cresson, Jr., moves me to express as forcibly as possible his great value, not only to the Philadelphia Academy, but to the numerous entomologists who depended upon him for information of types. He labored steadily in the most important, though often overlooked, work of preparation, arrangement and preservation of the collection. Such men are the foundation stones of a museum. Nathan Banks."

He was interested in music, played the piano, took lessons on the organ from the celebrated Henry Gordon Thunder, and for a time played the organ in the Episcopalian church at Swarthmore.

Forty years of personal association with Ezra T. Cresson, Jr., recall aid of all sorts received from him, from a minute's help in the manipulation of a microscope lamp to his assumption of the duties of Editor of the News for a year when illness laid the editor low. Sometimes, something could be done in reciprocity, but of him it can be said truly: He gave more than he received.

The writer is indebted to Mrs. Cresson, to his brother, Mr. William Cresson, and to Mr. James A. G. Rehn for information, for looking over this notice and for suggesting additions and improvements.

Philip P. Calvert.

Entomological Bibliography of Ezra T. Cresson, Jr.

from his own manuscript records and other sources

References to the journals in which most of his papers appeared are abbreviated as follows:

EN, Entomological News, Philadelphia.

NN, Notulae Naturae, Academy of Natural Sciences of Philadelphia.

PR, Proceedings of the same Academy.

TR, Transactions of the American Entomological Society, Philadelphia.

The titles of other journals are given in full.

1906 Some North American Diptera from the Southwest. Paper I. Ortalidae. TR xxxii, 279–288, pl. vi.

1907a Some North American Diptera from the Southwest. Paper II. Trypetidae, Mydaeidae. TR xxxiii, 99–108, pl. i.

1907b The North American species of the dipterous family Scenopinidae. TR xxxiii, 109–114, pl. ii.

1908a Dipterological Notes. I. Micropezidae. TR xxxiv, 1–12, pls. i, ii.

1908b Two new species belonging to the dipterous families Ortalidae and Trypetidae from Dutch Guiana, with notes on others of these Groups. EN xix, 95–99, pl. vi.

1910 Collecting and mounting Micro-Diptera. EN xxi, 406–410.

1911a Studies in North American Dipterology. Pipunculidae. TR xxxvi, 267–329, pls. v-ix.

1911b Daniel William Coquillett. EN xxii, 337–338, pl. x (portrait).

1912a Woe! Woe! Woe! Hear the voice of lamentation [editorial on specific names]. EN xxiii, 179.

1912a Descriptions of several new neotropical Acalyptrate Diptera. EN xxiii, 389–396, pl. xix.

1912b Studies of some Pipunculidae from the eastern United States. EN xxiii, 452–456.

1913a Collecting and mounting Micro-Diptera. II. Mounting. EN xxiv, 8–12.

1913b A partial review [Fauna of British India Diptera Nematocera by E. Brunetti, The Injurious and Beneficial Insects of California by E. O. Essig]. EN xxiv, 283–285.

1913c Descriptions of two new species of the dipterous genera Chaetopsis and Stenomyia, with notes on other species. (Ortalidae). EN xxiv, 317–321.

1914a The male of Syringogaster brunnea from Peru. EN xxv, 26, fig.

1914b "Daddy-long-legs?" (Phalangida, Tipulidae). EN xxv, 38.

1914c Costa Rican Diptera collected by Philip P. Calvert, Ph.D., 1909–1910 Introductory Remarks. TR xl, 1–8.

1914d Descriptions of new genera and species of the dipterous family Ephydridae. I. EN xxv, 241–250, pl. x.

1914e Some nomenclatorial notes on the dipterous family Trypetidae. EN xxv, 275–279.

1914f More nomenclatorial notes on Trypetidae. EN xxv, 323.

1914g Descriptions of new North American Acalyptrate Diptera. I. EN xxv, 457–460.

1915a Hints on packing insects for transportation. EN xxvi, 33.

1915b Descriptions of new genera and species of the dipterous family Ephydridae. II. EN xxvi, 68–72.

1915c A new genus and some new species belonging to the dipterous family Bombyliidae. EN xxvi, 200–207, fig.

1915d Photographing insects under magnification [review of A cold flame for zoological work by S. B. Doten]. EN xxvi, 270.

1915e Note on the Bombyliid genus Rhabdoselaphus Rond. (Pseudogeron Cr.). EN xxvi, 305.

1915f Some North American Diptera from the Southwest. Paper III. A revision of the species of the genus Mythicomyia [Empididae]. EN xxvi, 448–456, figs. 1–6.

1916a Studies in American Ephydridae. I. Revision of the species of the genus Paralimna. TR xlii, 101–124, pl. ix.

1916b Descriptions of new genera and species of the dipterous family Ephydridae. III. EN xxvii, 147–152.

1916c Dipterological Notes. II. A study of the lateralis group of the Bombyliid genus Villa (Anthrax of authors in part). EN xxvii, 430–444.

1917a Studies in American Ephydridae. II. A revision of the species of the genera Notiphila and Dichaeta. TR xliii, 27–66, pls. i, ii.

1917b Opening up a new field [review of Sarocophaga and allies in North America by J. M. Aldrich]. EN xxviii, 86–87.

1917c Descriptions of new genera and species of the dipterous family Ephydridae. IV. EN xxviii, 340–341.

1918a New North American Diptera (Scathophagidae). EN xxix, 133–137.

1918b Costa Rican Diptera collected by Philip P. Calvert 1909–10. Paper 3. A report on the Ephydridae. TR xliv, 39–68, pl. iii.

1919a Review (Wasp Studies Afield by P. & N. Rau). EN xxx, 54–55.

1919b Dipterological notes and descriptions. PR lxxi, 171–194.

1920a A Revision of the Nearctic Sciomyzidae (Diptera Acalyptratae). TR xlvi, 27–89, pls. i–iii.

1920b Descriptions of new North American Acalyptrate Diptera. II. Trypetidae, Sapromyzidae. EN xxxi, 65–67.

1920c Description of a new species of the Asilid genus Pogosoma. EN xxxi, 211–215.

1921 Catalogue of the Coleoptera of America, north of Mexico, by Charles W. Leng [notice]. EN xxxii, 62.

1922a Studies in American Ephydridae (Diptera). III. A revision of the species of Gymnopa and allied genera constituting the subfamily Gymnopinae. TR xlvii, 325–343, pl. xx.

1922b Descriptions of new genera and species of the dipterous family Ephydridae. V. EN xxxiii, 135–137.

1923a The Bassett types of Cynipidae. TR xlviii, 197–203.

1923b Let us try to help each other (Dip.: Borboridae). EN xxxiv, 58.

1923c Obituary Dr. Kalman Kertesz. EN xxxiv, 128.

1923d A new species of an Achias-like fly from Nicaragua, apparently belonging to the little known genus Plagiocephalus (Diptera: Ortalidae). EN xxxiv, 257–260.

1923e Records of some western Diptera with descriptions of two new species of the family Bombyliidae. PR lxxv, 365–367.

1924a Descriptions of new genera and species of the dipterous family Ephydridae. VI. EN xxxv, 159–164.

1924b Studies in the dipterous family Ortalidae, with descriptions of new species, mostly from North America. TR 1, 225–241.

1925a What shall be done with the News? [editorial]. EN xxxvi, 86.

1925b Descriptions of new genera and species of the dipterous family Ephydridae. VII. EN xxxvi, 165–167.

1925c Another record for the female of Glutops singularis (Dipt.: Leptidae). EN xxxvi, 211.

1925d Studies in the dipterous family Ephydridae, excluding the North and South American faunas. TR li, 227–258.

1926a Applied Entomology by H. T. Fernald [review]. EN xxxvii, 188.

1926b Concerning the types of Mallophora rex and chrysomela (Asilidae). Psyche xxxiii, 91.

1926c Descriptions of new species of the dipterous family Ephydridae from Hawaii. Proceedings of the Hawaiian Entomological Society vi, 275–278.

1926d Entomological Bibliography of Henry Skinner. EN xxxvii, 234–246.

1926e List of new genera and species described by Henry Skinner. EN xxxvii, 246–249.

1926f Descriptions of new genera and species of Diptera (Ephydridae and Micropezidae). TR lii, 249–274.

1927 How Insects Live by W. H. Wellhouse [review]. EN xxxviii, 89–90.

1928a [F. M. Mason collection of Coleoptera]. EN xxxix, 104.

1928b Introduction to The types of Hymenoptera in the Academy of Natural Sciences of Philadelphia other than those of Ezra T. Cresson. Memoirs Amer. Ent. Soc. v, 1–3.

1929a Studies in the dipterous family Ephydridae. II. TR lv, 165–195.

1929b A revision of the North American species of fruit flies of the genus Rhagoletis (Trypetidae). TR lv, 401–414.

1929c Index to the literature of the species of insects. Fourth International Congress of Entomology. Transactions, 484–487.

1930a Descriptions of new genera and species of the dipterous family Ephydridae. VIII. EN xli, 76–81.

1930b Studies in the dipterous family Ephydridae. III. TR lvi, 93–131.

1930c Notes on and descriptions of some Neotropical Neriidae and Micropezidae. TR lvi, 307–362.

1931a Notes on the Abstersa-group of the genus Tephritis, and a description of a new species from California (Diptera: Trypetidae). EN xlii, 3–5.

1931b Descriptions of new genera and species of the dipterous family Ephydridae. IX. EN xlii, 104–108.

1931c Descriptions of new genera and species of the dipterous family Ephydridae. X. EN xlii, 168–170.

1931d Diptera of Patagonia and South Chile based mainly on material in the British Museum (Natural History). Part VI. Fasc. 2—Ephydridae, 85–116. London, Br. Mus. (Nat. Hist.).

1931e (With A. Thienemann) Ephydriden der Deutschen Limnologischen Sunda-Expedition. Archiv fuer Hydrobiologie, Suppl. IX, Tropische Binnengewässer II, 585–586.

1932a Common Pests by R. W. Doane [review]. EN xliii, 55–56.

1932b Studies in the dipterous family Ephydridae. IV. TR lviii, 1–34.

1932c Die Rubenfliege (Pegomyia hyoscyami) by H. Bremer and O. Kaufmann [review]. EN xliii, 139–140.

1932d Special note [protest against Die neotropischen Chloropiden by O. Duda]. EN xliii, 168.

1932e Bibliography of William G. Dietz, M.D. EN xliii, 281–282.

1933a New African species of the dipterous genus Paralimna (Ephydridae). Annals & Magazine of Natural History (10) xi, 24–33.

1933b Descriptions of new species of the dipterous family Ephydridae. EN xliv, 65–70.

1933c Review [Ward's Entomological Bulletin, Turtox News]. EN xliv, 111–112.

1933d Macrolepidoptera of the World by Adolf Seitz [review]. EN xliv, 164–166.

1933e Fighting the Insect by L. O. Howard [review]. EN xliv, 223–224.

1933f A new genus and species of the dipterous family Ephydridae reared from duckweed. EN xliv, 229–231.

1933g Gulliver in the Bush by H. J. Carter [review]. EN xliv, 282.

1934a Ward's Entomological Bulletin [notice]. EN xlv, 83.

1934b Terminology of types. EN xlv, 122–126.

1934c Obituary notice John Merton Aldrich. EN xlv, 202.

1934d Descriptions of new genera and species of the dipterous family Ephydridae. XI. TR lx, 199–222.

1934e Yale North India Expedition. Report on Diptera of the family Ephydridae. Memoirs Connecticut Academy of Arts & Sciences x, 1–4.

1934f A note on the disposition of type material. EN xlv, 216–217.

1934g A reminder [International rules of Nomenclature]. EN xlv, 217.

1934h Two new species of the genus Hydrellia from Mount Desert, Maine (Diptera: Ephydridae). EN xlv, 234–236.

1934i Notes on a new Manual of North American Diptera [by C. H. Curran]. Comments and criticisms. EN xlv, 259–264.

1935a The Field Book of Insects by F. E. Lutz [review]. EN xlvi, 146.

1935b (With P. P. Calvert) Paul C. Stockhausen [obituary]. EN xlvi, 203–204, pl. II.

1935c Animalium Cavernarum Catalogus by B. Wolf [review]. EN xlvi, 229.

1935d A new species of Micropeza from Colorado (Diptera: Micropezidae). EN xlvi, 229–230.

1935e Occurrence of Gibbium psylloides Czemp. in Philadelphia (Coleoptera: Ptinidae). EN xlvi, 230.

1935f A fifty year Festschrift (Internationalen Entomologischen Vereins E. V. Frankfurt a. M.). EN xlvi, 257.

1935g Descriptions of new genera and species of the dipterous family Ephydridae. TR lxi, 345–372.

1936a (With R. G. Schmieder) Das Werden einer grossen Encyclopaedie by W. Junk [review]. EN xlvii, 53–55.

1936b Dipterologi by W. Junk, Hymenopterorum Catalogus by H. Hedicke [review]. EN xlvii, 55.

1936c Ward's Entomological Bulletin [notice]. EN xlvii, 75.

1936d Contribution to a Bibliography of the Described Immature Stages of North American Coleoptera by J. S. Wade [review]. EN xlvii, 112.

1936e Ancient Artizans by S. W. Frost [review]. EN xlvii, 227.

1936f Descriptions and notes on genera and species of the dipterous family Ephydridae. II. TR lxii, 257–270.

1936g The Templeton Crocker Expedition to western Polynesian and Melanesian Islands. 1933. Diptera, Ephydridae. Proceedings, California Academy of Sciences (4) xxii, 50–53.

1937a Descriptions of two new species of Indo-Australian Ephydridae. Arbeiten, morphologische u. taxonomische Entom., Berlin, iv, 205–207.

1937b Zoological results of the George Vanderbilt African Expedition of 1934. Part VIII. Lepidoptera Rhopalocera. PR lxxxix, 369–383.

1938a Descriptions of some North American Micropezidae. EN xlix, 72–76.

1938b Source Book of Biological Terms by A. L. Melander [review]. EN xlix, 89.

1938c Procedure in Taxonomy by E. T. Schenk & J. H. McMasters [review]. EN xlix, 89–90.

1938d Notes on and descriptions of some neotropical Ephydridae. Revista de Entomologica, Rio de Janeiro, viii, 24–40.

1938e The Neriidae and Micropezidae of America north of Mexico. TR lxiv, 293–366, 3 pls.

1939a Description of a new genus and ten new species of Ephydridae, with a discussion of the species of the genus Discomyza. NN 21, 12 pp.

1939b The Fulgoridae of Ohio by H. Osborn [notice]. EN l, 234.

1939c A Classification of the Larvae and Puparia of the Syrphidae of Illinois by E. M. Heiss [review]. EN l, 299.

1940a Descriptions of new genera and species of the dipterous family Ephydridae. XII. NN 38, 10 pp.

1940b Destructive and Useful Insects by C. L. Metcalf & W. P. Flint, Edition 2 [review]. EN li, 177.

1940c The Spider Book by J. H. Comstock, revised by W. J. Gertsch [review]. EN li, 178.

1941a New genera and species of North American Ephydridae. NN lii, 35–38.

1941b The species of the Neotropical genus Nostima (Diptera: Ephydridae). NN 78, 8 pp., 5 figs.

1941c (With E. P. Meiners) Charles L Heink [obituary]. EN lii, 119–120.

1941d Insect Pests of Farm, Garden and Orchard by L. M. Peairs [review]. EN lii, 259.

1942a Descriptions of two new Nearctic species of the genus Hydrellia reared from pondweed (Ephydridae). EN liii, 78–79.

1942b Synopses of North American Ephydridae. I. The subfamily Psilopinae, with descriptions of new species. TR lxviii, 101–128.

1943a Descriptions of new genera and species of the dipterous family Ephydridae. XIII. NN 121, 4 pp.

1943b The species of the tribe Ilytheini (Ephydridae: Notiphilinae). TR lxix, 1–16, pls. i, ii.

1943c Household Pests in Chicagoland by H. Hartnack [review]. EN liv, 129–130.

1943d In Retrospect [history of Ent. News]. EN liv, 164–166, 219–222.

1943e General Catalogue of the Hemiptera. Fasc. 4, Fulgoridae, part 3 Araeopidae (Delphacidae) by Z. P. Metcalf [review]. EN liv, 265.

1944a Descriptions of new genera and species of the dipterous family Ephydridae. XIV. NN 135, 9 pp.

1944b Synopses of North American Ephydridae Ia. Supplement to Part I on the subfamily Psilopinae. II. The tribes Hydrelliini, Hydrinini and Ilytheini of the subfamily Notiphilinae, with descriptions of new species. TR lxx: 159–180.

1944c A note on the dates of Loew's Diptera Americae Septentrionalis Indigena. EN lv, 206–207.

1945a A systematic annotated arrangement of the genera and species of the Indoaustralian Ephydridae. I. The subfamily Psilopinae. TR lxxi: 47–75.

1945b The Diptera or True Flies of Connecticut. Fasc. 1. by G. C. Crampton, C. H. Curran & C. P. Alexander [review]. EN lvi, 259.

1946a A systematic annotated arrangement of the genera and species of the Neotropical Ephydridae. I. The subfamily Psilopinae. TR lxxi: 129–163.

1946b Synopses of North American Ephydridae. III. The tribe Notiphilini of the subfamily Notiphilinae. TR lxxii: 227–240.

1946c A systematic annotated arrangement of the genera and species of the Ethiopian Ephydridae. I. The subfamily Psilopinae. TR lxxii: 241–264.

1946d Fleas of Western North America by C. A. Hubbard [review]. EN lviii, 246–247.

1947a A systematic annotated arrangement of the genera and species of the Neotropical Ephydridae. II. The subfamily Notiphilinae. TR lxxiii: 35–61.

1947b A systematic annotated arrangement of the genera and species of the Ethiopian Ephydridae. II. The subfamily Notiphilinae. TR lxxiii: 105–124.

1949 A systematic annotated arrangement of the genera and species of the North American Ephydridae. IV. The subfamily Napaeinae. TR lxxiv: 225–260.

A Few Ants from the Mackenzie River Delta

By William L. Brown, Jr., Biological Laboratories, Harvard University

During the month of July, 1948, Dr. Marie Hammer of Copenhagen, Denmark, collected a few ants on the dry bluffs near Reindeer Station on the Mackenzie River Delta, Canada. Most of the ants were nesting in rotten wood. This collection is of interest because of the scarcity of ant records from the Arctic; Reindeer Station is well above the Arctic Circle and only a few miles from the Arctic Sea.

Workers and females of *Camponotus herculeanus* Linn. and workers of *Formica fusca* Linn. were taken on several occasions nesting in rotten logs, branches and stumps. *Leptothorax* (*Mychothorax*) *acervorum* subsp. *canadensis* Prov. was taken twice as single stray workers, once in a rotten stump and once among leaves on the ground. One of the two *Leptothorax* specimens seemed transitional to the Alaskan subspecies *kincaidi* Pergande.

The determinations of the above were made in accordance with the manuscript of Dr. William S. Creighton's forthcoming book on North American ants.

Melon Aphids Inhabiting Roots *

By H. F. Chu, Institute of Zoology, National Academy of Peiping, Peiping, China

The melon aphid, *Aphis gossypii* Glover, is a most serious pest on cotton in China and it is properly known as the cotton aphid. Ordinarily, we consider that melon aphids feed on leaves, stems and buds of the hosts and are not known to attack the parts below the ground surface. However, when weather is cold during early Spring and late Autumn, the aphids in China go down from the leaves and stems to the base of the host-plant. Furthermore, the aphids reach to a depth of one to three inches underground and attack both the main roots and the root branches in large numbers. The discovery of these aphids living on the roots in Spring and Autumn is of importance in life-history studies. It, likewise, may be an important factor in the matter of controlling the pest.

When the author was working on the life-history of cotton aphids in Peiping, China, several more important oviposition host-plants were found. Among these host-plants, the aphids and their eggs were found on the roots of *Marrubium incisium* Benth., *Lactuca chinensis* Maxim., *Ixeris denticulata souchifolia* Stebb., *Ixeris chinensis versicolor* Kitam., *Viola yedoensis* Makino and *Viola prionantha* Bunge.

Ants play an uncertain relation to this habit. Many ants are usually found associating with the aphids on the roots. Apparently the ants appreciate the honey-dew voided by the aphids. They also dig soil around the base of host-plant in order that the aphids can get into the spaces between the roots and the ground. At the same time the soil particles dug by the ants form a small mound around the base of the host-plant and the aphids live underneath the mound. It was also observed that the aphids get into the soil through the soil cracks around the base of the host-plant.

* Contribution from the Institute of Zoology, National Academy of Peiping, Ser. C, No. 14.

Presence of a European Centipede in New York State

R. V. Chamberlin in 1945 (Ent. News, LVI, p. 199) reported that the European centipede, *Cryptops hortensis* Leach, hitherto taken only at quarantine stations in this country, occurred commonly in the cultivated soil about the campus near the biology building of the University of Utah at Salt Lake City.

During the past two years I have collected numerous adults and immature specimens of this centipede in and about Ithaca, New York. It has evidently become well established here in cultivated soil but more commonly in the lower strata of leaf piles.

The form occurring at Ithaca, New York is clearly *Cryptops hortensis hortensis* L. This subspecies was previously known from Europe, the Azores, St. Helena, and Madeira, but in view of Chamberlin's Utah records and the data here given, *Cryptops h. hortensis* must now be considered a naturalized member of the Nearctic fauna.—Ralph E. Crabill, Jr., Cornell University, Ithaca, New York.

Personals

Professor **J. Chester Bradley** has been spending the winter collecting insects in Africa for Cornell University. Although collecting all orders, particular attention has been given to the hymenopterous family Scoliidae in order to round out taxonomic studies long in progress. Last summer he attended the International Congresses of Zoology in Paris and of Entomology in Stockholm and the sessions of the International Commission on Zoological Nomenclature and visited museums in England, Sweden, France, Spain, and Italy. He and his wife, reaching Cairo in mid-October, traveled by rail and steamer to the source of the Nile. They spent three weeks in various parts of Uganda, then crossed into the Belgian Congo, where they visited the Parc Albert and collected at the base of Mt. Ruwenzori, in the Ituri rain forest, on the shores of Lakes Kivu and Tanganyika, and along the Lualaba River. Subsequently they visited the museums in Bulawayo, Pretoria, Durban, and Capetown, and collected in Southern Rhodesia, the Transvaal, Basutoland, northern Zululand, the coast of Pondoland, and in the desert area east of Great Bushmanland. The material collected will be available to specialists desirous of widening their knowledge of the Ethiopian fauna.

Mr. **Frederick H. Rindge,** a graduate of the University of California, has been appointed Assistant Curator in the Department of Insects and Spiders at the American Museum of Natural History in New York. Mr. Rindge will receive his doctor's degree in June, 1949, from the University of California where he has been working on the geometrid moth genus *Drepanulatrix* and its immediate relatives. In the capacity as Assistant Curator in charge of Lepidoptera he will continue his work on butterflies and moths.

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1949 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Bath, J. D. and O. L. Sponsler—An alternative method for the culture of Sciara larvae. [80] 109: 255. **Bierens de Haan, J. A.**—Über den Begriff des Instinktes in der Tierpsychologie. [Folia Biotheoretica] Ser. B, no. 2: 1–16, 1937. (Three other papers on instinct, by different authors, *Ibid.*, pp. 17–76.) **Čermák, I. K.**—Prof. Dr. Jindřich Uzel (Obit.). [Acta Soc. Zool. Cechoslovenicae] 11: 13–17, 1947. **Hoffman, C. H., H. K. Townes, H. H. Swift and R. I. Sailer**—Field studies on the effect of airplane applications of DDT on forest invertebrates. [25] 19 (1): 1–46. **Hrabě, S.**—Prof. Dr. Jan Zavřel (Obit.). [Acta Soc. Zool. Čechoslovenicae] 11: 18–24, 1947. **Kenk, R.**—The animal life of the temporary and permanent ponds in southern Michigan (Acarina and insects, pp. 50–53). [Misc. Publ. Mus. Zool. Univ. Mich.] No. 71. **Kiriakoff, S. G.**—Report on war damage in Europe. IV. Poland. [Lep. News] 3: 4. **Kitzmiller, J. B.**—The use of dioxane in insect microtechnique. [84] 67: 227–30, 1948. **Kontkanen, P.**—On the restriction of dominance groups in synecological research on insects. [Ann. Ent. Fennici] 2: 33–40, 1948. **Nicholson, A. J.**—Fluctuation of animal populations (Presid. address) [Rpt. 26th Meet. Austr. and N. Z. Assoc. Adv. Sci., 1947] pp. 134–48. **Popovici, Z.**—Los estudios de hidrobiologia en la Argentine. [Mus. Arg. Soc. Nat. "Ber. Riv."] Miscel. 1: 1–119, 1948. **Sotavalta, O.**—The flight-tone (wing-stroke frequency) of insects. [Acta Entom. Fennica] 4. **Vappula, N. A.**—Finnish entomological publications in 1946. [Ann. Ent. Fennici] 2a: 1–14, 1948. **Waddington, C. H.**—The concept of equilibrium in embryology. [Folia Biotheoretica] ser. B, no. 3: 127–38, 1948.

ANATOMY, PHYSIOLOGY, MEDICAL—Barigozzi, C. e G. Tonissi—Ricerche preliminari sul fototropismo dei mutante di Drosophila melanogaster. [Pontif. Acad. Sci., Commentationes] 10: 431–59, 1946. **Beament, J. W. L.**—The penetration of insect egg-shells. II. The properties and permeability of sub-chorial membranes during development of Rhodnius prolixus. [19] 39: 467–88. **Beaumont, A.**—A contribution à l'étude du métabolisme de l'hémoglobin de Gastrophilus intestinalis. [C. R. Soc. Biol., Paris] 142: 1369–71, 1948. **Butt, F. H.**—Embryology of the milkweed bug, Oncopeltis fasciatus (Hemiptera). [Cornell Univ. Agr. Exp. Sta., Memoir] No. 283: 1–43, ill. **Cumber, R. A.**—The biology of the humble bees, with special reference to the production of the worker caste. [88] 100: 1–45, ill. **DeBach, P.**—Population studies of the long-tailed mealybug and its natural enemies on citrus trees in southern California, 1946. [26] 30: 14–25. **Essig, E. O.**—Aphids in relation to quick decline and tristezia of citrus. [60] 25: 13–23. **Flemion, F.**—Lygus bugs in relation to the occurrence of embryoless seeds in Umbelliferae. [80] 109: 364–65. **Frisch, K. von**—Gelöste und ungelöste Rätsel der Bienensprache. I. [Die Naturwissenschaften] 35: 12–23, 1948. II. Die Tänze auf horizontaler Unterlage. *Ibid.* 38–43. **Ganapati and Tate**—On the gregarine Lankesteria culicis from the mosquito Aedes geniculatus. [61] 39: 291–94. **Goetsch, W.**—Entdeckung und Anwendung des Vitamin-T-Komplexes. [Naturw. Rundschau] 1: 115–18, 1948. **Grassé, P-P.**—Les antennes et le phototropisme chez Blatella germanica. [C. R. Acad. Sci., Paris] 228: 864–66. **Grison, P.**—Effets d'implantation de cerveaux chez de Doriphore (Leptinotarsa decemlineata) en diapause. [C. R. Acad. Sci., Paris] 228: 428–30. **Hadorn, E.**—Genetische und entwicklungsphysiologische Probleme der Insektenontogenese. [Folia Biotheoretica] ser. B, No. 3: 109–26, 1948. **Heitzmann. P. and G. Bouchard**—Sur le metabolisme de la cire d'Abeille par les microorganismes. [C. R. Acad. Sci., Paris] 228: 713–14. **Hurst, H.**—Reversible action of DDT. [53] 163: 286–87. **Ilse, D.**—Colour discrimination in the dronefly, Eristalis tenax. [53] 163: 255–56. **Jobling, B.**—Host-parasite relationship between the American Streblidae and the bats, with a key to the American genera and a record of the Streblidae from Trinidad, B.W.I. [61] 39: 315–29. **Katz, B.**—Neuro-muscular transmission in invertebrates. [Biol. Reviews, Cambr. Phil. Soc.] 24: 1–20. **Kerr, W. E.**—Formação das castas no gênero Melípona. Nota prévia. [An. Esc. Sup. Agric. "Luiz de Queiros," Univ. São Paulo] 3: 299–312, 1946. **Koch, A.**—Wege und Ziele der experimentalen Symbioseforschung. [Naturw. Rundschau] 1: 166–71, 1948. **Landa, V.**—Contributions to the anatomy of ephemerid larvae—1: Topography and anatomy of tracheal system. [Acta Soc. Zool. Cechoslovenicae] 12: 25–82, 1948. **Ledoux, A.**—Biologie des femelles de la fourmi fileuse (Oecophylla longinoda) e'levées isolement. [C. R. Acad. Sci., Paris] 228: 430–31. **Milne, A.**—The ecology of the sheep tick, Ixodes ricinus. Host relationships of the tick. Pt. 1. Review of previous work in Britain [61] 39: 167–72.—Pt. 2. Observations on hill and moorland grazings in northern England. *Ibid.:* 173–97. **Newcombe, Sandoz and Rogers-Talbert**—Differential growth and moulting characteristics of the blue crab Callinectes sapidus. [41] 110: 113–52. **Noirot, C.**—Le developpement des neutres chez les termites superieurs. [C. R. Acad. Sci., Paris] 228: 600–02. **Peklo, J. and J. Satava**—Fixation of free nitrogen by bark beetles. [53]

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Review

A Century of Entomology in the Pacific Northwest. By Melville H. Hatch, 1949, University of Washington Press, Seattle. Pp. vii, 43, 9 halftone illustrations (portraits). Publication date, March 14, 1949. Price $1.50.

The century of entomology here concerned began when "Insects were first collected in the lower Columbia River country in the years 1834 to 1836 by Dr. John Kirk Townsend (1809–1851), an ornithologist of Philadelphia." "The Pacific Northwest" embraces British Columbia, Washington, Idaho and Oregon. The century is divided into three periods: those of the itinerant collectors (1834–1879), of the resident collectors (1879–1890), and of established entomological laboratories (1890–1930), while the fourth chapter considers the years from 1930 to the present. The third chapter, on the period of established laboratories, is the longest in the book (pp. 8–19). The fifth chapter lists the principal insect collections in the area, the largest being that at the Oregon State College, "said to number about 150,000 specimens, of which about ninety percent are from Oregon and about two-thirds are named. It includes 285 types." The literature, profusely cited, amounts to 250 titles, occupying pp. 29–40, and is accompanied by a taxonomic index. The index of names of entomological workers approaches 220 entries (pp. 42–43). The portraits are of John M. Aldrich, A. L. Melander, George W. Taylor, R. C. Treherne, A. L. Lovett, E. M. Blackmore, Ralph Hopping, Orson Bennett Johnson and Trevor Kincaid. Aldrich is described as "famous dipterist and most eminent entomologist ever to have sought residence in the Pacific Northwest."

Twenty-three years ago, Prof. Hatch contributed an historically penetrating article to Entomological News (June, July, 1926), entitled "Thomas Lincoln Casey as a Coleopterist." Much of the high quality as a writer there displayed is evident in this new book on Pacific Northwest Entomology. It will be most helpful to those interested in the systematic, geographic and economic aspects of the subject of this region.

Philip P. Calvert.

EXCHANGES

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

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

Wasps (Vespoidea, Sphecoidea, Chrysidoidea) of the world by exchange or purchase. Will collect other orders in exchange. D. G. Shappirio, 4811 17th St., N.W., Washington 11, D. C.

Lepidoptera—Large quantities of Plexippus, Colias, Cardui, Vanillae wanted for cash or exchange for tropical butterflies. G. MacBean, 710 Miller Rd., Sea Island, Vancouver, B. C.

Ants of the tribe Dacetini (*Strumigenys, Rhopalothrix* and related genera) wanted for world revision. W. L. Brown, Jr., Harvard University Biological Laboratories, Cambridge 38, Mass.

Mallophaga (on which immediate determination is not necessary) wanted for study and determination. R. L. Edwards, Dept. Biology, Harvard University, Cambridge 38, Mass.

Tingidae (Heteroptera) of the world wanted, in alcohol, with host and other ecological data. Will collect other orders in exchange. N. S. Bailey, 16 Neponset Ave., Hyde Park 36, Mass.

Bombidae, nearctic and neotropical, wanted for exchange, identification, or purchase. Will exchange in other groups for bumblebees. Barth Maina, Dept. Zool., Univ. of Chicago, Chicago 37, Ill.

Saturnidae of the world. Will purchase individual specimens or cocoons. F. E. Rutkowski, St. Bede College, Peru, Illinois, U. S. A.

Butterflies of New England, principally from New Haven, Conn., for exchange. Louis Clarke, 28 W. Elm St., New Haven 15, Conn.

Wanted—Proc. Ent. Soc. Phila., vols. 1–6; Proc. Cal. Acad. (Nat.) Sci., 1–7; Proc. Acad. Nat. Sci. Phila., 1–20; Trans. Amer. Ent. Soc., 1–10; Bull. Buff. Soc. Nat. Sci., 1–5; Psyche, 11, 13, 15; Ent. Amer. n.s., 7–26. C. F. dos Passos, Mendham, N. J.

Miridae (Capsidae)—American species wanted, with locality labels, in exchange for British species. D. Leston, F.R.E.S., 6 Frognal Rise, London N. W. 3, England.

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The Identity of Habrobracon pectinophorae Watanabe (Hymenoptera: Braconidae)

By P. W. Whiting, Department of Zoology, University of Pennsylvania

Inaba (1939) reported diploid males, triploid females, a gynandromorph and a haplo-diploid mosaic male in *Habrobracon pectinophorae* Watanabe. Her stocks were "derived from the culture of the wasp with *Ephestia* which are kept in the Government Agricultural Experiment Station in Tokyo and the Prefectural Agricultural Experiment Station in Sizuoka for the purpose of checking the famous pest of rice-plant, *Chilo simplex*" (p. 517). Two mutations, *curved* antennae and *white* eyes, were used in the genetics experiments. Later (Inaba, 1940) impaternate females were produced following colchicine treatment.

The genetical and cytological conditions are in general similar to those found in *Habrobracon juglandis* (Ashmead) and in *Habrabracon brevicornis* (Wesmael) as reported in numerous papers by the writer and others (Whiting, 1945). The diploid males of *H. pectinophorae* proved of relatively high fecundity and the chromosomes, though similar in number to those of *H. juglandis*, showed certain differences in shape.

Following Cushman (1922) the names *H. juglandis* and *H. brevicornis* have been used in the genetical literature to designate the two species which are clearly distinct, but previous to that time *H. brevicornis* was applied indiscriminately to both species. *H. juglandis*, a natural parasite of stored products Lepidoptera, is a synonym of *Microbracon hebetor* (Say), and

H. brevicornis, a natural parasite of the European Corn-Borer, *Pyrausta nubilalis* Huebner, is a synonym of *Microbracon brevicornis* (Wesmael) according to Muesbeck (1925).

In a recent letter (March 4, 1949) Muesebeck informs me that "*Habrobracon pectinophorae* Watanabe was described in 1935 (Insecta Matsumurana, vol. 10 (1 and 2), p. 44). The type series which is deposited in the Hokkaido Imperial University, Sapporo, Japan, was reared from *Pectinophora gossypiella* (Saund.), the pink bollworm." In an earlier letter (July 30, 1948) Muesebeck states: "I examined the series of *Habrobracon pectinophorae* Watanabe rather carefully but I found no basis whatever for distinguishing this sample from what we have long known as *Microbracon hebetor* (Say). It is only natural to expect a parasite of such cosmopolitan Lepidoptera as the Indian-meal moth and the various species of *Ephestia* and *Sitotroga* to occur almost everywhere."

Mr. A. H. Lankenau, a graduate student for a time at the University of Pennsylvania, became interested in *H. pectinophorae* and had considerable correspondence with occupation authorities in Japan in an endeavor to obtain material. A living culture was finally received in July 1948, trans-shipped from San Francisco to Philadelphia. Since Mr. Lankenau had meanwhile left the University for other work, the material was trans-shipped to me at the Marine Biological Laboratory, Woods Hole, Massachusetts, where it was received in excellent condition. No differences in form or color could be distinguished between this stock and the wild type stock of *H. juglandis* with which genetics experiments were in progress. Crosses were made with both wild type and with mutant types. The F_1 "hybrid" females were fully fertile and resembled the dominant wild type parents. Mutant traits introduced from *H. juglandis* reappeared in F_2 according to expectation.

No cytological studies have been made on the material shipped from Japan. However, in view of the fact that chromosomal differences were reported by Inaba, it was thought worth while to make some tests with genes showing linkage in *H. juglandis*. Accordingly the problem was assigned to Mr. Robert L.

Cornish, a student at the University of Pennsylvania. Mr. Cornish made crosses of the wild type *pectinophorae* females with *juglandis* males, some of which carried the linked genes *stubby* antennae, *black* body color and *cantaloup* eye color and others carried the linked genes *long* antennae, *honey* body color and *veinless* wings. F_1 unmated females were isolated in each case and F_2 impaternate males segregating the different traits were classified and counted. The linkage relationships proved similar to those found in the American material. It may therefore be concluded that if genetic differences exist they do not significantly involve the chromosomal regions containing the genes tested. Tests for other regions might possibly show tightening of linkage due to chromosomal inversions, translocations, etc. Such irregularities are suggested in different stocks of *H. juglandis*. The Japanese material recently received may also be different in some respects from that investigated by Inaba.

Distinct races differing genetically are not to be expected in such a cosmopolitan species in which the germ-plasm is subject to continuous intermixture. In any case there appears to be no basis for specific distinction between our "*juglandis*" stocks, and the Japanese "*pectinophorae*." Both are specifically identical with *Microbracon hebetor* (Say).

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A New Species of Mallophaga from a Partridge

By K. C. Emerson, Oklahoma A. and M. College,
Stillwater, Oklahoma

Colinicola pallida n. sp.

Female. Head circumfasciate; clypeal margin pointed. Trabeculae well developed. Antennae filiform, the second segments being the longest. Temples rounded but not expanded or produced. Chaetotaxy of the head as in *C. docophoroides* (Piaget 1880). Prothorax short, with one dorsal seta in each posterolateral angle. Pterothorax slightly longer than prothorax, widest at the posterior margin. Seven posterior dorsal pterothoracic setae on each side of a bare median area. Abdomen elongately oval. Tergal plates prominent, separated medianly; each with a row of setae on the posterior margin. Dorsal chaetotaxy as follows: segment I, 4—4; segment II, 8–4–8; segment III, 8–6–8; segment IV, 8–6–8; segment V, 6–4–6; segment VI, 4–4–4; and segment VII, 3–2–3. In addition to the above chaetotaxy, there is one postspiracular seta on each side of segments II to VII.

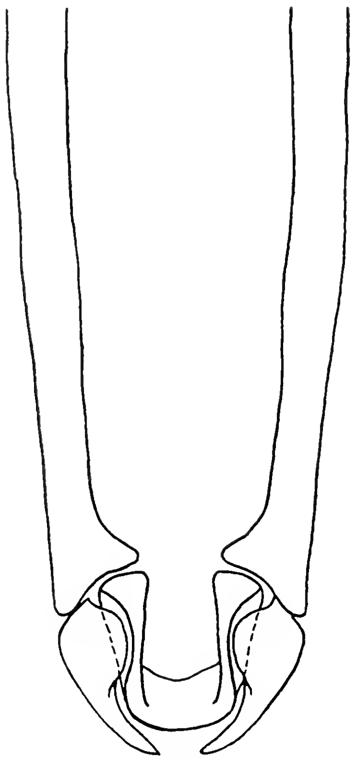
Male. Head approximately the same size as in the female. First antennal segments enlarged but without appendages; second segments of normal diameter but as long as the first; third segments prominently curved; fourth segments produced at angles. Chaetotaxy of the head as in the female. Thorax and abdomen essentially the same shape, as in the female, but smaller. Dorsal chaetotaxy of the tergal plates as in the female; but without the median setae between the tergal plates. Genitalia as shown in fig. 2.

Type host: *Callipepla squamata pallida* Brewster, Arizona Scaled Partridge.

Type material: *Holotype* male, *allotype* female, and *paratypes* collected by O. G. Babcock and H. S. Peters in Pecos County, Texas (Bishopp No. 12886).

Discussion

Four species of this genus are now known from the United States. In *Colinicola mearnsi* Emerson 1948 and *C. numidianus* (Denny, 1842), the clypeal margin is broad and evenly rounded. *C. docophoroides* (Piaget 1880) and *C. pallida* n. sp. each have a narrow clypeal margin which is very pointed. The latter two can be easily separated by a comparison of the male genitalia.



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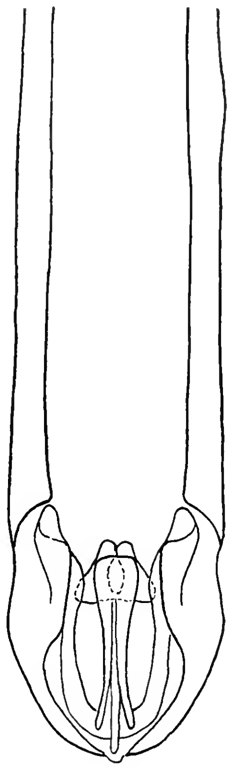

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Fig. 1. Male genitalia of *Colinicola docophoroides* Piaget.
Fig. 2. Male genitalia of *Colinicola pallida* n. sp.

Late Summer Invertebrates, Mostly Insect, of the Alaskan Arctic Slope

By NEAL A. WEBER, Swarthmore College, Swarthmore, Penna.

The Alaskan Arctic slope is that part of Alaska draining to the Arctic Sea and is a treeless area. August 19 to September 5, 1948, a brief visit was paid to this region (Entomological News, December 1948, 59:253–257).[1] Snow fell during most of the nights and the temperatures were generally in the 30°'s and 40°'s Fahrenheit. Most of the conspicuous insects had disappeared this late in the season and the present records reflect mainly a sampling of the fauna remaining active at the time. The collections were made chiefly at Pt. Barrow (Latitude 71° 21′ North) and at Anaktuvuk Pass on the north front of the Brooks Range in the Endicott Mountains (Latitude 68° 05′ North). From the Alaskan Arctic slope there are very few records and these mostly by Riley (1884, United States Polar Expedition) and Johansen, Hewitt, et al. (1918–22, Canadian Arctic Expedition of 1913–18).

The records are listed below by phyla, classes and orders of the animals involved, beginning with Annelida and ending with Arthropoda.[2] They are of adults unless otherwise stated.

ANNELIDA

PISCICOLIDAE: A specimen of the leech, *Ottonia* or near, was taken from the side of an Arctic herring at Anaktuvuk Pass.

[1] By courtesy of the Office of Naval Research and the Arctic Research Laboratory.

[2] I am much obliged to the following for identifying these specimens, most of the identifications of which were arranged through the kind co-operation of Drs. E. A. Chapin, C. F. W. Muesebeck and Waldo Schmidt: H. E. Anthony, J. Bequaert, R. E. Blackwelder, L. L. Buchanan, H. W. Capps, T. D. Carter, O. L. Cartwright, F. A. Chace, R. V. Chamberlin, W. J. Clench, J. C. Crawford, P. F. Darlington, W. J. Gertsch, G. Glance, C. T. Greene, A. B. Gurney, K. V. Krombein, H. Morrison, M. C. Myer, P. W. Oman, J. A. G. Rehn, W. E. Ricker, H. H. Ross, L. M. Russell, C. W. Sabrosky, R. J. Sailer, A. Stone, H. K. Townes.

OLIGOCHAETA: Oligochaete worms were taken from the tundra debris of lemming runways at Pt. Barrow.

MOLLUSCA

GASTROPODA

Valvata lewisi helicoidea Dale. Anaktuvuk. At shore of small lake and hibernating to a depth of 6-8 inches in the tangle of roots and humus along a stream bed. "Alaska, Yukon, British Columbia" (Clench).

Lymnaea randolphi Baker. Anaktuvuk. Young specimens at lake shore and adults scattered dead on tundra or at lake shores. Largest species here. "Alaska, Yukon, British Columbia" (Clench).

Vertigo modesta Say. Anaktuvuk. At base of *Salix* in humus. "New England to California and north" (Clench).

Succinea strigata Pfr. Anaktuvuk. Common on tundra. One specimen was crawling August 27 amid small patches of snow on the tundra near a small lake. Also specimen at Umiat in *Alnus* thicket. "Greenland to Bering Strait" (Clench).

PELECYPODA

Sphaerium stamineum Conrad. Anaktuvuk. At shore of small lake. "Northern U. S. and north through Canada" (Clench).

ARTHROPODA

ARACHNIDA

Spiders are numerous and important animals of the tundra. The distribution of the species below was kindly given by the identifier, Dr. Gertsch, and may be seen to be primarily holarctic.

Lycosidae

Pardosa tesquorum Odenwall—Anaktuvuk. A Siberian species.

Pardosa varians Gertsch—Anaktuvuk. Known from Northwestern Canada.

Pardosa lapponica Thorell?—Anaktuvuk. A European species.

Pardosa tristis Thorell—Anaktuvuk. Known from the Rocky Mountains.

Tarentula pictilis Emerton?—Anaktuvuk.

Thomisidae

Xysticus britcheri Gertsch—Anaktuvuk. Described from New York and hitherto known only from one or two specimens.

Thanatus formicinus Clerck—Anaktuvuk. A European species.

Gnaphosidae

Gnaphosa orites Chamberlin—Umiat (Per Scholander). A European and probably Siberian species.

Dyctynidae

Dictyna sp.—Anaktuvuk.

Argiopidae

Tetragnatha extensa Linnaeus—Anaktuvuk. A European and Siberian species.

Aranea sericata Clerck—Anaktuvuk, two spiders in neat cocoon with dead leaves attached. A European and Siberian species.

Linyphiidae

Coryphaeolana sp.—Pt. Barrow.

Hilaira curvitarsis Sorensen—Pt. Barrow, common on tundra. Known from Northern Canada and Greenland.

"*Erigone*" *chilkatensis* Chamberlin and Ivie?—Anaktuvuk, under small rocks with south exposure on island in river bed.

Erigone sibirica Kulczynski?—Anaktuvuk. A Siberian and European species.

Erigone psychrophila Thorell—Pt. Barrow, among grass and herbs on tundra.

"*Erigone*" sp. A—Pt. Barrow, crawling slowly on hillock of tundra which had a surface temperature of 36°, with patches of snow in vicinity.

"*Erigone*" sp. B—Anaktuvuk, under small rocks with south exposure on island in river bed.

CHILOPODA

Dr. R. V. Chamberlin has recently described the following (ENT. NEWS, 1949, 60: 12–15):

Lithobiidae

Arebius integrior Chamberlin—Anaktuvuk, tundra margin of river. The type and only known locality.

Escimobius cryophilus Chamberlin—Anaktuvuk. The type and only known locality.

Oabius sp.—Whitehorse, Yukon Terr. Under loosely buried wood in sandy soil with second growth pine beside the airport.

Schendylidae

Escaryus paucipes Chamberlin—Anaktuvuk Pass, valley tundra. Previously known only from Haines, Alaska.

INSECTA

Collembola

Collembola are of the utmost importance to many forms of life and, with mites, are probably the most numerous animals of the tundra. The study of the specimens by Miss Glance is not yet completed and there are a number of species in addition to the three below.

Entomobryidae

Folsomia spp.—Pt. Barrow, in tundra.

Isotoma sensibilis—Pt. Barrow, in tundra.

Poduridae

Achorutes sensilis Folsom—Pt. Barrow, in tundra.

Orthoptera

Melanoplus m. mexicanus (Sauss.)—Fairbanks, September 7, in weedy lot. "The widely distributed lesser migratory locust. About a peripheral record" (Rehn).

Chorthippus longicornis (Latr.)—Fairbanks, September 7, in weedy lot. "A holarctic species ranging from North Europe to Eastern Canada and into the more boreal parts of the U. S." (Rehn).

Thysanoptera

Thripidae

Thrips sp. were taken August 25 and 30 at Anaktuvuk, on the former date on galls of *Salix*, on the latter from tundra at base of *Salix*. Also September 1 at Pt. Barrow from tundra with surface temperature of 36° F.

Corrodentia

Corrodentia may be added to the list of "snow insects," insects to be found walking actively or tunnelling in snow, on the basis of several taken at Anaktuvuk. One was taken while burrowing into the snow which at the time had a surface temperature of 28° F., the air temperature being 32° F.

Mallophaga

Specimens of the common species of eider ducks and murres at Pt. Barrow which were briefly examined appeared to be free of Mallophaga. This was also true of Greater Scaup and Old Squaw at Anaktuvuk. On a Golden Plover at Barrow a single young nymph of a species of *Mysidea* or some related genus was taken.

Trichodectidae

Trichodectes mephitidis Osborn. On Arctic weasel, *Mustela arctica arctica* (Merriam). Anaktuvuk. "Probably new host and new northern Alaskan record." "Known from *Mustela noveboracensis*, *Mephitis mephitica* and *Spilogale interrupta*" (Bequaert).

Anoplura

Echinophthiriidae

Antarctophthirus trichechi Boheman. On Pacific walrus, *Odobenus divergens* (Illiger), Pt. Barrow. "Known from walrus in Greenland, Spitzbergen and the coast of N. E. Siberia" (Bequaert).

Homoptera

Psyllidae

Psylla alaskensis Ashm.—Umiat.
Psylla sinuata Crawf.—Anaktuvuk, along river margin.
Trioza sp., near *varians* Crawf.—Anaktuvuk.

Aphidae

Prociphilus sp., probably apterous. Anaktuvuk.

Coccidae

Puto sp., probably undescribed. Anaktuvuk, base of dwarf *Salix*.

Hemiptera

Anthocoridae

Anthocoris melanocerus Reuter. A pair *in copula,* Umiat, in *Alnus* thicket and a specimen at Anaktuvuk, at base of *Salix*.

Plecoptera

Capniidae

Capnia oenone Neone—Anaktuvuk, males and females crawling on stem of dwarf *Salix* on island in stream and walking on snow with surface temperature of 29° F. "Previously known only from southern British Columbia" (Ricker).

Nemouridae

Nemoura trispinosa Class. Anaktuvuk, on dwarf *Salix* and on rocks in river.

Trichoptera

Limnephilidae

Grensia praeterita (Walk.) Anaktuvuk, the common trichopteran at this time.

Genus uncertain. "May be *Grensia* but latter is not yet described" (Gurney). Anaktuvuk, larvae August 26 in pool (39° F.).

Lepidoptera

Lymantriidae

Byrdia sp. Anaktuvuk, August 27. A large, densely hairy larva.

Phalaenidae

Species undet. Umiat, in *Alnus* thicket.

Diptera

Suborder Nematocera

Tipulidae

Tipula sp.—Anaktuvuk, large larvae in pools, one at 39° F.; Pt. Barrow, August 21.

Culicidae

Aedes sp.—Whitehorse, Yukon Terr., August 18; Anaktuvuk, August 27. Mosquitoes were mostly absent, sluggish and non-biting. Unidentified males, Pt. Barrow, August 21.

Bibionidae

Bibio sp.—Anaktuvuk, larvae August 28.

Fungivoridae

Lycoria sp.—On lab window at Barrow, in *Alnus* thicket at Umiat and about *Salix* at Anaktuvuk. Tiny and midge-like.

Boletina sp.—Umiat, in *Alnus* thicket.

Phronia sp.—Anaktuvuk, flying in lee of river bank August 25. Appearance suggesting Drosophila.

Rhymosia sp.—Anaktuvuk.

Melusinidae

Melusina sp.—Pt. Barrow, Anaktuvuk, superficially suggesting spindly tipulids and moderately large.

Simuliidae

Simulium arcticum Mall.—Anaktuvuk, becoming a nuisance at lake shore, noon, August 27.

Tendipedidae

Spaniotoma sp.—Pt. Barrow, and the commonest midge at Anaktuvuk. They were taken walking on snow which had a surface temperature of 28° F., the air temperature being 32° F., and floating on pools. Larvae were taken at Pt. Barrow in snowy owl pellets consisting of fur and bones of *Dicrostonyx r. rubricatus* (Rich.). In addition Collembola lived in this medium. Larvae here on the tundra were also "looping" over the wet soil which had a temperature of 36° F., snow patches in the vicinity having a temperature of 29° F. and tiny pools of 36° F. Larvae at the very tip of Pt. Barrow, a low sandspit, remained active in the top inch of tundra, beneath which the soil was partially frozen. Other larvae at Anaktuvuk were active in a pool beside the river.

Diamesa sp.—Anaktuvuk, midges resembling *Spaniotoma* but not taken as often. Found walking on snow with a surface temperature of 28.5° F.

Empididae

Bicellaria pilipes Loew—Anaktuvuk, resembling the common *Spaniotoma* but slightly heavier and with darker wings.

Phoridae

Megaselia dubitata Mall—Anaktuvuk, *Drosophila*—like except for larger wings and much smaller than the *Bicellaria.*

Suborder Cyclorrhapha

Calliphoridae

Phaenicia sp.—Pt. Barrow, larvae on or in an Eskimo dog carcass August 22 which had lain on the tundra near the sea for some three or so months but which was decomposing very slowly in the cold climate.

Calliphora terrae-novae Macq.—Whitehorse, Yukon Terr., August 18 at window in house.

Cynomyopsis cadaverina (R.D.)—Pt. Barrow, pupae from dog carcass of *Phaenicia* above.

Boreëllus atriceps Zett.—Pt. Barrow, pupae from dog carcass of *Phaenicia* above from which imagoes emerged on the tenth day following (August 31).

Protophormia terrae-novae (R. D.)—Pt. Barrow, September 1-5, appearing at the inside of windows of Arctic Research Laboratory; probably brought in as immatures on caribou skins. Anaktuvuk, August 26.

Larvaevoridae

Genus and species?, near *Alaskophyto*—Anaktuvuk.

Scopeumatidae

Scopeuma nubiferum (Coq.)—Pt. Barrow, dead in pool, August 22.

Probably species of Scopeumatidae (immature).—Anaktuvuk.

Muscidae

Alliopsis obesa Mall.—Anaktuvuk, alighting twice momentarily on snow bank covering permanent ice in bend of river.

Genus and species?—Anaktuvuk, small muscid alighting on jacket as if seeking place for oviposition.

Hylemya sp.—Whitehorse, Yukon Terr., August 18, at window of building.

Acalyptratae

Piophilidae

(?) [*Allopiophila*] sp. "Possibly a new genus and new species. It seems near *A. aterrima* (Becker), described from Novaya Zemlya" (Sabrosky). Pt. Barrow, on turfy tundra August 22 and appearing from carcass of small duck September 2 at tip of sandspit of the point. Beneath the duck the ground was covered with frost crystals and maggots here were contracted and immobile. Imagoes appeared 24 hours later from the carcass in the laboratory.

Heleomyzidae

Neoleria tibialis (Zett.), at least in sense of authors—Anaktuvuk, of *Drosophila* size but more slender.

Neoleria sp.—Pt. Barrow, small, dark and compact imagoes under the Eskimo dog carcass described under *Phaenicia* above; sluggish in the near-freezing temperature, ice and snow on the tundra not thawing (August 22).

Oecothea aristata Mall.—Anaktuvuk.

Sphaeroceratidae (Borboridae)

Leptocera fontinalis (Fall.).—Pt. Barrow, small, compact and dark flies appearing in the mess hall sparingly at the dining tables. Numbers were found dead in a 30 gal. can of cornmeal. Not a pest and reported to be present only in 1948.

Copromyza sp.—Pt. Barrow, with *Leptocera* above, and under dog carcass of *Phaenicia* et al. above.

Agromyzidae

Agromyza immaculata Coq.—Anaktuvuk, tiny, with long wings, flying in lee of river bank.

Agromyza sp.—Anaktuvuk, as above.

Coleoptera

Carabidae

Curtonatus sp.—Anaktuvuk, palest carabid taken.

Cryobius sp.—Anaktuvuk, apparently the smallest and commonest carabid here.

Stereroceras haematopus Dej.—Anaktuvuk, iridescent and moderately sculptured.

Lyperopherus agonus Horn—Anaktuvuk, the largest and most sculptured carabid taken.

Dytiscidae

Hydroporus sp. in pool (39° F.), Anaktuvuk, August 26.

Silphidae

Silpha lapponica Hbst.—Anaktuvuk, larva with mites numerous and attached to ventrum.

Staphylinidae—Tachyporinae

Larvae in tundra, Pt. Barrow, August 20–23.

Staphylinidae—Staphylininae

Larva (unident.) in tundra, Anaktuvuk.

Micralymma brevilingue Schiodte—Pt. Barrow, September 1.

Tachinus apterous Maklin. In tundra, Pt. Barrow, September 1 (first record from mainland).

Staphylinidae—Omaliinae

Larvae (unident.) in tundra, Pt. Barrow, including very tip of Point, September 1–2.

Elateridae

Cryptohypnus sp. (prob. *nocturnus* Esch.). Larva, Anaktuvuk, August 25.

Curculionidae

Lepidophorus lineaticollis Kby.—Anaktuvuk, in soil near Eskimo racks of caribou meat, August 25.

HYMENOPTERA

Tenthredinidae

Euura sp.—Anaktuvuk, in vicinity of gall of *Salix*.
Allantinae larva—Anaktuvuk.

Ichneumonidae

Promethes elongatus (Prov.)—Whitehorse, Yukon Terr., August 18.
Stenomacrus brevipennis (Ash)—Pt. Barrow, among grass and herbs August 20.
Stenomacrus sp.—Anaktuvuk, crawling through thin vegetation on island in stream bed, August 26.
Atractodes sp.—Anaktuvuk.

Diapriidae

Xenotoma sp.—Anaktuvuk.

Formicidae

Leptothorax acervorum canadensis Provancher—Umiat (Per Scholander). Nearctic equivalent of a palearctic species.

Apidae

Bombus moderatus Cr.—Anaktuvuk, August 27.

Vespidae

Vespula norvegica albida Sladen—Anaktuvuk.

The Simuliidae of Pennsylvania (Dipt.)*

By S. W. Frost, The Pennsylvania State College

During 1948, 160 blackfly adults were separated from a large number of insects taken in light traps operated in twenty widely-separated localities of Pennsylvania. These catches supplied sufficient information for a preliminary report on the abundance and distribution of the Pennsylvania species. Eleven species were taken including several of considerable economic importance. A few records have been added from specimens in the Harrisburg collection. All were kindly determined by Dr. Alan Stone of the U. S. National Museum, Washington, D. C.

Summary of the Simuliidae taken in Pennsylvania

Species	Number males	Number females	Number of localities	Dates of collection
Simulium vittatum Zett.	15	90	5	May 28 to Sept. 9
Simulium fibrinflatum Twinn	0	9	2	June 17 and Sept. 7
Simulium pictipes Hag.	7	0	1	May 2
Simulium venustum Say	1	5	4	May 21 to July 3
Simulium aureum Fries	1	0	1	June 14
Simulium perissum D & S.	1	0	1	June 2
Simulium hydationis D & S.	1	0	1	June 9
Simulium jenningsi Mall.	0	1	1	June 7
Prosimulium hirtipes Fries	1	25	9	Apr. 4 to June 2
Prosimulium magnum D & S.	0	1	1	May 6
Eusimulium species	0	2	2	May 28 and June 18
Total 11 species	27	133		

This figure represents a fair proportion of the species likely to be found in Pennsylvania. Approximately 50 species of Simuliidae are known from North America. Thirty-three of these are limited in distribution to the Western United States, Alaska and Canada. Another twelve species are restricted to

* Authorized for publication on February 28, 1949 as paper No. 1516 in the Journal Series of the Pennsylvania Agricultural Experiment Station.

the Southern United States, Central America and the West Indies. Only seven distinct species are given in "A List of the Insects of New York." The Pennsylvania records are slightly more extensive. The following species, common in Eastern United States, should also occur in Pennsylvania: *Simulium metallicum* Bellard, *Eusimulium mutatum* (Mall.), *Eusimulium johannseni* (Hart) and *Eusimulium aureum bracteatum* (Coq.). Some of these were taken in light traps but the material was difficult to identify because no males were captured.

Four species deserve special mention. *Simulium vittatum* Zett. appears to be the most common species in Pennsylvania. This species has a wide range of distribution occurring generally throughout the United States including Alaska and is also known from Canada, Greenland and Mexico. It frequently attacks man and his stock and is generally troublesome. The long period of flight throughout the summer contributes to its special annoyance.

Prosimulium hirtipes Fries stands next in importance; however, it has a short period of flight during early spring.

Simulium venustum Say is another annoying species but appears not to be as common in Pennsylvania as the above species.

One specimen of *Simulium hydationis* D. & S. was taken at Ohiopyle on June 9. Ohiopyle is located in Southwestern Pennsylvania on the Youghiogheny River in an Austral section of the State. Apparently this species has previously been taken only in Virginia.

It would seem from the accompanying table that the females are attracted to light more frequently than the males. In the case of *Simulium pictipes* Hag. the reverse seems to be true although the number of specimens obtained is too small to draw definite conclusions. In collecting blackflies by the biting method, females would undoubtedly predominate also.

The Simuliidae is an important group containing many species that annoy man, attack his animals or transmit certain animal diseases. The blackfly menace has been a bane to fishermen and hunters for a long time and some relief would be welcome. The application of D.D.T. to control mosquitoes has shown reduction in the blackfly populations. These facts indicate the need for further surveys and more detailed study of the habits of these flies.

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Correction

The biographical sketch of Father Hermann Schmitz, S.J., written by Father Borgmeier and appearing in the Revista de Entomologia 19: 587–88, was incorrectly listed as an obituary in the Current Literature section of ENT. NEWS for March (page 76). We are sorry for this error and have since learned that Father Schmitz, one of the few remaining specialists on World Phoridae now resides at Bad Godesberg a. Rh., Germany, and that he expects to return to Holland in 1951 in order to continue as curator of the famous Wasmann collection in Maastrich.

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1949 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

Papers published in ENTOMOLOGICAL NEWS are not listed.

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Review

A Textbook of Entomology. By Herbert H. Ross. John Wiley & Sons, Inc., New York. Chapman & Hall, Limited, London. 1948. Pp. viii + 532. Price, $6.00.

We have here, for the first time in this country, a text that covers practically all branches of entomological science. It begins with a chapter on history in which the emphasis is on the development of entomology in America. Then follows a chapter on the various classes of arthropods, chapters on external and internal anatomy, on physiology, and on the life cycle, including embryology, transformation, food habits, reproduction and social life. About equal space (228 pages) is then given to the orders of insects, with keys to the principal families. Finally, there is a chapter on ecology, in which climatic factors, food, enemies, etc., are discussed, and also a chapter on insect control. In every chapter, Dr. Ross adheres to his aim of presenting the basic facts and fundamental ideas to the exclusion of much detail. The anatomical terminology and the morphological interpretations adopted agree largely with those of Snodgrass, many of whose excellent figures are used as illustrations. The physiological data given are also completely up-to-date.

As a text for students in entomology, this book will draw immediate attention to the absorbing interest of many of the approaches to the study of insects that are too often neglected in courses that emphasize wing veins and taxonomy. And for prospective zoologists, a course based on this text will provide general zoological training in a group of animals that is proving so useful in investigations in pure physiology, genetics, cytology, evolution, etc.

The book is printed on glossy paper so that the many illustrations look very well, with some exceptions. A number of the figures, it may be said, are unnecessarily large and their arrangement is often such that page space is wasted. Should the publishers prove sufficiently far-sighted to invest the necessary effort and funds, much could be accomplished by a more careful planning of the illustrations and by devising additional figures that would be more closely coordinated with the text to form a didactic unit.

The plan of the book is excellent and it is evident that the author is a master of his materials and has succeeded in presenting them in a well organized manner. It is the only American text that attempts a balanced presentation of the entire field of entomology.—R. G. Schmieder.

EXCHANGES

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Fleas of the Sagebrush Meadow Mouse

By C. Andresen Hubbard, Vanport College, Portland 3, Oregon

The sagebrush meadow mouse, *Lagurus curtatus pauperrimus,* has been one of the rare mice of North America even in museum collections. During 1948, two naturalists of the State of Washington, Dr. C. Wesley Clanton of the Washington State Department of Health and Dr. Murray Johnson, Surgeon of Tacoma, Washington working on plague investigation in central Washington uncovered ranges where these rare mice were taken by the hundreds. Samplings of their fleas were sent to the writer for determination. The great bulk of these were two entirely new insects, and are described herewith, each bearing the name of one of the above investigators. The type locality in each case is Davenport, Lincoln County, Washington, the type host the sagebrush meadow mouse. Because there are large numbers of these fleas before the writer at this time types are deposited in the Academy of Natural Science of Philadelphia, the U. S. National Museum, the British Museum and in 20 other depositories maintained by the writer. The holotype male and allotype female in each case, mounted on a single slide and bearing the writer's number 2700 and dated May 15, 1949, have been sent to the National Museum.

Megabothris clantoni new species

The new species is close to *Megabothris abantis* (Roths.) from which it differs in the male by the shape and armature of the finger. Whereas the finger of *abantis* is somewhat rectangular with long, posterior face undulant, in *clantoni* the finger is ham-shaped, the shank portion between long spiniform and

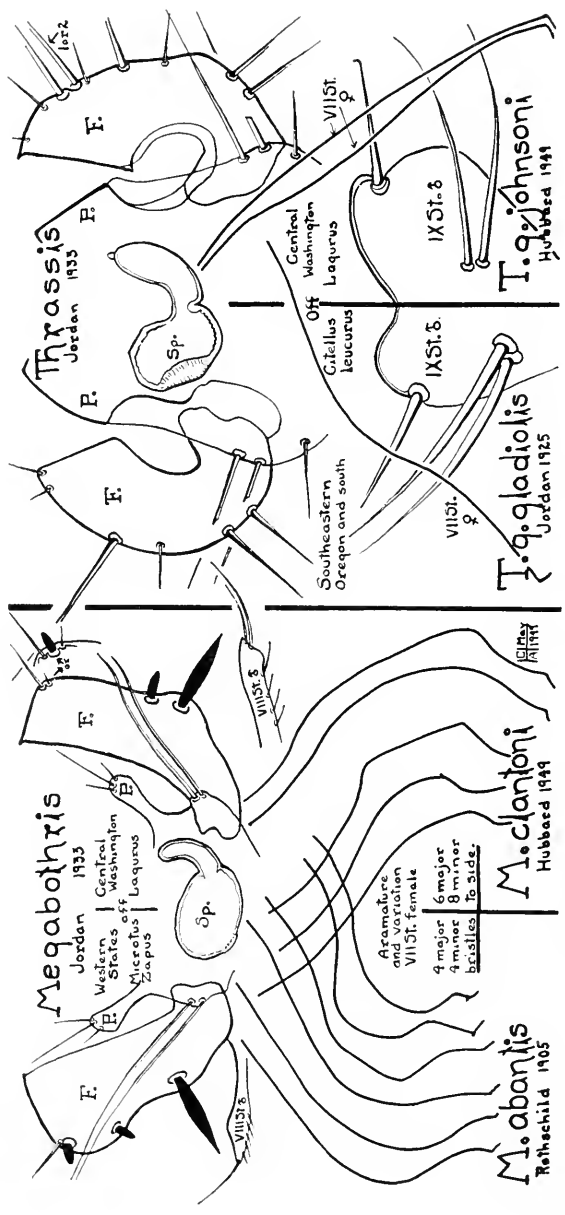

Fig. 1. *Megabothris abantis, M. clantoni, Thrassis gladiolis gladiolis, T. g. johnsoni.*

articulation with process as long as the portion of finger above long spiniform. Armature in *abantis* a lower long pointed spiniform, then above it about equally spaced two much shorter spiniforms apically rounded, but in *clantoni* this arrangement is changed by having the upper spiniform of *abantis* represented in the majority of cases by a simple small bristle. About 1 out of 20 specimens in *clantoni* have the armature arrangement of *abantis*.

Due to the amount of variation in the apical outline of the VII sternite of the female in both *abantis* and *clantoni* it is difficult to distinguish one from the other. This outline in *clantoni* is with upper lobe which varies from well rounded to angulate. The outline of the allotype is with upper lobe with flat surface, lower angle angulate, upper angle rounded. The spermatheca is barrel shaped, with crooked finger shaped appendix but without appendage.

The new flea measures 2.00 mm. in male, 2.75 mm. in female.

Remarks: As early as June 16, 1938 the writer took the female of this flea off Lagurus at Bickleton, Washington but mistook the specimens for *M. abantis*. Specimens coming to him from Clanton have been in the ratio of 5 females to 1 male. These fleas have proved plague positive in parts of central Washington. From February through June at least the flea count on these mice is very high.

Thrassis gladiolis johnsoni new subspecies

The new subspecies is close to *Thrassis gladiolis gladiolis* which ranges some 300 miles to the south in southeastern Oregon. The writer has no evidence that the range of the two fleas comes closer. The chief difference between the males of *Thrassis g. gladiolis* and *Thrassis g. johnsoni* is the very prominent IX sternite in the new form which if one were to state it in the vernacular "sticks out like a sore thumb." The finger of *johnsoni* is of the general shape of *gladiolis* but the armature is somewhat different, being of 5 major bristles along the posterior border, the two uppermost very long and fairly close together. Midway down the border is a major bristle, which may be directed downwards. At the lower angle of the border are the usual 2 Thrassis spike-like bristles. The VIII sternite is apically angulate rather than rounded as in other *gladiolis*. The IX sternite sets well out beyond the other modified segments. The apical bristle is not so spine-like and the customary paired bristles below the apex are grass-blade-like.

In the apical outline of the VII sternite of the female the undulation found in the females of other *gladiolis* is missing. The outline, if not damaged, is nicely rounded. The armature consists of 5 stout bristles. The spermatheca is typically Thrassis.

In length these fleas measure 1.50 mm. in male and 2.00 mm. in female.

Other interesting data in this study were the rarity of fleas other than *Megabothris clantoni* and *Thrassis gladiolis johnsoni* on Lagurus. In some 500 fleas checked the writer found only 4 males of *Malaraeus telchinum* (Roths.), a deer mouse flea, 1 male and 3 females of *Catallagia decipiens* (Roths.), a mouse flea and 1 male and 2 females of *Meringis shannoni* (Jordan), a pocket mouse flea. Clanton took 11 specimens of *Rattus norvegicus* as Odessa, Lincoln County, Washington which carried amongst other fleas 1 male and 2 females of *Megabothris clantoni* and a female of *Thrassis gladiolis johnsoni.*

Personal

Doctor **H. B. Hungerford** has retired as head of the Department of Entomology of the University of Kansas. He will continue his teaching, both at the University of Kansas and, during summer months, at the University of Michigan Biological Station. He expects to continue his research program on the aquatic Hemiptera. Having recently published a revision of the Corixidae of the Western Hemisphere, he plans to complete his study of the Corixidae of the Eastern Hemisphere.

He is replaced as chairman of the Department of Entomology by Doctor Charles D. Michener, who is continuing studies now in progress on the saturniid moths and plans to continue his principal research studies in the taxonomy, evolution, biology and behavior of bees.

Agrion versus Calopteryx

The NEWS presents below two letters that were received recently from England by its Editor Emeritus, Dr. Philip P. Calvert, and that comment upon the article "Calopteryx versus Agrion; Again?" by Dr. Erich Schmidt, published in ENTOMOLOGICAL NEWS for October 1948, pp. 197–206. Following these, there is a reply to Miss Longfield by Dr. Schmidt, and also parts of Dr. Calvert's letter to Miss Longfield that bear on the same subject.

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How exceedingly tiresome of Dr. Erich Schmidt to have again raised this question of "Calopteryx versus Agrion" (ENT. NEWS, 1948, 59:197), and on insufficient knowledge. There is no question of the date of publication of volume 9 of Brewster's Edinburgh Encyclopedia (Part I. Entomology), in which volume is Leach's article on the Class Odonata of Fabricius. We have the volume in this museum and the date of publication is 1815. Stephens' date of 1810 referred to the date of publication of volume I of the Encyclopedia, which is proved by the following reference in Stephens' *Systematic Catalogue of British Insects,* 1829, where on page xxvi, under "Authors quoted," the reference to Leach is as follows: "Leach in Edinburgh Encyclopedia: articles Entomology and Insecta. Edinburgh. 1810, etc. 4to." Probably Leach's MSS. was ready by 1810, but it was not in print for another five years.

Latreille in 1802 (*Hist. nat. gén. Crust. Ins.,* Vol. 3, page 287) gives *virgo* as the "example" for the genus *Agrion* Fabr. Possibly it is this that some authors consider "obscure," but no one can say the same for Latreille's second reference published in 1810 (*Consid. gén. Anim. Crust. Arach. Ins.,* page 434). Here, Latreille gives a list of all the genera in his book, each name followed by that of one species, which he says, p. 421, that he designates as the type. There is not the slightest ambiguity on this occasion, where *virgo* is cited as the type of *Agrion.* Kirby was absolutely correct in changing the names as he did, in 1890. That both de Selys Longchamps and Dr. Ris disliked the change of names (who does not?), is beside the point. They did not apply to have the law of priority suspended in this case, nor do I see any reason for supposing that the International Commission on Zoological Nomenclature would have interfered with the published fixation of the type of *Agrion* by Latreille.*

Personal opinions of regret at the application of the law of priority get us nowhere. The generic name of *Agrion* for *virgo* has been widely in use for 59 years, whereas *Calopteryx*, it seems, was only generally adopted for 51 years before the publication of Kirby's catalogue. There is, therefore, little difference in the question of "usage." The original fault lay in Burmeister adopting Leach's name instead of Latreille's, in 1839 (Handb. Ent. 2, page 825). The case for *Agrion* versus *Calopteryx* is clearly proved and all Dr. Schmidt's arguments are useless.

CYNTHIA LONGFIELD, F.R.E.S.

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Bridgewater, Somerset

Miss Longfield has sent me a copy of her note on the subject of *Agrion* versus *Calopteryx*. At the moment I have not seen the paper by Dr. Schmidt to which she refers, but in the meantime I would like to add the following comments to her letter, with which I am in general agreement:

For those who adhere to the International Rules of Zoological Nomenclature, there can be no doubt that the genotype of *Agrion* Fabricius, 1775, is *Libellula virgo* Linnaeus, 1758, by the earliest designation (Latreille, 1810); consequently *Calopteryx* of authors falls as a synonym of *Agrion*.

The International Commission on Zoological Nomenclature has ruled (in Opinions 11 and 136) that the designations of genotypes by Latreille, 1810 are valid designations when they do not conflict with other requirements of the International Rules.

* The Nomen. Commission's Opinion 11, says these types should be accepted.

Calepteryx Leach, 1815, Brewster's *Edinb. Encycl.* 9 (1) : 137 —the date of publication is known to be April 1815 (see Sherborn, 1937, *J. Soc. Bibl. Nat. Hist.* 1 : 112).

The late R. A. Muttkowski seems to have referred the case of *Agrion* versus *Calopteryx* to the International Commission, and quotes their decision in favour of *virgo* as the genotype of *Agrion* (1910, *Bull. publ. Mus. Milwaukee* 1 (1) : 14–15); but no Opinion embodying this decision of the Commission has been published. Muttkowski's premisses, however, were not valid, being based on the citation of an *example* † by Latreille, 1803 (1910, *ibid.:* 26), but this was corrected in a subsequent paper (Muttkowski, 1910, *Bull. Wis. Nat. Hist. Soc.* 8: 158) where the then Secretary to the Commission is quoted as showing that it is possible to settle the question of the genotype of *Agrion* (by the designation of Latreille, 1810) without referring the subject to the Commission at all. This no doubt accounts for the Opinion quoted by Muttkowski never having been published by the Commission; it was I assume withdrawn before publication as being unnecessary.

J. Cowley

Mozartstrasse 22.
(22) Bonn am Rhein,

Very probably we should not have touched this stinging nettle of nomenclature if we had known earlier that which Prof. Hedicke of Berlin, formerly a collaborator of the "Nomenclator Zoologicus," of the Prussian Academy of Sciences wrote us concerning the date of publication of Leach's paper in Brewster's Encyclopedia, stated by C. D. Sherborn with superexactness and published in his "Index Animalium." According to

† Mention of a species as an example of a genus does not constitute a selection of a type (International Rules, Art. 30 II g). This excludes Latreille, 1803 (the correct date is [1802–1803], for which see Griffin, 1938, *J. Soc. Bibl. nat. Hist.* 1: 157).

There is no warrant for emending Leach's original spelling *Calepteryx*, for he gives no derivation for the name, nor is one obvious from his remarks. From his statement that "This genus comprehends those *Agrionida* with coloured wings" it is only a probability, not a certainty, that he intended the name to be based on καλλι- or καλός and πτέρυξ.

Hedicke, the matter is more complicated than was mentioned in the foregoing article (Miss Longfield's), the most valuable contribution of which is the statement of the probability that Leach's manuscript was ready by 1810.

Now we are not sorry for having written the article, since a further study of the matter brings out other interesting facts that might easily be overlooked. We know of Kirby's error in establishing his "ultra-radical" change of names on the basis of Latreille's paper of 1802, and now we know also, and well, that the later paper of 1810 is in no way better! In a footnote in Trans. VII Int. Congr. Ent., Berlin, p. 559, and in more minute detail in Entom. Rundschau 56, 1939, p. 187 ff., it is stated that Latreille sometimes gave two species names as "types" for one genus, which certainly does not conform to our modern idea of "genotype." For this reason there arises not only a "slightest ambiguity" but a really decided one concerning Kirby's change of name, and he is "absolutely incorrect" in the same manner as the writer of the foregoing article and the modern anachronists such as Muttkowski, Stiles and Cowley. The International Congress of Zoology in Lisbon (1935), however, took the first step in a retreat when it limited the application of its former decision to only those genera of Latreille (1810) that have only one species name as the "type." However, since the foregoing reflections will be valid generally, from a logical point of view, for all of Latreille's genera in his paper of 1810, we may expect that even the God-like International Commission of Zoological Nomenclature will, although perhaps only after a period of reflection, arrive at the next step (a necessary conclusion), the entire "suspension" of its somewhat superficially made Opinion 11, an opinion that originated during a period when that honorable group was made up preponderantly of "rigorists of priority." *

* I should like also to call attention to the following: In comparing the time in years during which the two names were in general use, Miss Longfield overlooks the fact that for a long time after the appearance of Kirby's catalogue no attention was paid to the change in name, not even in England. The outstanding authorities there, such as McLachlan and K. J. Morton used *Calopteryx* all their lives, ignoring Kirby, just as did

To date, this is still only a dream of the future. However, the present generation has a duty to establish an accord in nomenclature as soon as possible, and the writer believes that the path of "classical nomenclature" will always be better than any other, especially for the younger generation, in order to prevent, in the end, football versus entmology.

ERICH SCHMIDT

P. O. Box 14,
Cheyney, Pennsylvania.

A practical consideration also enters into the nomenclatural question of *Calopteryx* versus *Agrion* which I emphasized in my June, 1927, editorial, "Does Familiarity Breed Contempt" (ENT. NEWS 38: 185–6). For some years I have been bringing together notes on papers dealing with the chemical, physical and biological characters of waters in which Odonate larvae (nymphs) live. I have just looked over these notes from authors whose names begin with A—D, who have anything to say on larvae of *Calopteryx* or *Agrion*, with these results (purely systematic papers are not included):

W. J. Lucas together with the entire faunistic literature of England, so that while these authors lived *Calopteryx* was in almost universal use in England, that is up until about 1935. Lucas died in 1932, and Morton in 1940. The first attempts to recognize Kirby (by F. F. Laidlaw in 1902) were very feeble and did not succeed even after the publication of Muttkowski's catalogue (1911). Not until the newer compilations made their appearance as a substitute for Lucas' work, now out of print, was the mistaken change of name actually effected. Moreover, on the continent of Europe (with the exception of Navas, of all people) *Calopteryx* is in almost universal use and always will be. Actually, then, *Calopteryx* has been in general use for about 100 years as contrasted with about 15 years for *Agrion*.

Furthermore, it should be considered, all important monographs, namely those of Selys, Hagen and Bartenef use *Calopteryx*, not *Agrion*, and these have more weight than all modern compilations that have an anachronistic foundation. To be sure, the International Rules have as yet found no adequate means of providing nomenclatorial recognition for the old masters who are not now in a position to defend their life's work against modern anachronism and nonsense. This destruction of old, good names without sufficient reason is, it seems to us, one symptom of the "decline of the West."—ERICH SCHMIDT.

Ali Sade, A. 1934. Trudy Azerbaidzhanskogo Atdelenia etc. 7, Baku. *Agrion* (*Enallagma*) *cyathigerum*, p. 9.
Baldensperger, A. 1927. Bull. Soc. Hist. Nat. Colmar 20. *Agrion, Calopteryx*, pp. 74, 81, 86, 87.
Id. 1929. Op. cit. 21. *Agrion, Calopteryx*, pp. 187, 188, 204, 225, 269.
Bartenev, A. N. 1930. Rev. Zool. Russe 10(4). *Calopteryx, Agrion*, pp 78, etc.
Id. 1932. Op. cit. 11(1). *Agrion, Calopteryx*, pp. 58, 59.
Berg, K. 1948. Folia Limnol. Scand. 4, Kjobenhavn. *Calopteryx virgo, splendens*, p. 117 etc. According to p. 9, the Odonata were identified by E. W. Kaiser, using J. W. Lucas' Aquatic (Naiad) Stages of British Dragonflies (1930), p 116.
Beyer, H. 1932. Abhandl. westfal. Prov. Mus. Naturk. 3. *Calopteryx, Agrion*, pp. 61, 134.
Boldyreva, N. V. 1930. Hydrobiol. Ztschr. USSR. 9. *Agrion*, pp. 60, 80.
Byers, C. F. 1930. Univ. Florida Publ. Biol. Sci. Ser. *Agrion* (sensu Kirby 1890), p. 265.
Carpenter, K. C. 1927. Jl. Ecol. 15, Cambridge, Eng. *Agrion pulchellum*, p. 45.
Collenette, C. L. 1944. Entom. 77. *Coenagrion puella*, p. 61.
Decksbach, N. K. 1936. Arch. Hydrobiol. 30. *Agrion*, p. 118. Also in Ychene Zapiski Mosk. Gosyd. Yniv. 8. *Agrion*, pp. 86, 111.
Dorr, E. 1935. Arch. Hydrobiol. 38(3). *Calopteryx, Agrion*, p. 510.
Dorier, A. & Vaillant, F. 1948. C. R. Acad. Sci. Paris, 226(15). *Agrion, Calopteryx*, p. 1223.

It will be seen that a majority of these papers use *Calopteryx*, but I am not concerned with determining how large or how small that majority is. What interests me is that many authors still use *Calopteryx*. The conclusion I draw is that, to make one's meaning perfectly clear, it is necessary to specify, in each case where the term *Agrion* is used, just what *Agrion* means in that case. It seems to me to be advisable to use both names in each case in some such way as this: "*Agrion virgo*, also known as *Calopteryx virgo*," *Coenagrion pulchellum*, also known as *Agrion pulchellum*." A very recent example of this practice is in Col. MacNeill's ingenious paper on "Distribution of dragonflies in Ireland" in the Irish Naturalists' Journal, ix (9) for January, 1949, pages 234 and 236.

What *Calopteryx* is is known, what *Coenagrion* is is known. *Agrion* is the uncertainty. What an unforgivable crime it would be, from the priorist's point of view, to drop *Agrion* altogether! ! !

PHILIP P. CALVERT

Oviposition of Cryptocephalus confluens Say (Coleoptera, Chrysomelidae)

By J. W. TILDEN, San Jose, Calif.

On September 26, 1947, a pair of these beetles was taken in copula on a bush of *Baccharis pilularis* D. C. subsp. *consanguinea* D. C. (C. B. Wolf) (Compositae, Astereae), at Page Mill Road, Santa Clara County, California. The pair was brought into the laboratory where the beetles were kept for observation in a large vial of thin glass in which a twig of the food plant was supported by moist sand. This type of container has proven very useful for observational work, since the vial may be placed on its side for use under a binocular microscope without displacing the contents. All of the following observations were made under binocular microscopes of various powers. An effective closure for the vial is formed by loose cotton which allows free exchange of gases and also some humidity control.

For the two days following, the beetles fed on the leaves, cutting scalloped fringes on the leaf edges. On the morning of September 29, the pair was again in copula. The female supports and carries the male during mating. The prothoracic and mesothoracic legs of the male are closely appressed to the elytra of the female. Apparently the setose tarsi of these legs adhere to the elytra of the female, and seem to constitute the only means by which the male remains in position. The metathoracic legs trail. The female controls the entry of the male organ by movements of the terminal sternite of the abdomen. In some instances the male attempted to mate for a period of several minutes before the female advanced the sternite. The female continues to feed during copulation.

The first egg was found on the bottom of the vial on September 30. The oviposition and subsequent treatment of the egg is peculiar and interesting. The female is equipped with a sulcus on the fifth abdominal sternite which serves, in conjunction with the metathoracic tarsi, to hold the egg. The egg is extruded and is caught by the tips of the tarsi and applied to the sulcus. While the egg is in this position, the female applies a relatively large mass of secretion which forms a mound-like patch on the surface of the egg. The egg is then rotated slightly by means of the tarsi, and another patch of secretion is applied adjoining the first. This process is repeated until the egg is covered with approximately equal rough mounds of this material. The egg is then revolved several times by the tarsi, the legs twitch almost imperceptibly, and the egg, together with its coating, is flipped out and falls to the ground.

The secretion is dull olive in color when first applied, soon darkening nearly to black. After several days, the color changes to a dull brown in the process of drying and remains so without further change. This secreted covering is friable and easily pried away with needles, parting along lines that mark the boundaries of the individual applications. In drying, the coating shrinks away from the egg to some extent, leaving a small space between the coating and the egg; that is, the coating envelopes the egg loosely, the egg being free inside the coating.

The measurements of the case or coating are about 1.5 mm. by 0.9 mm. The egg is smooth, shining, pale in color, without visible sculpture at a magnification of 30 ×, and measures 1.0 mm. by 0.6 mm. in size. The outside measurements of the case are thus 0.5 by 0.3 mm. larger than the egg. The entire structure resembles nothing so much as an old fashioned peanut candy, except for the difference in color.

The process of applying the coating requires about twenty minutes to each egg. After the egg is dropped, the female grooms her appendages carefully and raises and lowers the elytra several times. Occasionally the flight wings are raised and vibrated as though the insect were about to take flight, but in each case the elytra were lowered again without the insect actually attempting to fly.

The manner of oviposition resembles closely that described by Spruyt [1] for *Saxinis saucia* Leconte, as far as the application of the primary coat is concerned, but this species of *Cryptocephalus*, at least, applies only the one coat and does not apply the eight serrated bands of material described by Spruyt for *saucia*. Neither is the primary layer truncated at one end of the longitudinal axis in *Cryptocephalus*, as described for *Saxinis*. On the contrary, the finished case of *Cryptocephalus* is quite evenly oval in outline.

On September 30, fourteen eggs were laid between 8:00 A.M. and 3:00 P.M., and at 4:30 P.M. the beetles were again in coitu. On October 1, thirteen eggs were laid. On October 2, three eggs were found and the beetles were again seen to mate, at about 4:30 P.M. On October 3, six eggs were laid. No further eggs were found until October 6, when four eggs were laid. On October 8, a single egg was laid, and no further eggs were obtained, although the beetles were found mating on several occasions thereafter.

Observed copulations took place in late afternoon or early evening, whereas oviposition was confined mostly to the morning hours. On October 18, the beetles were preserved as specimens for determination, and since it was desired to keep them as intact as possible for this purpose, no dissection of the female was made, so it is not known if a residuum of unlaid eggs remained. However, the total output of eggs of another species of chrysomelid, *Trirhabda flavolimbata* Mannerheim, the entire life history of which was observed, varied from 43 to 73 eggs over a period of several weeks, so it is barely possible that the forty-one eggs laid by *Cryptocephalus confluens* represent a normal number for the species. Verification of this as fact would require additional observations.

Spruyt (*op. cit.*) found that eggs of *Saxinis saucia* hatched in twenty-six days, but those of *Cryptocephalus* overwintered,

[1] Spruyt, F. J., Observations on the egg-laying habits of *Saxinis saucia* Leconte. Pan-Pacific Entomologist 1 (4): 176–178, 1925.

and had not hatched when the project was abandoned in March, 1948, for other more pressing duties. Although the eggs when discarded appeared to be still viable, no embryos were found in them. This difference in hatching time may be due in part to the season at which the eggs are laid. The eggs of *Saxinis* were laid in July.

The significance of the application of secretions to the eggs is not apparent. Van Dyke [2] describes the rearing of larvae of *Saxinis saucia* from ant nests. Lefroy [3] mentions that larvae of *Cryptocephalus* have been found to be case bearers (as are those of *Saxinis*). However, I have been unable to locate literature stating *Cryptocephalus* to be myrmecophilous, nor have I seen any paper indicating that anyone has seen ants transport to their nests the eggs of known myrmecophilous Chrysomelidae.

The exact origin of the material that forms the case or coating is obscure. At the present time I am unable to say if it is fecal matter or the product of colleterial glands, but the latter explanation seems most reasonable. It seems unlikely that the serrated bands of *Saxinis*, at least, could be formed from fecal matter. Moreover, the true feces excreted by both sexes of *Cryptocephalus* were much less copious than the material that composed the coating. Coleopterists with whom this matter was discussed differed in opinion on this point, which will require additional study to clarify.

Deaths

Dr. Filippo Silvestri, for many years in charge of the Laboratory of Entomology at the Portici Station, and a Corresponding Member of the American Entomological Society, died at Bevagna (Perugia), Italy on June 10.

Dr. Andrey Avinoff, a Russian born entomologist who was Director of the Carnegie Museum in Pittsburgh from 1926 to 1945, died in New York City on July 16 at the age of 65.

[2] Van Dyke, E. C., Observations concerning certain Coleoptera from the Yosemite Valley, during the summer of 1921. Pan-Pacific Entomologist 1 (4): 175–176, 1925.

[3] Lefroy, M. H., Manual of Entomology, with special reference to economic entomology. Edward Arnold & Co., London, 1923 (page 195).

Preparing Ixodid Ticks for Mounting

By Roland W. Portman, University of Missouri, Branson, Missouri

Several years ago while attempting to classify some Ixodid ticks that had been preserved in 70 per cent alcohol it was found that some means of straightening their legs away from the body was necessary before all their morphological characteristics could be clearly observed. After the following procedure had been developed, it was discovered that the specimens might be glued on insect pins points for display and study, embedded on slides or mounted in many other ways. Then it was realized that the stretched ticks were wonderful material for the indoors photographer.

It is not known whether the following procedure is entirely original but it seems desirable to describe the technique so that others may be able to take advantage of the method. The materials needed are a supply of ticks, a pair of straight pointed forceps, teasing needle, some microscope slides, some strips of cotton the size of the slides and about one-quarter inch in thickness, some strips of fine sandpaper cut to the same size as the slides, and a few rubber bands.

Select a tick from the supply and grasp the tick with the forceps along the mid-dorso-ventral line, making sure that none of the legs are held under the forceps. With the fingers of the free hand gently stroke and pull the legs laterally and somewhat anteriorly until the muscles have been relaxed or stretched. This may require a little time to break down the muscle tension. When the legs on one side have been relaxed turn the tick over and repeat the procedure with the legs on the other side. This process must be done gently; otherwise the pulvilli will be torn from the tarsi, the legs disjointed or pulled from the body.

When all the legs have been relaxed, place the tick on a strip of sandpaper with the dorsal side up. Then hold the tick against the sandpaper with a teasing needle and arrange the legs in the desired position. The pulvilli will in most cases catch onto the sandpaper and hold the legs in the desired position. Several ticks may be arranged on one piece of sandpaper as long as they do not overlap. Practice and experience is the best guide. Then place another strip of sandpaper over the ticks. On this place a strip of cotton, and then a microscope slide. Carefully turn these over and add a strip of cotton and a slide to the other side. Pick up the slides and wrap them with a rubber band. The cotton will act as a cushion but if the rubber band is stretched too tightly the ticks will be crushed flat and they will lose their natural shape. The slides are then set aside for several days until the ticks are thoroughly dried. At times tickets will stick to the sandpaper, but they can be released by bending the sandpaper slightly permitting the ticks to drop off. The legs of those specimens which were not thoroughly relaxed will sometimes curl up while drying but most specimens will be in the exact position in which they were placed.

By using Le Page's glue, or similar medium, the ticks may be mounted on insect pin points exposing either the dorsal or ventral aspects. Balsam slides may be prepared by soaking the ticks in xylol for a few minutes before embedding them or in toluene in preparing a clarite slide.

The Man who Stole Beetles

Systematists should take warning from the plight of a British entomologist whose sad case was reported recently in the London Daily Mail. Mr. Ephinstone Forest Gilmour of Shepherd's Bush, said by the Daily Mail to be a member of the Royal Society of Entomologists, found himself before a West London magistrate. Piled about in the court room were boxes containing hundreds of beetles—the physical evidence in the case. The result of the litigation was that the defendant received a sentence of three months for stealing beetles from the Natural History Museum in South Kensington.

The prosecution said that Mr. Gilmour had held a student's pass to the museum for two years. He was first suspected when the authorities read an article by him in an entomological magazine. In it he mentioned having in his collection a species of beetle which the museum staff thought was unique in their own collection. Presumably this specimen was found to be missing, for Mr. Gilmour was placed under observation.

He was soon intercepted leaving the museum with 55 specimens. He said he was only borrowing them, but the court took a different view of the matter. The home of the defendant was then visited by Detective Inspector Jeffery, and 5,141 beetles were found which were identified as the property of the museum.

The moral of this episode might well be, that unrestrained enthusiasm may have dire consequences.—M.E.P.

Reviews

ANT HILL ODYSSEY. By William M. Mann. 338 pp., illus. Atlantic-Little, Brown. Boston. 1948. Price: $3.50.

The present volume gives an account of Mann's boyhood and early manhood up until the time he took a position in the U. S. Government Service. Ordinarily such an account would interest only a small group of specialized readers, but this book has such a wealth of charm and wit that almost anyone, scientist or layman, who reads the first few pages will feel compelled to read on to the end of the book. Few naturalists, yes, even few soldiers of fortune, can look back on a more colorful life. Kind and generous, Mann has always had an unusual ability to get along with literally all kinds of people from primitive head hunters to erudite and world-renowned scientists. This understanding of human nature showed up in his early boyhood days in Montana, which, in many respects, are reminiscent of Tom Sawyer.

Mann's autobiography is literally one long collecting trip which was fortunately not too frequently interrupted and which ultimately reached out to many of the out-of-the-way places of the world. While still a very small boy in Montana he began collecting toads. Later, and in various parts of the United States, he collected insects, snakes and just about any other kind of animal that one can call to mind. There was, of course, the problem of preserving all of these specimens. Young Mann's solution to the problem in the case of the insects before he knew about pins was as follows: "I invented a process of putting corks from small bottles in the bottom of a cigar box and sticking them with chewing gum; to these I fastened my insect specimens, also with chewing gum (later I used glue), and during the spring made a small but to me fascinating collection." As time went on he learned about pins, but there were still many questions about the identity of the numerous specimens which were constantly being collected. Thus the need of further education became apparent. The following quotation regarding the selection of a college shows Dr. Mann's delightful wit, which is apparent in his conversations as well as in his writing: "It seemed to me that a year in entomology under a teacher would give me a better understanding of labial palpi, trochanters, and scutelli. A heavy correspondence followed, chiefly in regard to college catalogues, some of which were confusing, but I did learn that Harvard University was not in New Haven, Connecticut, where I had written.

"Then came a copy of the magazine, *The Canadian Entomologist*, and in it was an article entitled 'The Hypopygium of the Tipulidae.' I had to look up the words to see what they meant. The article had been written by Professor Rennie Wilbur Doane of the State College of Washington, and it seemed certain that anybody who could write an article with a title like that would be a good one to explain the things I wanted to know. His college, at Pullman, was the one I selected, though I did not tell my mother the exact reason for going there rather than to some place nearer home."

His formal education at Washington State College, at Stanford and later at Harvard under the famous William Morton Wheeler gave young Mann a broad basis for his later studies of the animals collected in Brazil, Haiti, Mexico, Arabia and various Pacific Islands, and fitted him admirably for his government work in entomology and in the Zoo.

If there is any one group for which this intriguing book will have a special appeal, it is the myrmecologist and the student of myrmecophiles. For throughout the book, Dr. Mann has included many interesting accounts of his own special little animals, the ants and their guests. For those already conversant with his many technical papers on this subject, new and interesting sidelights await them.

For my part, I find only one thing wrong with the book: there is not enough of it. It is certainly to be hoped that Dr. Mann will write further about his many adventures, collecting trips, and friends not mentioned in the present volume.—M. W. Wing.

A catalogue of insecticides and fungicides. Volume II: Chemical fungicides and plant insecticides. By Donald E. H. Frear. Pp. xii + 154, super roy. oct., Waltham, Mass. 1948: The Chronica Botanica Co.; New York City: Stechert-Hafner, Inc. Price: $5.50.

The first part of this catalogue was devoted to chemical insecticides (Ent. News, 59: 55). In the present volume, Dr. Frear presents a list of the chemical fungicides arranged, as were the chemical insecticides, in a code system that places compounds that are chemically related near each other in the list. Then follow shorter lists of condensation products, of plant product fungicides and of miscellaneous fungicides. The second half of this volume is taken up by the long list of plant insecticides that have been tested, arranged alphabetically. The indexes include a reference and author index, a numerical patent list and, finally, a complete alphabetical index of all the chemical compounds that are mentioned in both volumes. The book is embellished by a frontispiece of Millardet, the discoverer of Bordeaux mixture, and by a number of vignettes of insects and plants reproduced from old sources.

We cannot but express our gratitude to the Chronica Botanica Co. for demonstrating that even such a book as this, filled as it is with long lists of dry data, by the selection of the right paper, type, format, by a very few vignettes and by careful make-up can be made to afford the user a degree of esthetic pleasure along with the scientific information.—R. G. SCHMIEDER.

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1949 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Borodin, D. N.—Nicholas J. Kuznezov (1873–1948). (Biogr. sketch and bibliogr.) [Lep. News] 3: 29–34. **Ferguson and Jones**—A survey of the shore-line fauna of the Norfolk Peninsula. [1] 41: 436–46. **Keen, F. P.**—Notes on some forest insects of Baja California. [60]

8: 92–93. **Michener, C. D.**—Parallelisms in the evolution of the saturniid moths. [100] 3: 129–41. **Mickel, C. E.**—The classification of insects. [5] 42: 1–6. **Molitor, A.**—Experiments on the colony foundation of European ants. [45] 57: 101–08. **Noland, Lilly and Baumann**—A laboratory method for rearing cockroaches, and its application to dietary studies on the German roach. [5] 42: 63–70. **Park, O., S. Auerbach and M. Wilson**—Pselaphid beetles of an Illinois prairie. The fauna and its relation to the prairie peninsula hypothesis. [Bull. Chicago Acad. Sci.] 8: 268–76, ill.

ANATOMY, PHYSIOLOGY, MEDICAL—Basu, A. C.—Experiments on the pupa formation of Prodemia litura (Noctu.), a pest of cauliflower in West Bengal. [Proc. Zool. Soc. Bengal] 2: 73–79. **Bateman, A. J.**—Analysis of data on sexual isolation. [100] 3: 174–77. **Beard, R. L.**—Physiological effects of induced hemorrhage in Japanese beetle larvae. [45] 57: 79–91. **Bodine and Fitzgerald**—The formation of a complex between certain respiratory inhibitors and copper (in Melanoplus differentialis). [105] 33: 215–21. **Bohart, G. E.**—Record of a fungous outbreak among adult bees of the genus Andrena. [60] 8: 82. **Cook, E. F.**—The evolution of the head in the larvae of the Diptera. [50] 14: 1–57. **Dinnik and Zumpt**—The integumentary sense organs of the larvae of Rhipicephalinae (Acarina). [73] 56: 1–17. **Fitzgerald, L. R.**—The alkaline phophatase of the developing grasshopper egg. [41] 110: 461–87. **Frick, K. E.**—The biology of Microvelia capitata in the Panama Canal Zone and its role as a predator on anopheline larvae (Veli.). [5] 42: 77–100. **Friese, H.**—Über die Riesenformen der Männchen bei der Sandbiene (Andrena). [Ent. Tidsk., Stockholm] 70: 106–08. **Frigs, H. and M.**—The loci of contact chemoreceptors in insects. [1] 41: 602–58. **Hallenbeck, C.**—Insect thermometers. [56] 58: 256–59, ill. **Hovanitz, W.**—Interspecific matings between Colias eurytheme and C. philodice in wild populations. [100] 3: 170–73. **Jaynes and Speers**—Biological and ecological studies of the spruce budworm. [37] 42: 221–25. **Kühn, A.**—Über die Determination der Form—Struktur—und Pigmentbildung der Schuppen bei Ephestia kühniella. [Roux' Archiv] 143: 408–87. **Laidlaw, H. H., Jr.**—Development of precision instruments for artificial insemination of queen bees. [37] 42: 254–61. **Maas, A.-H.**—Über die Auslösbarkeit von Temperaturemodifikationen während der Embryonalentwicklung von Drosophila melanogaster. [Roux' Archiv] 143: 515–72. **Moore, H. W.**—Variations in fall embryological development of three grasshopper species. [23] 80: 83–88. **Mukerji, D. and P. K. Mitra**—Ecology of the mound-building termite, Odontotermes redemanni, in relation to measure of control. [Proc. Zool. Soc. Bengal] 2:9–27. **Pacaud, A.**—Relations topographique et signification fonctionelle de la localization du glycogene dans le mesenteron des larves de Simulium (Dipt.) au dernier stade. [C. R. Acad. Sci., Paris] 228: 1664–65. **Possompes, B.**—Ablation fractionnee de l'anneau de Weismann chez la larve de Calliphora erythrocephala. [C. R. Acad. Sci., Paris] 228: 1527–29. **Ray Chaudhuri, S. P. and J. Das Gupta**—Cytological studies on the Indian dragonflies. I. Structure and behaviour of the chromosomes in six species of dragonflies (Odonata). [Proc. Zol. Soc. Bengal] 2: 81–93. **Richards, A. G.**—Studies on arthropod cuticle. III. The chitin of Limulus (Crust.). [80] 109(2841): 591–92. **Richards and Fan**—Studies on Arthropod cuticle. V. The variation in permeability of larval cuticles of the blowfly, Phormia regina. [105] 33: 177–98. **Smith and Douglas**—An insect respirometer. [5] 42: 14–18. **Steinhaus, E. A.**—Insect pathology: The field concerned, training required and opportunities possible. [23] 81: 53–57. **Strickland, E. H.**—Wohlfahrtia (Metopi.) myiasis of mink in Alberta. [23] 81: 58–60. **Tashiro and Schwardt**—Biology of the major species of horse flies of central New York. [37] 42: 269–72. **Toth, L.**—Nitrogen-binding by Kalotermes flavicollis. (Isoptera) and its symbionts. [Hungarica Acta Biol., Budapest] 1: 22–29. **Tuxen, S. L.**—The hot springs, their animal communities and their zoogeographical significance. [Zool. of Iceland] 1(11): 1–206, ill, 1944. **Wellinston, W. G.**—The light reactions of the spruce budworm Choristoreura fumiferana (Tortrie). [23] 80: 56–82. **Williams, C. M.**—Extrinsic control of morphogenesis as illustrated in the metamorphosis of insects. [Growth] 12 (Supplement) 61–74. **Wishart, G.**—The biology of Melanichneumon tubicundus (Ichneumon.). [23] 80: 118–38.

ARACHNIDA AND MYRIOPODA—Baker, E. W.—Paratydeidae, a new family of mites. [65] 51: 119–22. **Bryant, E. B.**—The male of Prodidomus rufus (Araneae). [73] 56: 22–25. **Cunliffe, F.**—Pimeliaphilus isometri, a new scorpion parasite from Manila, P. I. (Pterygosom.). [65] 51: 123–29. **Dinnik and Zumpt**—(See under Anatomy.)

Hoff, C. C.—Wyochernes hutsoni, a new genus and species of chernetid pseudoscorpion. [84] 68: 40–48. **Hoffman, R. L.**—Nine new xystodesmid millipeds from Virginia and West Virginia, with records of established species. [71] 99 (3244): 371–89. **Janetzschek, H.**—Zur Brutbiologie von Neobisium jugorum (Arach., Pseudoscorpiones). [Ann. Naturhist. Mus., Wien] 56: 309–16, ill., 1948. **Nesbitt, H. H.**—Six new Mexican mites of the subfamily Rhizoglyphida. [60] 8: 57–70, ill. **Tuxen, S. L.**—Tardigrada. [Zool. of Iceland] 3 (24): 1–11, 1941. Myriopoda. *Ibid.* 3(36): 1–9, 1941.

SMALLER ORDERS—Crystal, M. M.—A descriptive study of the life history stages of the dog biting louse, Trichodectes canis (Mallo. Trichodect.). [18] 44: 89–97. **Denning, D. G.**—A review of the Rhyacophilidae (Trichop.). [23] 80: 97–117. **Eads and Menzies**—Meringis bilsingi, a new ectoparasite of the kangaroo rat, Dipodoznys ordii (Siphon. Hystrichopsyll.). [65] 51: 116–18. **Fristrup, B.**—Neuroptera and Trichoptera. [Zool. of Iceland] 3(43–44): 1–23, 1942. **Grensted, L. W.**—Some questions of nomenclature in the Odonata. [28] 85: 134–35. **Mac Swain, J. W.**—A method of collecting male stylops (Strepsiptera). [60] 8: 89–91. **Mukerji, D. and P. K. Mitra**—(See under Anatomy.) **Overgaard, C.**—Mallophaga and Anoplura. [Zool. of Iceland] 3(42): 1–22, 1942. **Park, O.**—A notable aggregation of Collembola. [5] 42: 7–9. **Ray Chaudhuri, S. P. and J. Das Gupta**—(See under Anatomy.) **Rehn, J. A. G.**—Dermaptera records from the Solomon, New Hebrides and Loyalty Islands. [83] 74: 159–63. Dermaptera records from various Pacific Is. *Ibid.*: 165–71 (*). **Teale, E. W.**—Fish-fly (Neuropt.). [56] 58: 274–75. **Toth, L.**—(See under Anatomy.)

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225–60 (k*). **Frick, K. E.**—(See under Anatomy.) **Hull, F. M.**—Some flies of the Genus Volucella from the New World (Syrph.). [73] 56: 26–40 (*). **Hull, F. M.**—American syrphid flies of the subfamilies Cheilosinae or Sysphinae. [18] 44: 73–79 (*). **James, M. T.**—Some new and poorly known Therevidae from Colorado. [5] 42: 10–13 (k*). **Komp, W. H. W.**—Aedes (Ochlerotatus) nubilus Theobald, 1903, a synonym of A. (O.) serratus (Culic.). [65] 51: 105–14. **Lange, W. H., Jr.**—Notes on the occurrence of Agromyzid flies during 1948, and a record of two unreported species in California. [60] 8: 91–92. **Leclercq, M.**—Observations ecologique sur les mouches de nos habitations. [Rev. Franc. d'Ent.] 16: 46–49. **Maas, A.-H.**—(See under Anatomy.) **Mimeur, J. M.**—Contribution à étude des Zoocécidies du Marac. [Encyclop. Ent., Paris] 24: 3–259, ill. **Pacaud, A.**—(See under Anatomy.) **Quisenberry, B. F.**—The genus Oxyna in the Nearctic region north of Mexico. [60] 8: 71–76 (*), ill. **Richards and Fan**—(See under Anatomy.) **Spiess, E. B.**—Drosophila in New England. [45] 57: 117–31. **Stone, A.**—Deuterophlebia coloradensis in Oregon (Deuterophlebi). [65] 51: 122. **Strickland, E. H.**—(See under Anatomy.) **Tashiro and Schwardt**—(See under Anatomy.)

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

1. American Midland Naturalist. Notre Dame, Indiana.
2. American Museum Novitates. New York, N. Y.
3. American Naturalist. Garrison-on-Hudson, New York.
4. Annals of Applied Biology. London.
5. Annals of the Entomological Society of America. Columbus, Ohio.
6. Annals and Magazine of Natural History. London.
7. Annales Academia Brasileira Sciencias. Rio de Janeiro.
8. Anales del Instituto de Biologia Mexico. Mexico City.
9. Anatomical Record. Philadelphia.
10. Arkiv för Zoologie. K. Svenska Vetenkapsakademien i. Stockholm.
11. Arquivos de Higiene e Saude Publica. São Paulo.
12. Biological Bulletin. Woods Hole, Massachusetts.
13. Bios, Rivista Biol. Geneva.
14. Boletin de Entomologia Venezolana. Caracas.
15. Boletin del Museo de Historia Natural "Javier Prado." Lima, Peru.
16. Boletin do Museu Nacional do Rio de Janeiro. Brasil.
17. Bull. Acad. Sci. (Izvestia Akad. nauk) U S S R (S. biol.).
18. Bulletin of the Brooklyn Entomological Society. New York.
19. Bulletin of Entomological Research. London.
20. Bulletin of the Museum of Comparative Zoology. Cambridge, Mass.
21. Bulletin of the Southern California Acad. of Sciences. Los Angeles.
22. C. r. Acad. Sci. (Doklady Akad. nauk) U S S R. Leningrad.
23. Canadian Entomologist. Guelph, Canada.
24. Canadian Journal of Research. Ottawa, Canada.
25. Ecological Monographs. Durham, North Carolina.
26. Ecology. Durham, North Carolina.
27. Entomologica Americana. Brooklyn Ent. Society, New York.
28. Entomological Monthly Magazine. London.
29. Entomological Record and Journal of Variations. London.
30. The Entomologist. London.
31. Florida Entomologist. Gainesville, Florida.
32. Frontiers. Philadelphia, Pennsylvania.
33. Great Basin Naturalist. Provo, Utah.
34. Iowa State College Journal of Science. Ames, Iowa.
35. Journal of Agricultural Research. Washington, D. C.
36. Journal of Animal Ecology. London.
37. Journal of Economic Entomology. Geneva, New York.
38. Journal of the Elisha Mitchell Science Society. Chapel Hill, N. C.
39. Journal of Entomology and Zoology. Claremont, California.
40. Journal of Experimental Biology. London.
41. Journal of Experimental Zoology. Philadelphia, Pennsylvania.
42. Journal of Heredity. Baltimore, Maryland.
43. Journal of the Kansas Entomological Society. Lawrence, Kansas.
44. Journal of Morphology. Philadelphia, Pennsylvania.
45. Journal of the New York Entomological Society. New York.
46. Journal of Parasitology. New York.
47. Journal of the Tennessee Academy of Sciences. Nashville, Tenn.
48. Journal of the Washington Academy of Sciences. Washington, D. C.
49. Memorias do Instituto Oswaldo Cruz. Rio de Janeiro.
50. Microentomology. Stanford University, California.
51. The Microscope and Entomological Monthly. London.
52. Mosquito News. Albany, New York.
53. Nature. London.
54. Nature. Washington, D. C.
55. La Naturaliste Canadien. Quebec.
56. Natural History. New York.

57. Occasional Papers, Mus. of Zool., Univ. of Michigan. Ann Arbor.
58. Ohio Journal of Science. Columbus, Ohio.
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104. Anales de la Escuela Nacional de Ciencias Biologicas. Mexico.
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107. Annales de la Société Entomologique de France. Paris.
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109. Notulae Naturae. Philadelphia.
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111. Revista Brasiliera de Biologie. Rio de Janeiro.
112. Eos, Revista Española de Entomologia. Madrid.
113. Minist. de Agri. de la Nación, Inst. Sanidad Vegetal, Buenos Aires.

EXCHANGES

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

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

Lepidoptera—Large quantities of Plexippus, Colias, Cardui, Vanillae wanted for cash or exchange for tropical butterflies. G. MacBean, 710 Miller Rd., Sea Island, Vancouver, B. C.

Ants of the tribe Dacetini (*Strumigenys, Rhopalothrix* and related genera) wanted for world revision. W. L. Brown, Jr., Harvard University Biological Laboratories, Cambridge 38, Mass.

Mallophaga (on which immediate determination is not necessary) wanted for study and determination. R. L. Edwards, Dept. Biology, Harvard University, Cambridge 38, Mass.

Tingidae (Heteroptera) of the world wanted, in alcohol, with host and other ecological data. Will collect other orders in exchange. N. S. Bailey, 16 Neponset Ave., Hyde Park 36, Mass.

Bombidae, nearctic and neotropical, wanted for exchange, identification, or purchase. Will exchange in other groups for bumblebees. Barth Maina, Dept. Zool., Univ. of Chicago, Chicago 37, Ill.

Saturnidae of the world. Will purchase individual specimens or cocoons. F. E. Rutkowski, St. Bede College, Peru, Illinois, U. S. A.

Butterflies of New England, principally from New Haven, Conn., for exchange. Louis Clarke, 28 W. Elm St., New Haven 15, Conn.

Wanted—Proc. Ent. Soc. Phila., vols. 1–6; Proc. Cal. Acad. (Nat.) Sci., 1–7; Proc. Acad. Nat. Sci. Phila., 1–20; Trans. Amer. Ent. Soc., 1–10; Bull. Buff. Soc. Nat. Sci., 1–5; Psyche, 11, 13, 15; Ent. Amer. n.s., 7–26. C. F. dos Passos, Mendham, N. J.

Miridae (Capsidae)—American species wanted, with locality labels, in exchange for British species. D. Leston, F.R.E.S., 6 Frognal Rise, London N. W. 3, England.

Wanted—Entomological microscope in good condition; Spencer, Bausch & Lomb, or other standard make. David G. Shappirio, 4811 17th St., N.W., Washington 11, D. C.

ENTOMOLOGICAL NEWS

JULY 1949

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ENTOMOLOGICAL NEWS

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Additional Data Upon the Fleas of the Sagebrush Vole

By C. ANDRESEN HUBBARD, Vanport College, Portland, Oregon

Since publishing last month (Ent. News, June 1949, pp. 141–144) on the fleas of the Sagebrush Vole in the State of Washington, the writer has been fortunate in having Dr. C. W. Clanton of the Washington State Board of Health send him several new batches of fleas from west of the Columbia River, whereas previous parcels had been taken east of the River, and through his own efforts in the field in the vicinity where Oregon, California and Nevada meet he collected from this mouse in all three states. The writer's voles (*Lagurus curatatus*) were taken in live traps baited with apple and oatmeal in gullies that had had streams in their bottoms earlier in the year. The gullies were in sagebrush plains. The voles were taken in the ratio of about 1 to 4 with the meadow mouse *Microtus montanus* and on the latter's runs. This new study, then, gives a picture of the fleas of Lagurus from Washington, Oregon, California and Nevada.

Throughout their range these desert meadow mice carry a Thrassis of their own which the writer described in last month's article as *Thrassis gladiolis johnsoni*. The writer can now report this flea off *Lagurus curatatus pauperrimus* (State of Washington Sagebrush Vole) on both the east and west side of the Columbia River which cuts the range of the mouse in two in the State of Washington. The records are from Davenport, Lincoln County, Washington, April, May and June, a large series. This is east of the Columbia River. And from Ellensburg, Kitittas County, Washington, during June and early July a good series from west of the River. And off *Lagurus curatatus intermedius* (Intermediate Sagebrush Vole), 14 miles north of Fort Bidwell, Modoc County, California, 2 males, 3 females; 13 miles south Adel, Lake County, Oregon, 1 male, 2 females; 49 Ranch, 4 miles west Vya, Washoe County, Nevada, 5 pair.

These data answer the question raised by the writer last month of how a *Thrassis gladiolis* could appear in Washington. Lagurus has carried it from south to north, in the south the range of the mouse being in the same dry sagebrush plains as *Citellus leucurus,* the Antelope Ground Squirrel, which is the true host of the flea *Thrassis gladiolis gladiolis* in southern Oregon, Nevada and California.

The writer has found no variation in *Thrassis gladiolis johnsoni* in the range of the Sagebrush Vole.

A flea of the genus Megabothris carried by these mice shows considerable variation, however. Several hundred specimens delivered to the writer by Dr. Clanton from east of the Columbia River in Washington showed no great variation. These the writer described last month as *Megabothris clantoni.* The writer finds that the related flea from *Lagurus c. intermedius* is different and new and shall be called:

Megabothris princei, a new species

There are before the writer at this time the holotype male and allotype female and a short series of paratypes. The new flea lies between *Megabothris abantis* and *M. clantoni.*

Male: Process of clasper as in *abantis* and *clantoni.* Finger with general shape of *clantoni* but with portion above shank rectangular rather than constricted apically as in *clantoni.* Armature as in *abantis,* i.e., 3 spiniforms on posterior border, two short, plump ones above, long pointed one below; the lower shorter one closer to the long one. VIII sternite in male similar to *clantoni* but armature consists of more stout curved bristles at apex and a constriction on lower border at about mid point.

Female: Apical outline of VII sternite not easily separated from *abantis* and *clantoni,* consisting in the allotype of a single rounded upper lobe, the armature of 8 major bristles and a lesser number of minor ones to the anterior. Spermatheca characteristic for the abantis-clantoni series but in type finger-like appendix is flattened apically toward body.

The male of the new flea is 2.75 mm. long, the female 2.25 mm. The type locality is the draw behind the 49 Ranch house (deserted) 4 miles west of Vya, Washoe County, NEVADA. The type host is *Lagurus curatatus intermedius* (Taylor). The *types,* mounted on separate slides, bearing the writer's number 2712 are deposited in the National Museum. *Paratypes* are deposited in British Museum, Canadian National Museum, Academy of Natural Sciences of Philadelphia and California Academy of Science. This flea bears the name of Frank Prince, Entomologist at Plague Suppressive Measures Laboratory, San Francisco, California.

Records: Off *Lagurus curatatus intermedius* (Taylor), 49 Ranch, 4 miles west Vya, Washoe County, Nevada. Types and 3 males and 5 females; 14 miles north Fort Bidwell, Modoc County, CALIFORNIA, 2 males, 1 female; 13 miles south Adel, Lake County, Oregon, 1 male, 2 females.

Off *Microtus montanus micropus* Hall, 49 Ranch, Vya, Nevada, a male.

During mid-summer Dr. Clanton changed his field of operations from east of the Columbia River in central Washington to west of the River. When the writer examined the fleas sent him off Lagurus from west of the River no variation was found in *Thrassis gladiolis johnsoni* but the Megabothris was different from the form east of the River. The new variation shall be called:

Megabothris clantoni johnsoni, a new subspecies

There are before the writer at this time the holotype male, the allotype female and 5 pairs of paratypes. In the new subspecies the finger is like *clantoni* but the VIII sternite is like *princei* and, since siphonapterists have given more weight to the finger than the VIII sternite in taxonomic studies, *johnsoni* is closest to *clantoni.*

Male: Finger ham shaped as in both *clantoni* and *princei* but, as in *clantoni,* constricted at the apex. Armature as in *clantoni,* on posterior border below the characteristic long pointed spiniform, above it a short plump spiniform and at apical angle a short stout bristle, which in a small percentage of cases is spiniform. The VIII sternite is princei-like in that apically it is armed with a series of curved long bristles followed proximally by a series of short ones.

Female: VII sternite as in the clantoni-princei-abantis series, with rounded upper lobe in allotype, the armature consisting of about 7 major bristles, 4 medium ones and as many small ones. Spermatheca typical for the group.

This flea is smaller than *clantoni* and *princei* measuring only about 2.00 mm. in both sexes. The type locality is 18 miles east of Ellensburg, Kitittas County, WASHINGTON where Dr. Clanton took the fleas off *Lagurus curatatus pauperrimus,* the type host. The *holotype* male and *allotype* female are mounted on one slide bearing the writer's number 2759 and deposited in the National Museum; *paratypes* distributed as for *M. princei.* This flea bears the name of Dr. Murray Johnson, Surgeon, of Tacoma, Washington, one of the leading naturalists of the State.

From this report it seems likely that the Columbia River is the dividing line between the range of *M. c. clantoni* to the east and *M. c. johnsoni* to the west.

Other Fleas from Lagurus

Two interesting records from Dr. Clanton's material from west of the Columbia River are from one vial of fleas off Lagurus: 48 males, 90 females of *Meringis shannoni* (Pocket Mouse flea) with only 5 pairs of *Thrassis gladiolis johnsoni* and 1 male *Megabothris clantoni johnsoni.* A second vial contained 6 pairs *Megabothris c. johnsoni,* 10 pairs *Thrassis g. johnsoni,* a pair *Catallagia decipiens,* 1 male *Meringis shannoni.* The writer took off *Lagurus c. intermedius* besides *Thrassis g. johnsoni* and *Megabothris princei, Malaraeus telchinum* and *Catallagia decipiens.*

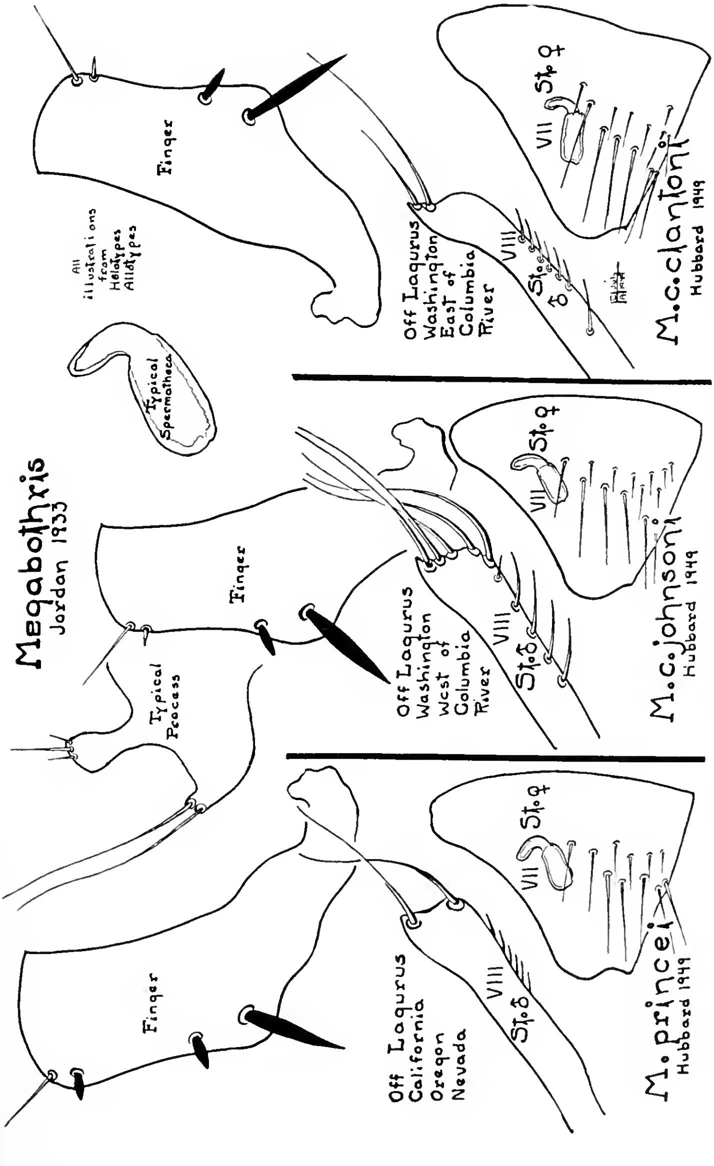

FIG. 1. *Megabothris princei*, *M. clantoni johnsoni*, *M. c. clantoni.*

In closing this article the writer wishes to say that the voles taken by him were brought back to the laboratory alive. It is now 2 P.M. and they have just ventured out of their nests for afternoon feed and exercise. The mice are gray, lacking the red found on the back of Microtus and their tails are very short, less than an inch in the mature mouse. As they feed, they go first to the apple. Apple then should be used as bait in live traps. Lagurus rises early for breakfast and at this time, coming from their warm nests, they carry many fleas. They soon dust them off, however, and catches later in the day bring the collector few fleas. Fleas from Lagurus in Washington have been found plague positive but it is not known as yet which of the Laguran fleas are vectors, although *Malaraeus telchinum* has definitely been condemned as a vector. Because of the plague angle, Lagurus and its fleas should be handled with some caution.

A Minute on Podium Luctuosum (Hymenoptera: Sphecidae)

Ever since Frederick Smith described *Podium luctuosum* from North Carolina in 1856, this wasp has been a rather rare species. Kohl reported it from Texas in 1902, and in recent years a few specimens have been taken at or in the vicinity of Washington, D. C. A specimen of *Podium luctuosum* was taken July, 1948 in a sand pit adjacent to Six Mile Creek, Ithaca, N. Y. This represents the northernmost record for the species up to the present. The specimen captured was a female carrying its prey, a female cockroach, *Parcoblatta virginica* (Brunner) [det. James A. G. Rehn]. Nothing has hitherto been known about the biology of *luctuosum*, although Rau presented a short but interesting account of the other Nearctic species, *P. biguttatum*.—V. S. L. Pate, Cornell University, Ithaca, N. Y.

Notes on the Mating Behavior and Oviposition of Creophilus maxillosus (Linné)

By George S. Fichter, Department of Zoology, Miami University, Oxford, Ohio

Creophilus maxillosus is conspicuously larger than the majority of beetles found around carrion. It can be distinguished easily from other beetles approximating its size by its Staphylinid characteristic of abbreviated elytra. No other Staphylinids of comparable size are found in such a habitat. Excluding the areas of whitish-yellow setae described below, the coloration of the beetles is entirely black.

Since *Creophilus maxillosus* is attracted to carrion, small vertebrate carcasses were employed as lures. These were placed at various locations in the field and examined regularly in order to collect the beetles attracted there. Many different animals (fish, frogs, turtles, snakes, lizards, birds, mice, rats, cats, and rabbits) were utilized in the course of the experiment. All served equally well as lures for the beetles. Rats were used most commonly.

The carcasses were generally placed directly on the surface of the ground. No attempt was made to trap the beetles at the carrion since the carcasses were examined frequently and the presence of an adequate food supply was sufficient to cause the beetles to linger. In addition, placing the carrion in containers and sinking the containers into the ground so that their brims are flush with the surface, which is the normal procedure for trapping, reduces its accessibility. When the carrion is completely exposed, there is nothing to hinder the natural dissemination of its odor and, hence, its discovery is facilitated.

Mating Behavior

In the laboratory the adult beetles were kept in a glass terrarium (35 × 15 × 12 centimeters) in which the dirt level was maintained at four to five centimeters. The beetles copulated readily under laboratory conditions, and the act was also observed on numerous occasions in the field. The following is a composite description of the observations noted.

When two beetles approached each other for the first time, they brought their antennae and mouth parts into contact momentarily, brushing them against each other rapidly. They generally followed this by examining the tips of their abdomens with their antennae. These preliminary activities apparently were a means of sex identification. For if the two beetles were of the same sex, they snapped viciously at one another with their mandibles, disengaged themselves after a temporary struggle, and separated hurriedly. On the other hand, if the two beetles were of opposite sexes, the male would immediately attempt to crawl astride the female. Frequently the female resisted such advances either by elevating the tip of her abdomen so that the male could not mount her or by running away rapidly. In either case the male at first persisted in its attempts. If the female ran, the male usually followed in close pursuit and sometimes succeeded in overtaking her. When the male's endeavors were continually rejected, the copulation attempt was finally abandoned.

When successful in mounting the female in the usual manner —crawling astride from the rear—the male bent the tip of its abdomen down to contact the slightly upturned tip of the female's abdomen and at the same time exserted its genitalia. At the insertion of the genitalia the male was astride the female. Its prothoracic legs were rested on the humeral angles of the female's elytra and were supported on their transversely expanded tarsites. The terminal tarsites, bearing the strongly curved claws, were protruded at the sides of the elytra and not employed in any manner of support. The mesothoracic legs were either rested on the edge of the abdominal segments or extended to the ground. Likewise, the metathoracic legs were stretched down at the sides of the female to rest on the ground.

This position of embrace characteristic of the initial stages of coitus was never maintained over a long period of time. Sometimes the female kept in continuous movement, and the union was accomplished as the beetles ran along, with the male jostled up and down in its awkward, insecure position. In most cases, however, the female remained motionless during the insertion of the genitalia but moved off after the elapse of a few seconds. Since the male had no firm clasp on the female with its tarsal claws and was attached to her only by its genitalia, the female glided from beneath the male easily in such cases, and the male became oriented so that it faced in the opposite direction to the female. The two remained united only by their genitalia. Unless the specimens were of similar size, the larger of the two usually crawled off, dragging its companion behind it. The smaller of the two seldom resisted or attempted to oppose the direction chosen by its mate. Both sexes were observed attacking and consuming maggots in many instances during coitus.

Sometimes a second male attempted to copulate with a female already engaged. In such cases the two males snapped viciously at one another. An interference of that sort often resulted in the disengagement of the copulating pair. Then the stronger of the two males would engage the female again unless she managed to escape completely. The males were totally indifferent to one another in her absence.

In the specimens confined to cages, the act of coitus was attempted almost every time a male chanced to encounter a female, even though it was the same one with which the act had just been completed. The sexual impulse of the male was apparently stimulated at the slightest contact with a female. The duration of the act was brief, and the beetles normally disengaged themselves within three to five minutes.

Oviposition

Eggs were deposited singly both above and below the surface of the ground. The dirt level was maintained at approximately five centimeters in the cages, and eggs were frequently found on the bottom as well as at various levels up to and on the surface. Likewise, eggs were found on the surface, beneath the carrion, and at various levels below the surface in the field. It seems likely from such discoveries that the beetles do not select particular depths of situations in which to place their eggs but are indiscriminate.

Although oviposition below the surface of the ground was never observed, it was seen on several occasions at the surface level. The female made no elaborate preparation of the substratum to form a slit or cavity of any sort for the reception of the egg. She merely applied the tip of her abdomen to the surface and at the same time generally elevated the anterior portion of her body slightly by stiffening the fore and middle legs. The rigid condition of the abdomen frequently pushed its tip into the soil and produced a slight depression, but this seemed wholly dependent on the nature of the soil. The entire act required little more than a minute if the female were left undisturbed. Immediately after the egg was deposited, the female crawled away without examining the egg or attempting to conceal it.

In several instances females in the process of ovipositing were accosted by males which attempted copulation. If the female had actually begun discharging the egg from her abdomen, such an interruption seemed to accelerate her activity. On the other hand, if she had just assumed her position, she tried to ward the male off in the usual fashion by fighting or running away hurriedly. In the latter instances the act was usually completed in a more secluded section of the cage.

Despite the apparent haphazard placement of the eggs, it should be noted that they are, nevertheless, advantageously located. The congregation of adult beetles about carrion brings together large numbers of males and females, and the association naturally results in mating and oviposition at that site. Eggs deposited in such surroundings are incubated by the heat of the decay, and the newly emerged larvae have little distance to travel in locating supply of food.

Eusattus vs. Sphaeriontis

By Ira La Rivers, University of Nevada, Reno

In 1908, Col. T. L. Casey described the genus *Sphaeriontis* to include "five known species," which he arranged in a key: *S. muricata* (Le Conte) 1852, *S. dilatata* (Le Conte) 1852, *S. acomana* n. sp., *S. ciliata* (Horn) 1894 and *S. puberula* (Le Conte) 1854. He further emphasized that *S. dilitata* could not be considered a synonym of *S. muricata,* as Horn had indicated as early as his 1870 monograph on the family.

Having had occasion to go over *Eusattus* and *Sphaeriontis* somewhat completely in the recent past, it became rather obvious that the group as defined by Casey was more finely drawn than the actual specimens themselves warranted. My conclusions are that *Sphaeriontis* is a weak subgenus of *Eusattus,* and perfect intergradation between *Eusattus muricatus* and *E. dilatatus* in my series indicates that Horn was correct in synonymizing the latter with the former.

Casey makes mention of the "densely punctulate epipleurae and more or less confluent granules of the elytra" as "amply distinguishing it" (*dilatatus*) "from *muricata,* aside from its radically different habitat." The morphologic structures he calls attention to are those which Horn long ago fully demonstrated to be too weak and intergrading to be of value, and it is difficult to see why Casey resurrected them. As for their being "radically different" in habitat, my experience has shown that the two occur in identical situations, on sand dunes or in sanded areas; perhaps Casey's biologic information was based on second-hand data from others or gleaned from collecting one or a few anomalous individuals "out of character."

Another possible source of error may have been the fact that Casey based some of his conclusions as to relationships within the group solely on published descriptions not having seen, at the time of his paper, specimens of *E. dilatatus, E. puberulus* or *E. ciliatus.* In addition, the three species Casey added to the genus are quite patently synonyms of *Eusattus muricatus,* my conclusions being based on specimens from his type locality.

The synonymy should be indicated as

Eusattus Le Conte 1852
(*Sphaeriontis* Casey 1908)
  muricatus Le Conte 1852
    (*dilatatus* Le Conte 1852)
    (*acomana* Casey 1908)
    (*latissima* (Casey) 1924)
    (*fulvescens* (Casey) 1924)
  ciliatus Horn 1894
  puberulus Le Conte 1854

I have previously made passing mention of *Sphaeriontis* as a subgenus of *Eusattus* (1948: 709).

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Records of the Order Zoraptera from Alabama

By B. D. VALENTINE and E. O. WILSON, University of Alabama

A B. Guerney (*Proc. Ent. Soc. Wash.*, 40: 3, 1938), in his synopsis of the order Zoraptera, estimated the range of *Zorotypus hubbardi* Caudell to be from Maryland to Texas. Although he included no records from Georgia, Alabama, and Mississippi, Guerney stated that the insect is probably abundant in all of the southern states. Recent collections from Alabama have been numerous enough to indicate that this is true at least in this state. Typical *Z. hubbardi* was collected from March 30 through April 28, 1949, in the following widely distributed localities: Millport, Lamar Co.; Gordo, Pickens Co.; Alberta City, Peterson, and Lynn Haven, Tuscaloosa Co.; Eutaw, Greene Co.; Alabama Port, Mobile Co.; Bear Point, near Orange Beach, Baldwin Co.; and Chattahoochee State Park, Houston

Co. Specimens were identified principally on the basis of genitalic slides compared with Guerney's figures. In seven of the localities, the insects were found under thick bark of moist pine stumps and logs. At Eutaw, they occurred under the bark of thoroughly dry pine stumps; and at Peterson, they were under the bark of a moist oak log. Many insects, particularly termites of the genus *Reticulitermes* and ants of the genus *Proceratium*, were frequently observed in the same situation as *Zorotypus*, but no evidence was found to indicate an obligatory association. In a total of 151 individuals taken, there were 59 apterous males, 45 apterous females, 3 dealate females, and 44 nymphs. No alate-form males were collected. Individual collections varied from a single apterous female to a group consisting of 21 apterous males, 18 apterous females, and 10 nymphs.

Notes on Gesomyrmex (Hymenoptera: Formicidae)

After my manuscript on *Gesomyrmex* (Amer. Ent. Soc. Amer. XLII (1949): 71–76) went into proof, I received a communication from Dr. James Chapman, Silliman University, Dumaguete, Philippines, together with workers from two nests of *G. luzonensis* var. *chapmani* Wheeler. I feel that some of the data extracted from the letter are well worth noting in print.

When Dr. Chapman returned to Dumaguete about two years ago he began looking for colonies of *Gesomyrmex*. A tree in which he had previously located several nests had been destroyed by fire when the Japanese burned his mountain house. Dr. Chapman looked for nearly two years before he found another colony. He had to climb trees, search for workers among the higher foliage, and then follow the ants back to their burrows in the branches. The nests are only in the living branches.

Dr. Chapman states that he has taken *Gesomyrmex* on three different islands of the Philippines group and that the ants seem at least superficially to belong to the same species.

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Night Collections of Dragonflies (Odonata: Anisoptera)

By George H. Bick, Zoology Department, Tulane University, New Orleans

My attention was called to the possibility of obtaining large numbers of dragonflies at night by Mr. J. Bolley and Mr. C. Chaney who observed many of them perched on weeds and shrubs and apparently sleeping in a weedy field just outside the city limits of New Orleans. On the night of May 4 Mr. Bolley and I collected *Libellula needhami* (9 males, 11 females) and *Pachidiplax longipennis* (1 male, 2 females) in about one and one-half hours using a flashlight only. Most of the dragonflies were taken about 18 inches above ground perched on the basal dry parts of *Paspalum* sp. On the night of May 24 at the same locality and in about the same period of time Dr. Penn and I collected *L. needhami* (11 males, 7 females), *Anax junius* (1 male), *P. longipennis* (1 female). These were taken along a road bordering the field and were mostly from *Ambrosia* sp., *Verbena bonariensis*, and *Salix nigra* at heights of about three feet.

On both occasions the dragonflies were perched vertically and were apparently sleeping. They were taken in the beam of light with the fingers. Often they scarcely stirred even after capture.

The ease in collecting these specimens as contrasted with the more tedious daytime net technique warrants calling it to the attention of other workers. The method seems to have possibilities to furnish basic data for population analyses.

D.D.T. as a Contributing Factor to the Increase of Trematode Diseases in Man and Other Animals.

Under the title "Does destruction of water insects cause increase of Trematode disease?" Mr. J. Omer-Cooper has an article in the Entomologist's Monthly Magazine, of London, for June, 1949, in which he states:

"In the Hluhlwe game reserve [Zululand] . . . there is a stream—a mere trickle of water at the time we visited it—with many pools in its bed, some of which are large and inhabited by fine specimens of crocodile. These crocodile pools and indeed all the pools in the game reserve have been sprayed by aeroplane many times with D.D.T. The waters had a curious dull dead look. Careful collecting showed that the D.D.T. had done its work well; not so much as a mayfly or dragonfly nymph was caught. There were no beetles, but the stones were dotted everywhere with surprisingly large numbers of aquatic mollusca. On the road to Mkuzi there was a fine pond with lily pads over which ran . . . jacanas . . . while dragonflies darted here and there over its surface. Here was a plentiful supply of both dragonfly and mayfly nymphs. Beetles were present in numbers that made glad the heart. Molluscs were not particularly plentiful."

Other examples of absence and of presence of dragonflies and their nymphs in Zululand and in the Northern Transvaal are given. Where enemies of molluscs, e. g., birds, certain insects, are destroyed, molluscs are numerous. "An increase in molluscs is likely to be accompanied by an increase in those Trematodes which spend the early part of their lives within their bodies. Many of these trematodes are parasites of the Mammalia. Man and his domestic animals suffer from their attacks. When water snails increase there should be a greater incidence of Trematode disease. In Zululand and in the Transvaal, Bilharziasis is very prevalent and seems to be definitely increasing."

We specify D.D.T. in this concatenation to render Mr. Omer-Cooper's examples the more eligible to inclusion in that series of classics which embraces Darwin's famous case of old maids (a post-Darwinian addition, to be sure), cats, mice, humble bees and red clover, and, still older, The house that Jack built.

PHILIP P. CALVERT.

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1949 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Carpenter, H.—Pseudacrea eurytus (Nymphalid): A study of a polymorphic mimic in various stages of speciation. [88] 100: 71–133, 28 figs. **Chopard, L.**—L'état actuel de la question des phases chez les insectes. [L'Annee Biol.] 25: 105–09. **Fischel, W.**—Die Instinkte der Tiere. [Naturw. Rundschau] 2: 193–98. **Franz, H.**—Untersuchungen über dei Kleintierwelt ostalpiner Böden. II. Die Collembola. [Zool. Jahrb., Abt. Syst.] 77: 81–162, 1944. **Gosmány, L. A. and G. Lengyel**—Hungarian Lepidopterology. I. A short history. [Lep. News] 3: 430. **Kiriakoff, S. G.**—Taxonomie et spéciation. La semi-espèce et la super-espèce. [Bull. et Ann. Soc. Ent. Belg.] 84: 64–70, 1948. La taxonomie des espèces jointives. *Ibid.* 120–23. **La Rivers, I.**—Entomic nematode literature from 1926 to 1946, exclusive of medical and veterinary titles. [Wasmann Coll.] 7: 177–206. **Meiners, E. P.**—A brief history of lepidopterology in Mo. [Lep. News] 3: 51–52. **Remington, C. L.**—The orders of insects. [Lep. News] 3: 45–47. William Barnes (1860–1930). *Ibid.* 53. **Scheffer, T. C. and O. W. Torgeson**—Humidifying apparatus for small test rooms. [80] 110: 214–15. **Woodrow, A. W.**—A convenient microsyringe. [80] 110: 142–43.

ANATOMY, PHYSIOLOGY, MEDICAL—Auerbach, S. I.—A preliminary ecological study of certain deciduous forest centipedes. [1] 42: 220–27. **Bodenstein, D. and A. Abdel-Malek**—The induction of aristopedia by nitrogen mustard in Drosophila virilis. [41] 111: 95–115. **Bonne-**

maison, L.—Action de l'effet de groupe sur la production des ailes chez Brevicoryne brassicae (Aphid). [C. R. Acad. Sci., Paris] 229: 142–43. **Bourgin, P.**—Incidence thermique sur le développment de queque Coleoptères. [110] 5: 51–53. **Bowman, T.**—Chromatophorotropins in the central nervous organs of the crab, Hemigrapons oregonensis. [12] 96: 238–45. **Brown and Jones**—Ovarian inhibition by a sinus-gland principle with fiddler crab. [12] 96: 228–32. **Cazal, P.**—Les glandes endocrines retro-cerebrales des insects (etude morphologique). Bull. Biol. Fr. Belg. Suppl. 32: 1–227, 1948. **Chaudhuri, S. P. R.**—Cytological studies on the Indian dragonflies. I. Structure and behavior of the chromosomes in six species of dragonflies. [Proc. Zool. Soc. Bengal] 2: 81–93. **Chauvin, R.**—Une nouvelle méthode d'appréciation de l'effet de groupe chez les acridiens migrateurs. [Ann. Sci. Nat. Paris] 5: 79–87. **Coutin, R. and P. Grison**—Hémichrysalides obtenues par ligature des chenilles de Laspeyresia pomonella L. (Lep., Tortr.) en rupture de diapause expérimentale. [C. R. Soc. Biol., Paris] 143: 15–17. **Deevey, G. B.**—The developmental history of Latrodectus mactans at different rates of feeding. [1] 42: 189–219. **Delamare-Deboutteville**—Sur la morphologie du adultes aptères et ailés de Zoraptères. [Ann. Sci. Nat. Paris] 9: 145–54. **Doncaster, J. P. and P. H. Gregory**—The spread of mosaic virus diseases in the potato crop. [Agr. Res. Council Rpt.] ser. no. 7: 189, London, 1948. **Eidmann, H.**—Zur Kenntnis der Ökologie von Azteca muelleri Em. (Formicidae), ein Beitrag zum Problem der Myrmecophyten. [Zool. Jahrb., Abt. Syst.] 77: 1–80, ill., 1944. **Fortin, B.**—Étude histologique du tube digestif de la larve d'Hylurgopinus rufipes (Scolytid). [55] 76: 142–80. **Götz, B.**—Tageszeit und Insektenaktivität. [Naturw. 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Sci., Paris] 228: 2057-58. **Henke, K.**—Einfache Grundvorgänge in der tierischen Entwicklung. II. Über die Entstehung von Differenzierungsmustern. [Die Naturwissenschaften] 35: 176-81, 203-11, 239-46. **Holdaway, G. F. and F. J. Day**—Temperature studies of the habitat of Eutermes exitiosus with special reference to the temperature within the mound. [Austral. Jour. Res.] 1: 464-93, 1948. **Hölldobler, K.**—Über ein parantologisches Problem. Die Gastpflege der Ameisen und die Symphilieninstinkte. [Zeitschr. Parasitenkunde] 14: 3-26. **House, H. L. and Patton, R. L.**—Nutritional studies with Blattella germanica reared under aseptic conditions. I. Equipment and technique. [23] 81: 94-100. **Husain, M. A., C. B. Mathur and M. L. Roonwal**—Studies on Shistocera gregaria, XIII. Food and feeding habits of the desert locust. [Indian Jour. Ent.] 8: 141-94, 1946. **Jackson, C. H. N.**—The biology of the tsetse flies. [Biol. 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Anatomy.) **Radford, C. D.**—A revision of the fur mites Myobiidae. [Bull. Mus. Nat. d'Hist. Nat.] 2 ser., 21: 91–97. **Ravoux, P.**—(See under Anatomy.) **Soares, B. A. M. and H. E. M. Soares**—Monografia dos generos de Opilioes neotropicos. [Arq. Zool. Est. Sao Paulo] 5: 553–635, 1948. **Stranatmann, R. W.**—The blood-sucking mites of the genus Haemolaelaps (Laelaptidae) in the United States. [46] 35: 325–52. **Thomas, M.**—L'instinct chez les Araignees. Observationes sur Tibellus oblongus. [Bull. et Ann. Soc. Ent. Belg.] 85: 23–24. **Thor, S. and C. Willmann**—Acarina 3. Trombidiidae. [Das Tierreich] Lf. 71b : v-xxvi, 187–541, 1947. **Turk, F. A.**—Dinocheirus stercoreus, a new pseudoscorpion from the Bracken Cave, Texas. [6] ser. 12, 2: 120–26. **Vachon, M.**—(See under Anatomy.)

SMALLER ORDERS—Bagnall, R. S.—Contribution towards a knowledge of the Isotomidae (Collembola). [6] ser. 12, 2: 81–96 (*). **Baibey, S. F.**—The genus Orothrips Moulton. [60] 25: 104–12 (k), ill. **Bianchi, F. A.**—New thrips records and species from the Marianas. [Proc. Hawaiian Ent. Soc.] 13: 347–50. **Carpentier, F.**—A propos des endosternites du thorax des Collemboles. [Bull. et Ann. Soc. Ent. Belg.] 85: 41–52, ill. **Chaudhuri, S. P. R.**—Odonata. (See under Anatomy.) **Delamare-Deboutteville**—(See under Anatomy.) **Denning, D. G.**—A new genus and five species of Trichoptera. [43] 22: 88–93. New and little known species of caddisflies. [1] 42: 112–22. **Franz, H.**—Collembola. (See under General.) **Guimãres, L. R.**—Contribução ao conhecimento dos Malófagos dos Psitácidas brasilieros. [Arq. Zool. Est. São Paulo] 5: 243–309 (*), ill., 1948. Sôbre algumas espécies do gênero Polygenis Jordan, 1939 (Pulicidae—Suctoria). *Ibid.* 539–52, ill. **Guimaraes, L. R. and G. H. E. Hopkins**—Notes on some Mallophaga from Crypturellus parvirostris and C. t. tataupa. [6] ser. 12, 2: 65–80 (S*). **Holdaway and Day**—Isoptera. (See under Anatomy.) **Holland, G. P.**—A revised check list of the fleas of British Columbia. [Proc. Ent. Soc. Brit. Columbia] 45: 7–14. **Le Calvez, J.**—Données caryologiques sur l'Embioptère Monotylota ramburi. [C. R. Acad. Sci., Paris] 229: 245–46. **Marlier, G.**—Trichoptera. (See under Anatomy.) **Mukerji, D. and P. K. Mitra**—Ecology of the mound-building termite, Odontotermes redemanni, in relation to measures of control. [Proc. Zool. Soc. Bengal] 2: 9–25, ill. **Noirot, C.**—Isoptera. (See under Anatomy.) **Ross, H. H.**—Descriptions of some western Limnephilidae (Trichoptera). [60] 25: 119–

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Reviews

A General Textbook of Entomology, by A. D. Imms. Seventh edition. New York, E. P. Dutton and Co., Inc. Pp. xii, 727, 624 figs., $12.50.

Reviews of earlier editions of this great textbook have appeared in Entomological News for 1925 and 1934. Published by Methuen and Co., Ltd., London, it is handled in this country by E. P. Dutton and Co. who have placed it on sale as of May tenth. Its author, the well known chief of the Rothamstead Experimental Station, died on April third.

The jacket of the book states that this is a "revised" edition, a statement that is rather misleading since the book has by no means been brought up to date and does not differ essentially from the third edition which appeared in 1934. A few unimportant illustrations have been replaced since then and two or three new references have been added to the literature.

In spite of the fact that some parts of the book are not up to date, this text is still very valuable and useful, even in America. The section on classification is very extensive and thorough and under each order there is included an account of the internal anatomy of that order, something that one cannot find in American general textbooks. The information on external features, taxonomy and biology is similar to that in our own Comstock and about as detailed, while the keys are less formidable and discouraging since they are broken up into separate keys to the superfamilies. Finally, another useful feature of Imms has been the carefully selected list of references at the end of each chapter.—R. G. SCHMIEDER.

THE FIG, by Ira J. Condit. Pp. xviii + 222, 27 text figures. Waltham, Mass., 1947, the Chronica Botanica Co.; New York City, Stechert-Hafner, Inc. Price $5.00.

This volume is sufficiently comprehensive in its treatment to be valuable alike to the historian, the fig culturist, the botanist and the entomologist. The author has traced the history of the fig in great detail as the most ancient of known cultivated fruits, from about 2000 B.C., to its first introduction into America in about 1575, and on to its high development in the modern fruit industry.

In addition, he discusses the systematic botany, breeding, caprification, varieties and character of the fruit, fig culture, propagation, dried figs, chemistry and food value, marketing, disease and pests. The work is of interest to the entomologist not only from the standpoint of insects which attack the fig, but also for their unique and necessary use in its fertilization. The book is most thoroughly documented and contains a comprehensive bibliography of about 750 titles.—M. E. PHILLIPS.

EXCHANGES

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

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

Lepidoptera—Large quantities of Plexippus, Colias, Cardui, Vanillae wanted for cash or exchange for tropical butterflies. G. MacBean, 710 Miller Rd., Sea Island, Vancouver, B. C.

Ants of the tribe Dacetini (*Strumigenys, Rhopalothrix* and related genera) wanted for world revision. W. L. Brown, Jr., Harvard University Biological Laboratories, Cambridge 38, Mass.

Mallophaga (on which immediate determination is not necessary) wanted for study and determination. R. L. Edwards, Dept. Biology, Harvard University, Cambridge 38, Mass.

Tingidae (Heteroptera) of the world wanted, in alcohol, with host and other ecological data. Will collect other orders in exchange. N. S. Bailey, 16 Neponset Ave., Hyde Park 36, Mass.

Bombidae, nearctic and neotropical, wanted for exchange, identification, or purchase. Will exchange in other groups for bumblebees. Barth Maina, Dept. Zool., Univ. of Chicago, Chicago 37, Ill.

Saturnidae of the world. Will purchase individual specimens or cocoons. F. E. Rutkowski, St. Bede College, Peru, Illinois, U. S. A.

Butterflies of New England, principally from New Haven, Conn., for exchange. Louis Clarke, 28 W. Elm St., New Haven 15, Conn.

Wanted—Proc. Ent. Soc. Phila., vols. 1–6; Proc. Cal. Acad. (Nat.) Sci., 1–7; Proc. Acad. Nat. Sci. Phila., 1–20; Trans. Amer. Ent. Soc., 1–10; Bull. Buff. Soc. Nat. Sci., 1–5; Psyche, 11, 13, 15; Ent. Amer. n.s., 7–26. C. F. dos Passos, Mendham, N. J.

Miridae (Capsidae)—American species wanted, with locality labels, in exchange for British species. D. Leston, F.R.E.S., 6 Frognal Rise, London N. W. 3, England.

Wanted—Entomological microscope in good condition; Spencer, Bausch & Lomb, or other standard make. David G. Shappirio, 4811 17th St., N.W., Washington 11, D. C.

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Studies on the Silphidae. I. Secondary Sexual Differences in the Genus Nicrophorus (Coleoptera)

By Raymond Q. Bliss, Philadelphia, Pa.

Secondary sexual characters have been described in the genus *Nicrophorus* by Horn (1), Portevin (2), and Arnett (3), but there is some lack of agreement among these authors as to the characters included and as to the reliability of each character when used to diagnose the sex of an individual. My own recent studies have led me to conclude that there are no secondary sexual characters valid for the whole genus, although some species may show them.

The above authors agree that the form of the anterior tarsi is a good character to separate the sexes. Horn states, "Tarsi slender, the anterior dilated in the male and fimbriate at the sides." Arnett states, ". . . the males have . . . the fore tarsal pulvilli expanded, whereas in the females . . . the fore tarsal pulvilli are simple." Portevin says, of the tribe Nicrophorini, page 178, "Les tarses sont de 5 articles, les quatre premiers larges chez le ♂, aux tarses antérieurs," and on page 187, of his genus *Necrocharis*, "Celui-ci [males] a les tarses antérieurs faiblement dilatés," and on page 191, of the genus *Nicrophorus s. s.*, "Les tarses antérieurs sont dilatés chez le ♂ sur les quatre premiers articles, parfois si faiblement qu'ils ne diffèrent guère de ceux de la ♀." This last statement seems to contradict somewhat the first.

The shape of the area of the head behind the eyes is used by Portevin who says, page 175, "Tête ovale, parfois subtriangulaire ou carrée en arrière, chez le ♂, à cause du développement des tempes," and on page 186, *Necrocharis*, "Tête ovale, brusquement étranglée derrière les yeux; . . . ," apparently without regard to sex, and on page 188, of the genus *Nicrophorus s. s.* "Tête grosse, ovale, ♀, subtriangulaire, ♂, avec les tempes, très renflées dans ce dernier sexe, ..." Arnett says, "the males have the eyes situated well forward on the head, . . . in the females the eyes are placed well towards the back of the head, ..." Horn, however, says, "The head exhibits some variation in form within specific limits; that is, while the eyes in some individuals are very close to the hind angles of the head, in others the head is notably prolonged behind them. This is neither sexual nor specific."

The clypeus and rhinarium are also used: Portevin says, page 176, "La pièce clypéal, généralement campanuliforme chez le ♂, est presque toujours de la même couleur dans les deux sexes, mais elle varie de forme et d'étendue avec la taille des individus; elle est toujours plus ou moins réduite chez la ♀," and on page 188, "L'épistome est séparé du front par une ligne tantôt droit, tantôt angulée; la pièce membraneuse qu'il renferme est généralement plus développée chez le ♂; où elle affecte la form campanulée; elle s'étend alors presque toujours jusqu'à la suture clypéo-frontale. Chez la ♀ elle a souvent une forme triangulaire, passant au trapèze tres transverse, pour aboutir à une simple bordure étroite à la partie antérieure du clypeus; elle est parfois si petite qu'on peut la considerer comme nulle. Sa couleur est constante dans la même espèce mais varie quelquefois avec le sexe." Arnett says, ". . . the ♂♂ have . . . the clypeus large . . . in the ♀ the clypeus is appreciably smaller. . . ." Horn also states that the rhinarium varies in size and shape but gives it no sexual significance. He does not give any difference in the clypeus.

Portevin states that the tooth on the posterior trochanter is always more developed in the male but varies with the size of the individual. He also says that the frontal lines of the head are more often less noticeable in back in the male and equally well marked from one end to the other in the female. He sums up as follows: "Les tarses antérieurs sont dilatés chez le ♂ sur les quatre premiers articles, parfois si faiblement qu'ils ne diffèrent guère de ceux de la ♀. Ce sont alors les caractères tirés des trochanters, de la forme de la tête et surtout de la membrane clypéale, qui indiqueront le sexe." He mentions one or all of these characters in his remarks on each species.

In Portevin's remarks, in which he sometimes says clypeal piece and sometimes clypeal membrane, I find it difficult to decide whether he is referring to the entire clypeus or to the rhinarium. However, I found the rhinarium to be so variable individually that I believe it cannot be used at all. This seems to me to apply also to the frontal lines, and to some extent to the posttrochantinal spines.

Horn says that the posterior femora are stout in the ♂ of *N. carolinus* and *N. americanus*. I did not find this to hold good and noted that there is some variation in individuals. Horn also says that in *N. orbicollis* the posterior tibiae are much stouter in the ♂. It seems to me that there is a tendency for them to be more slender proximally and more expanded distally in the ♂ but this also does not hold for all individuals. However as these characters are only given for the particular species and in this study I am only considering the secondary sexual characters for the genus they are not included in this paper.

Recently I had the opportunity to study the material of this genus in the collection of The Reading Public Museum and Art Gallery, Reading, Pennsylvania. An attempt was made to evaluate the usefulness of these characters in determining the sexes, and to see if there are any secondary sexual characters that are possessed, in common, by all the species of this genus. This paper is the result of that study, and the remarks and conclusions are based on the above mentioned material.

The specimens were relaxed in Barber's relaxing fluid for from 24 to 48 hours and the genitalia drawn out, thus enabling the sex to be determined. They were studied under a Spencer stereo-binocular microscope using the 9 × ocular and the 1 ×, 2 ×, and 3 × objectives.

In each species those characters that seemed to be of any value in that species were studied and recorded.

The data presented below are the results of my investigations on 288 individuals belonging to 12 species.

N. carolinus (L.), 7 ♂♂ and 7 ♀♀ were studied. The frontoclypeal suture is straight or nearly so in all. One male has the temples expanded, the rest small. One male has the fore tarsi less expanded than in the other males, and one female has the fore tarsi slightly expanded. As for the posttrochantinal spine, the male mentioned above with less expanded fore tarsi has small spines and is a small specimen. Another male has these spines small. Two females have these spines larger than the other females. It seems then that the fore tarsi are a fairly good indicator of sex in this species but not infallible. They are, in both sexes, less expanded than in most species of the genus. The posttrochantinal spine is not very good and the other characters worthless.

N. americanus (Oliv.), 14 ♂♂, 21 ♀♀. Three males have the frontoclypeal suture straight or nearly so, and in one female it is slightly curved caudad. The other males have a larger clypeus and the frontoclypeal suture is curved caudad, the other females have this suture straight and a smaller clypeus. However the difference between the sexes in these two characters is slight in some individuals. The temples tend to be larger in the males but this difference is slight also. One of the males with a straight frontoclypeal suture has small temples, and three females have the temples large. The fore tarsi are expanded in both sexes. The posttrochantinal spine is the same in both sexes. There seems to be no very good secondary sexual difference in this species.

N. sayi Lap., 8 ♂♂, 3 ♀♀. The frontoclypeal suture tends to be curved caudad in the males and straight in the females. The temples are all small but tend to be smaller in the females. One male with a straight suture has very small temples. The others of each sex have these two characters more typical of their sex but the difference is slight. The fore tarsi of the males are expanded. One female has the fore tarsi slightly expanded, the other two not expanded. The posttrochantinal spine has no significance. The fore tarsi seem to be the best character but I do not like to draw conclusions from such a small number of specimens.

N. orbicollis Say, 34 ♂♂, 24 ♀♀. The frontoclypeal suture is straight or almost so in both sexes. The temples tend to be larger in the male but five males have small temples. The fore tarsi are not a good secondary sexual character as they tend to vary in both sexes, in some females they are expanded and in a few males they are slender. The posttrochantinal spine also varies with the individual. The temples seem to be the best character but are not absolutely reliable.

N. marginatus Fab., 37 ♂♂, 29 ♀♀. The frontoclypeal suture varies. The temples tend to be large in both sexes. The fore tarsi are expanded in the male and slender in the female. This held good for all the specimens. The posttrochantinal spine varies with the individual. The post tibia varies with the individual in the amount of curvature. The fore tarsi appear to be a very good criterion for determining the sexes.

N. pustulatus Herschel, 12 ♂♂, 10 ♀♀. The fore tarsi are expanded in the males and slender in the females, except one female, a large individual, has them slightly expanded. The other characters vary with the individual.

N. investigator Zett., 5 ♂♂, 6 ♀♀. The frontoclypeal suture is slightly curved caudad in the males and straight in the females. The temples of the males vary somewhat but are larger than the females. The fore tarsi are expanded in the males and slender in the females. The posttrochantinal spine varies but tends to be more prominent in the males. All the secondary sexual characters seem to be good, but I think definite conclusions should not be made on such a small amount of material.

N. nigritus Mann., 2 ♂♂, 5 ♀♀. This is too small a number for definite conclusions, but none of the characters is good insofar as shown by this material.

N. vespilloides Hbst., 6 ♂♂, 6 ♀♀. The small number precludes any conclusions, but none of the secondary sexual characters hold good.

N. tomentosus Web., 17 ♂♂, 20 ♀♀. The frontoclypeal suture is slightly curved in the males and straight in the females, the difference is slight and one male has a straight suture. The temples tend to be large and square in the males and small and round in the females, but vary individually, and some of each are like the opposite sex. The fore tarsi are expanded in the males and slender in the females. The posttrochantinal spine varies individually. The fore tarsi seem to be the only reliable character in this species.

N. guttulus Mots., 5 ♂♂, 5 ♀♀. This is too small a number to draw conclusions. All have the frontoclypeal suture straight and the temples large. The fore tarsi are expanded in the males and slender in the females.

N. hecate Bland, 2 ♂♂, 3 ♀♀. Again the number is too small. However none of the secondary sexual characters was reliable except the fore tarsi which are expanded in the males and slender in the females.

Discussion

It seems hardly necessary to point out that it is the function of taxonomy to describe species in such a way that they may be recognized and this should apply to the sexes also. If secondary sexual differences exist they should be described, but this can only be determined from a study of a fairly large series of specimens. Differences that are found only in some species should not be given as applying to a whole genus. Characters that vary individually so that the individuals of each sex approach those of the other sex are not useful even though they do not actually intergrade. Those characters that do not vary individually, but are possessed by some individuals of each sex, even though they may predominate in one sex and be rare in the other, are of no value. To describe such characters with such qualifying words as 'generally,' 'sometimes,' or 'more or less' is confusing. Even though the statement, as qualified, is true one cannot know the number of exceptions that exist. Any rule or character used diagnostically must hold good for almost all of the individuals, certainly at least 90 per cent, and even this proportion may be too small where accurate results are desired.

My studies have convinced me that there are no secondary sexual character that are applicable to the entire genus. The fore tarsi seem to be most useful, but even this character does not hold good in some species. In those in which it does, it is possible that if a larger number of individuals had been available for study more variation might have been shown. As to the other characters, *N. investigator* is the only one in which they hold good, but 5 ♂♂ and 6 ♀♀ cannot be used as an adequate sample of a species. The shape of the temples is almost always either definitely rounded or square without intergrades but cannot be correlated with the sex in many individuals. The fronto-clypeal suture varies individually and intergrades, and so does the rhinarium. The posttrochantinal spine intergrades between the individuals of each sex in each species. It does seem to show specific differences in some species but that is apart from the subject of this paper. Many of the individuals show a strong tendency to have the characters that have been said to pertain to the opposite sex. This is more true of some species than of others, and especially the smaller males of each species approach the female and the larger females approach the male in the characters studied. Some individuals resemble the opposite sex in only one of these characters while others do in two or three. The use of the term "gynandromorph" in this connection is incorrect, according to modern usage, since no true sex-mosaics were encountered, i.e., no individuals in which a definitely circumscribed region, say one side, is genetically of the opposite sex.

It seems, then, that to determine the sex the genitalia must be observed. They can be drawn out after being relaxed, or caused to be extruded by the method of Valentine (4), though I have not tried the latter. Some individuals die with the genitalia sufficiently extruded to determine the sex. Also the males have what appears to be one more abdominal segment than the female.[1] This is more or less retracted into the next segment cephalad, but is frequently extruded enough to be ob-

[1] I am not concerned here with the homologies, but only with determining the sexes. However, from a rather cursory study of the literature I am inclined to the opinion that, in this genus, the first two abdominal sternites have become atrophied and that the six visible ventral abdominal sternites are really sternites 3–8 of the abdomen, and that the extra segment of the male mentioned here is the 9th. Also that in the female the ninth segment, or part of it, has participated in forming the genitalia.

served. It is composed of four sclerotized pieces, one dorsal, one ventral, the other two lateral, connected by membranes. The aedeagus when extruded comes out between the ventral and left lateral pieces, where the membrane is reduced.

I would have liked to have made a more precise and quantitative study of this subject but rather doubt that any additional practical information would have come of it. I believe I have shown that the usually used sexual differences are not very reliable, so I have cleared up this one point. A more thorough study, if undertaken, should deal with each species separately, using a large series of specimens.

My thanks are due to The Reading Public Museum and Art Gallery, Reading, Pa., and to Mr. Lawerence S. Dillon, Curator of Insects there, for loan of the material used.

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IXth International Congress of Entomology.

The IXth International Congress of Entomology will be held August 17th–24th, 1951, in Amsterdam (Netherlands). Entomologists wishing to receive, in due course, programs and application forms are requested to communicate with the Secretariate, c.o. Physiologisch Laboratorium, 136 Rapenburgerstraat, Amsterdam.

Further communications will follow in 1950.

A New Species of Microcylloepus from Nevada (Coleoptera: Dryopidae)

By Ira La Rivers, University of Nevada, Reno

HELMINÆ

Microcylloepus Hinton 1935

Microcylloepus moapus [1] sp. nov.

[2] *General:* a somewhat narrow, linear species; dorsum reddish-black, often obscured by a bluish-white powder, even in alcohol; color sometimes lightening to reddish-brown on posterior pronotum and anterior elytra. 1.7–1.9 mm. long; 0.7–0.8 mm. wide.

Head: round, compact, withdrawn beneath anterior margin of pronotum to posterior eye margins; surface minutely granulate; occiput, face (interocular space) and clypeus blackish-blue, granulate, in contrast to smooth, shiny black labrum. A thin silvery band is usually discernible across lower (ventral) end of clypeus (labro-clypeal band). Mouthparts and 11-segmented antennae yellowish; palpi white at sensory tips; antennae nearly equal to pronotal length; eyes whitish.

Pronotum: darker anteriorly (blackish, often with blue-white tinge), generally fading to reddish or yellowish brown on posterior half. Surface finely granulate; convex, and occasionally somewhat shiny anteriorly, flattened posteriorly. Lateral longitudinal carinae distinct for entire pronotal length, more or less bisinuately following outlines of lateral edges. Posterior disc bearing a readily detectable "Y"-shaped ridging, the handle of the "Y" generally more easily seen than the forks. Edges sinuate on all sides except anterior, which is smooth across front, terminating in the antero-lateral angles which are abruptly produced forward into short, blunt angles; lateral edges bisinuate, the anterior sinuosity slightly weaker and shorter than pos-

[1] From the Piute word "moapa," meaning "muddy"; the Warm Springs area in northern Clark County is the source of the Moapa River.

[2] The following description is based entirely on alcoholic material. In dried specimens, the true color pattern is badly obscured by pile and a coating of bluish-white powder.

terior; greatest pronotal width across posterior lateral sinuosities; tuberculations of lateral edges give the effect of very weak serrations under strong magnification. Postero-lateral angles weakly acute, much less spinous than antero-lateral angles. Sinuosity of posterior margin in the form of an unstrung longbow. Base- and apex-widths about equal.

Elytra: essentially unicolorous brown- to reddish-black, often lightening anteriorly. Color occasionally obscured somewhat by bluish-white powder. Surface weakly costate and coarsely punctate, punctures arranged in longitudinal series—the whole distinctly producing an appearance of roughness. Costae IV and V evident under strong power; the longest (V) originates ventrad to umbonal area and extends caudad nearly to elytral apex; Costa IV originates across top of umbonal area, curves away from, then toward, Costa V, disappearing in posterior third of elytra. Both costae are resolved into lines of closely set tubercles under high power. The tiny, rounded scutellum may be inconspicuously the same color as surrounding elytra, or may stand out weakly by virtue of being a bit lighter in color. Elytral sides straight and slightly divergent in anterior third, thence evenly rounded to apices. Humeral angles well rounded. Wings small, nonfunctional, reduced to one-third elytral length.

Venter: yellow-brown to deep reddish, nearly always blackish along prothoracic collar. Conspicuous short, white pile present, most noticeably along metasternal and abdominal edges in alcoholic material. Surface weakly granulate but not particularly roughened.

Legs: from dorsal aspect, in approximately the normal walking position (in which stance these animals characteristically die in alcohol), femora are typically blackish at apices, yellow or brown inwardly; tibiae blackish, lightening in color at both ends; tarsi yellowish. Ventrally, femora lighter proximally.

Genitalia: see fig. 1.

Type locality: NEVADA, Clark County (*Warm Springs* (Big Pool and its outlet streams), 26–27(xii)48, el. 1,700 ft., LaR.). Known only from the type locality.[3]

[3] For a more comprehensive description of the type locality, see Reference No. 3.

Types: in the author's collection; paratypes in the collections of California Academy of Sciences, U. S. National Museum, American Museum of Natural History, British Museum (Natural History) and the Paris Museum.

Microcylloepus moapus seems closest to *M. thermarum* (Darlington) 1928 (*Helmis*) described from "Hot Spring no. 15;

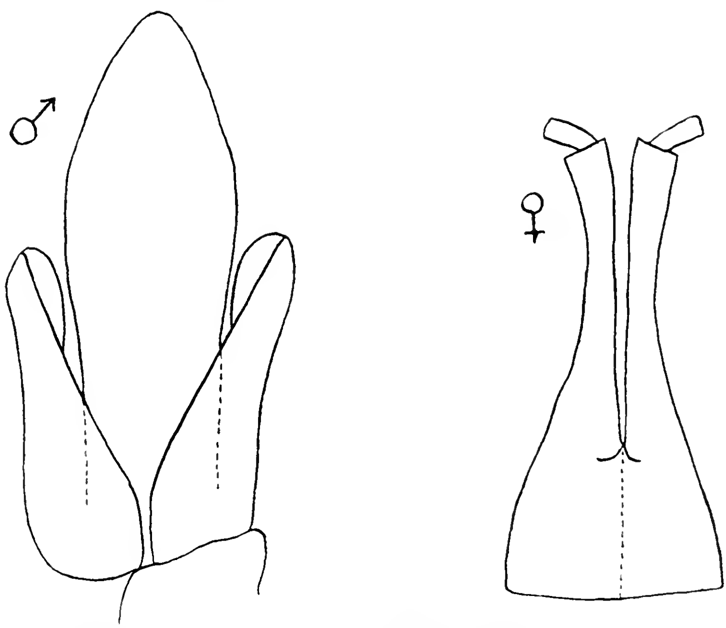

Fig. 1. Male and female genitalia of *Microcylloepus moapus* sp. nov. (holo- and allotypes, respectively).

Opal Mine 25 mi. So. Denio, Ore.," from some of Dr. C. T. Brues' material. Actually, the type locality of *M. thermarum* is some 25 miles within Nevada, since Denio is a bordertown. *M. moapus* differs from *M. thermarum* in being slightly more robust, particularly about the elytra, and in having a pronounced constriction of the pronotum near base, where pronotal sides narrow distinctly before sweeping out to form the postero-lateral angles. This is lacking in *M. thermarum*, the posterior sinuosity curving inwardly smoothly to the postero-lateral angle without such a constriction. These two species constitute a small but distinct group among the Microcylloepi known to me by virtue of the very long and comparatively narrow pronotum. The Hintonian *M. angustus* from south-central Mexico (District of Temascaltepec) at an elevation of 5,600 feet may form a third link in this group-chain, although I can base my opinion only on Hinton's statement that *M. angustus* "most nearly resembles *M. thermarum* (Darlington) of Oregon, but may be distinguished by having the inner sublateral carinae of the elytra moderately prominent and extending to apical half, whereas in *thermarum* the inner sublateral carinae are absent or scarcely visible" (1940). I have not seen the species, but its described flightlessness is in accord with one of the group's dominant characteristics. Our species are known only from thermal waters, but no mention is made by Hinton of temperature conditions surrounding the types of *M. angustus.*

Merely as a preliminary statement, I do not anticipate at the moment that the Microcylloepi will be of primary aid in deciphering the most important of the perplexing mysteries of stream growth and pattern-change which still shroud our basic understanding of the geohydrography of the Great Basin. This statement I can apply, and then, as indicated, only preliminarily, to the thermal species known to me. Cooler waters may show a different picture, but it is possible that the unique similarities between many thermal waters in Nevada may be such as to produce little recognizable change in isolated populations of a given stock, except over very long periods of time—and of course, the longer the time-periods involved, the more it is likely that any changes would be due to gradual alterations in the thermal environment rather than merely to the element of time *per se* allowing random perfection of genetic tendencies. There is no doubt that *M. moapus* and *M. thermarum* are close, and it is quite possible that intervening forms may come to light in future and show the whole to be one intergrading series of populations. With present knowledge, however, they are distinct enough to be readily separable.

From the larger and more widespread *Microcylloepus similis* (Horn) 1870, which occurs with it, *M. moapus* may be easily differentiated by the wing characteristics. *M. similis* possesses large wings which reach at least to abdominal apices in contrast to the reduced flight stubs of *M. moapus*.

Since not enough material of *M. thermarum* is available at present for dissection, it is impossible to compare genitalia and wing conditions between the two species.

Microcylloepus moapus fraxinus subsp. nov.

Identical to the typical subspecies but more robust in form and slightly longer, a difference hardly detectable unless side-by-side comparison can be made. Lateral pronotal and elytral serrations are also slightly stronger and more marked. The most prominent distinguishing characteristic lies in the wing structure. In *M. m. moapus*, the wings are greatly reduced, never exceeding one-third the abdominal length; *M. m. fraxinus* possesses less reduced wings which reach caudad just slightly more than half the abdominal length. There are no detectable differences in genitalia.

Type locality: NEVADA, Lincoln County (Ash Springs (Pahranagat Valley), outlet streams, 28(xii)48, el. 3,750 ft., LaR.). Known only from the type locality. Ash Springs is some 55 airline miles north of Warm Springs. Both lie on the course of Pleistocene White River, but are no longer directly connected. The widespread *M. similis* seems distributed along the entire course of Pleistocene White River, being found associated with both subspecies of *M. moapus*, as well as occurring seemingly by itself at Hiko Spring, several miles north of Ash Springs.

Types: in the author's collection.

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LA RIVERS, I. In press. The meeting point of Ambrysus and Pelocoris in Nevada (Hemiptera: Naucoridae). Pan-Pac. Ent.

A New Centipede from the Eastern United States (Chilopoda: Geophilidae)

By Ralph E. Crabill, Jr., Cornell University

Although Chamberlin has described several species of *Brachygeophilus* from the western United States, the following species is the first member of the genus to be taken in the east and is therefore of particular interest.

Brachygeophilus rupestris new species

The present species bears a marked resemblance to the European species *Brachygeophilus truncorum truncorum* (Bergsö and Meinert, 1866) but may be readily distinguished from the latter by the distinct but small clypeal area on the anterior portion of the clypeus; by the four (or three) ventral coxal pores present on each ultimate leg; and by the distinctly longer than wide cephalic plate (61 : 52). In addition, this American species has a total length of 22.2 mm., whereas Brolemann reports that the maximum length of the European species is 18 mm. long.[1]

Type: ♀, Olean, Cattaraugas Co., New York. March 30, 1949. (Walter Kempf, O. F. M.; under a rock along bank of Alleghany River), in author's collection, C–393.

Female. Total length 22.2 mm. *Antennae* pale yellow throughout; absolute length (after clearing in KOH and mounting in balsam) 2.2 mm.; 3.5 times the length of the cephalic plate; 1st article short, subquadrate, wider than subsequent articles, its width to greatest width of next article is 15 : 13; articles 2, 3, 4, and 5 subrectangular; articles 6, 7, 8, and 9 roughly obconical, the rest roughly globular except the last, which is ovate, in distended condition shorter than preceding two articles (20 : 25); most proximal articles sparsely beset with long setae, the following articles becoming gradually more glabrous, these setae proportionately shorter, less strong. *Cephalic plate* yellow, same shade as antennae; longer than wide (61 : 52), widest at mid-length; lateral margins gently convex, anterior margin slightly, angularly bowed forward, the anterior corners angular,

[1] Faune de France, vol. 25, 1932, p. 181.

posterior margin slightly incurved, the posterior corners rounded; dorsal surface areolate except for a solid area on either side and a central area, delineated on all sides by areolated strips of varying width; beset dorsally with long setae, anteriorly one seta immediately behind inner corner of each first antennal article, behind these, a transverse row of seven setae, remainder of setae on the posterior four-fifths of the plate not arranged in such definite rows. *Clypeus* coarsely areolate; wider than long (5:3); clearly delineated by a pale lateral line on either side; immediately behind the anterior clypeal margin behind and between the antennal insertions a definite clypeal area present, this delicately areolate, white, and beset with three small setae arranged in a triangle, the apex posteriorly; immediately in front of and slightly lateral to the clypeal area are two post antennal setae, one at the inner basal angle of each antennal insertion; immediately behind the clypeal area and slightly lateral to it are two widely separated, small setae. *Labrum* dark brown, the three portions, taken together gently bowed forward; central portion beset with six triangular, strong teeth; length of central portion to entire labrum is 1:1.6, lateral portions each with two or three obscure, irregular pectinations on medial third. *First maxillae* as in *B. t. truncorum* with four small, weakly chitinized lappets, one on the basal outer margin of each telopodite, one on either outer corner of the syncoxite; each telopodite beset with four setae arranged lengthwise; the syncoxite distinctly areolate, the telopodites less so; telopodites slightly surpassed by syncoxal projections anteriorly. *Second maxillae* with medial syncoxal area coarsely areolate; whitish; narrower than second telopodite article (of second maxillae) (4:6); telopodite with well developed claw, first article with one or two inner setae, the second with two or three, the last with about six, these long, clear, subequal to apical claw. *Prehensors* dark yellow, same shade as rest of head, except claw which is dark brown; areolate; just short of attaining the anterior cephalic margin when closed; tarsus at claw base with slight, pointed denticle, other articles unarmed; ventral and medial surfaces of articles sparsely beset with long, brown setae. *Prosternum* same color as prehensors; areolate; chitin lines very short, indistinct, barely separated from lateral prosternal sutures; greatest width 1.4 times greatest length.

Tergites light yellow, darkest anteriorly, shading to whitish yellow posteriorly; all tergites and basal plate bisulcate, distinctly so anteriorly, becoming less distinctly so posteriorly; first tergite broadest anteriorly, the sides converging posteriorly; last tergite wider than long (1.6:1); each tergite with two definite transverse rows of six to nine setae, one row paralleling the anterior margin, one the posterior margin; last tergite with eight very long setae, two setae arranged longitudinally on each lateral border, four setae centrally; anterior margin of last tergite straight, the posterior margin semicircular. *Stigmata* first stigma (on second pedal segment) distinctly larger than second stigma, thereafter becoming gradually smaller posteriorly. *Sternites* light yellow; areolate; the first rounded anteriorly; the second to twelfth with a central, transverse, rectangular area raised and separated from anterior and posterior steeply sloping sides by light areolate lines; the anterior sloping sides of sternites 2–10 shallowly excavate to constitute on each a carpophagus structure; sternites 2–12 with a definite, well-chitinized posterior tubercle, these fitting into the split intercalary sternites; all sternites broadly trisulcate, those bearing posterior tubercles most distinctly so, the more posterior sternites shallowly trisulcate; all sternites with two rows of transverse setae, four in each row; ultimate leg sternite trapezoidal, narrowing strongly posteriorly, posterior margin straight, twice as broad as long; terminal pores present; anterior most intercalary sternites distinctly divided medially, posterior ones less distinctly so. *Legs* 37 in number; light yellow; beset with long dark setae arranged in circular rows; claws slightly curved, dark brown; first legs subequal to second in length. Terminal claws of ultimate and penultimate legs equal in size. Ultimate legs beset with long sparse setae. *Ultimate leg coxae* each with four large, ventral pores (the left coxa with a fifth small outer one), arranged in a longitudinal row of three with the fourth, the largest, on the immediate medial side of the second outer pore.

Allotype: ♂, Clifton Forge, Alleghany Co., VIRGINIA, March 6, 1949 (Richard L. Hoffman), in author's collection, C–394.

Male. Total length 7 mm. Essentially the same as the female type but differing in the following characters: *Clypeal area* distinct but containing only two setae, instead of three. *Post clypeal areal setae* just behind clypeal area but not as widely separated as in the type. *Ultimate leg coxal pores* with same arrangement as in the type but only three in number, the outer medial pore not present. *Ultimate legs* as in type beset with long setae, but legs are distinctly more crassate than those of female type. Pairs of legs 39.

Paratype: ♀, Clifton Forge, Alleghany Co., VIRGINIA, March 6, 1949 (Richard L. Hoffman), in author's collection, C–395.

Female. Total length 9 mm. Agrees with the type and with the allotype in bearing a distinct clypeal area and in having the cephalic plate distinctly longer than wide (61 : 53). Agrees with the allotype in having but two setae within the clypeal area and in having the post clypeal areal setae closer together. *Ultimate leg coxae* each with three pores, the fourth medial pore not present. Pairs of legs 39.

Remarks: All measurements of the various portions of the cephalic plate were made after it had been mounted in balsam. In balsam the clypeal area, though still evident, tends to become less distinct, so that it is best seen unmounted. The slight variations in setal arrangement and ultimate leg coxal pore number evidenced in the allotype and paratype from Virginia are probably due to their immaturity, which is evident from their lengths, 7 and 9 mm. as opposed to the length of the type, 22.2 mm.

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1949 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

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Reviews

THE WAYS OF A MUD DAUBER. By George D. Shafer. Stanford University Press, Stanford, California. 1949. Pp. xiii + 78. Price $2.50.

This attractive little book makes fascinating and easy reading. The result of five years of patient study and experimentation by a retired professor of physiology, it is dedicated to "Crumple-Wing," a perfect female of the large species *Sceliphron cementarium,* perfect except that one wing failed to expand fully so that she could not fly. "Crumple-Wing" therefore had to be attended by the author. In this task much was learned that had not been known before, how the mother mud dauber, herself, feeds on the vital body fluids of spiders as well as stocking her cells with their paralyzed bodies for her offspring.

Mud daubers are shown to have personality, to differ from each other in their reactions. By patient efforts they may be conditioned so that they will feed on honey placed on one's finger. Life histories of mud daubers are given and these are illustrated by plates of photographs including kodachrome reproductions of the wasps and spiders in addition to very helpful figures in the text.

Much attention is given to the white pellets seen in the "fat body" of the overwintering larva and to those passed from the rectum of the adult into the cocoon before emergence. These are largely made up of uric acid, highly insoluble in water. How, then, is this waste product so quickly transferred from the tissues where it is stored to the rectum whence it may be voided? It is shown that by means of the enzyme uricase the "uric acid to allantoin" reaction takes place in the body. This soluble allantoin, as also some uricase, is excreted by the Malpighian tubules into the rectum. Then, with the reabsorption of excess water, the allantoin in the rectum becomes highly concentrated, resulting in a reverse reaction, "allantoin to uric acid," which is also initiated and maintained by the uricase. Thus the pellets reappear where they may be voided. "What man, afflicted with gout, would not envy the mud dauber her ability to eliminate uric acid when she is ready to emerge from her cell?"—P. W. WHITING.

THE INSECT WORLD OF J. HENRI FABRE, with Introduction and Interpretive Comments by Edwin Way Teale. Dodd, Mead and Co., New York. 1949. Pp. xvi + 333. Price $3.50.

Hitherto available in English, when not out of print, only in the form of a number of separate books, this new edition of Fabre makes it possible for everyone to possess the best parts of the famous *Souvenirs Entomologiques* bound in one convenient volume and at a very modest price.

No other writer on insects has been so widely read and acclaimed as has this author. Fabre was a penetrating observer who described and interpreted what he saw with such enthusiasm and in such fine literary language that the doings of the insects come to stand out very vividly in the mind of the reader.

Mr. Teal's short introduction provides a concise account of Fabre's life and struggles, and of his work and its significance to naturalists and to students of insect behavior. Each of the 40 chapters is introduced by a few lines of explanation and there is an index at the back of the book.—R. G. SCHMIEDER.

THE MODE OF ACTION OF ORGANIC INSECTICIDES. By Robert L. Metcalf. Chemical-Biological Coordination Center, National Research Council, Washington, D. C. Pp. 84. 1948.

This review was prepared under the auspices of the Entomology subcommittee of the above Coordination Center. Dr. Roger B. Friend, of the Connecticut Agricultural Station, is the chairman. The substances treated of are: nicotine, pyrethrum, rotenone, organic thiocyanates, dinitrophenols, phenothyazine, DDT, benzene hexachloride and organic phosphates. In respect to each of these substances a concise account is given of the information gleaned from the literature on: its toxicology, method of gaining entrance to the body of the insect, the physiology of its action (i.e., upon what tissues or organs it acts and the mode of action), and some other matters of biochemical interest that were available. The information recorded is in all cases credited to the original sources, which are listed in the 300 selected references at the end of the book.

To workers in this field, this little book will, no doubt, be a great convenience. To the non-adept, it will at least provide some acquaintance with the difficulty and intricacy of the problems involved and yield some insight into the type of work presently occupying insect physiologists and toxicologists.—R. G. SCHMIEDER.

Entomon, a new Journal.

Entomon. Internationale Zeitschrift für die gesammte Insektenkunde. The extended title includes also: "vereinigt mit Zentralblatt für das Gesammtgebiet der Entomologie, Klagenfurt." This journal has appeared monthly since January 1949. The size is 6½ x 9 inches, and each number consists of 24 pages of text, double column, and using small type, ca. 8 point. It is published in Munich by Dr. Herbert Brandt and Hermann Bollow, and there are listed on the masthead as contributors 17 outstanding entomologists, mostly European. It is planned to publish on all aspects of the science and to interest all kinds of entomologists with a view of offsetting the effects of too narrow specialization.

In the first issue there is an article, by Hans Sachtleben, Director of the deutsches entomologisches Institut, on the problems of bibliography. This institute is planning to bring the bibliographic works of Hagen and of Horn and Schenkling up to date; these older works include 25,229 titles up to 1863. W. Horn estimated that about 300,000 titles have appeared between 1863 and 1925. Since 1925 there have been annual increments of about 5000, and the total number of titles since 1864 must be around 400,000, of which almost three-quarters (280,000) have been accumulated in the card files of the Institute. The Institute solicits the aid of all entomologists and institutions in completing this work and in checking the cards to make corrections and additions to the parts dealing with their own publications. Published, this index, since 1864, would occupy 20 volumes of 1000 pages each. The Horn and Schenkling "Index," unlike the Hagen work, is still without a subject index, a lack that may be remedied as a result of work now well under way by the coleopterist Dr. Carl Fiedler. Dr. Fiedler, now 85 years of age, is known, among other things, for his papers on American Cryptorrhynchidae.

Also in this first issue are: an account, with seven small maps, of the spread of the San Jose scale over the face of the earth, a description of the external anatomy of the Narcissus fly Lampetia, as well as special departments for International Nomenclature, Entomological Technic, Short Notes and Reviews. The other early issues have the same make-up and in each there are articles of general interest as well as specialized systematic papers. There are articles on stridulation in grasshoppers, butterfly migrations, quantitative zoogeography, and there is one giving new data on the amazing mating blights of male bumble bees. These males, it appears, cover a 300 meter circuit with its many regular stopping places about 20 times per hour all day long! Lazy drones?

In addition to the regular numbers, supplemental numbers are planned. The price is DM 1.50 per month plus postage. Single copies, DM 2.00.—R. G. S.

EXCHANGES

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

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

Lepidoptera—Large quantities of Plexippus, Colias, Cardui, Vanillae wanted for cash or exchange for tropical butterflies. G. MacBean, 710 Miller Rd., Sea Island, Vancouver, B. C.

Ants of the tribe Dacetini (*Strumigenys, Rhopalothrix* and related genera) wanted for world revision. W. L. Brown, Jr., Harvard University Biological Laboratories, Cambridge 38, Mass.

Mallophaga (on which immediate determination is not necessary) wanted for study and determination. R. L. Edwards, Dept. Biology, Harvard University, Cambridge 38, Mass.

Tingidae (Heteroptera) of the world wanted, in alcohol, with host and other ecological data. Will collect other orders in exchange. N. S. Bailey, 16 Neponset Ave., Hyde Park 36, Mass.

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NOVEMBER 1949

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ENTOMOLOGICAL NEWS

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Some Unusual Syrphid Flies

By Frank M. Hull, University of Mississippi

Several flies of unusual interest that have been recently received are here described.

Cacoceria willistoni n. sp.

A remarkable fissicorn fly differing from *cressoni* Hull in the black stripe along the second vein besides numerous other particulars. Length 10.5 mm.

Male. *Head:* vertex black, slightly raised; the ocelli lie in an equilateral triangle, the anterior part of the vertex quite pollinose with scattered whitish hairs, the posterior pile of the vertex somewhat more yellowish. The eyes are dichoptic, separated by a distance at least as wide as the total width of the ocellar triangle, and the front diverges sharply beyond this medial point. Across the medial point of the front there is a slender crease which is bare; the white micropubescence reaches above and below up to this bare crease. Most of the lower front, however, is polished and bare and the pubescence ends along the eye margin opposite the preantennal callosity and begins again just below the antennae where it curves downward and medialward to reach across the face below the antennae. There is also a broad band of sparse, whitish micropubescence which extends diagonally down from the eye margin to the epistoma. The face, metallic black in color, has a low inconspicuous tubercle in the middle, is faintly pollinose in the middle. Eyes bare. The antennae are slender and elongate, longer than the height of the head, and the third segment is quite remarkable. It is developed into two long, deep, slender prongs; the dorsal prong is not quite as long as the ventral one and is slightly curved downward. This prong bears the long slender whip-like arista which is slightly and gradually thickened over the basal half and becomes quite fine at the apex. The first segment of the antennae is slender and elongate and five or six times as long as wide, pale brownish yellow on the basal half, becoming diffusely blackish apically and is considerably longer than the slender second segment which is entirely black. The third segment is entirely black and the arista dark brown. There are no traces of pores upon the third segment. *Thorax:* mesonotum dull black, rather convex, with a pair of widely separated, vittate stripes of yellow pile which is nearly erect but directed slightly forward. These stripes merge into a broad wide area of similar pile in front of the scutellum which is bordered on either side by short thick black pile. All of the pile on the sides of mesonotum behind the suture is black except for this middle area and except for a slender band of inconspicuous yellow hairs merging with the black which lies immediately behind the transverse suture. There are two or three scattered yellow hairs in the middle of the black pilose area and the pile of the post-calli is mostly black with a few yellow hairs. The pile in front of the suture is entirely brassy yellow but is subappressed and pointed backwards except upon the wide submedial stripes as previously described. Pleura dully shining black with whitish pile, the scutellum dark brassy brown, almost black with the margin obscurely and narrowly yellowish brown. The pile is short and yellow and there is a well developed yellow ventral fringe. Squamae and fringe blackish. Halteres yellowish white with a black knob. *Legs:* anterior and middle legs dark sepia-brown, the hind legs also dark sepia-brown except that the hind femora are narrowly but obscurely and diffusely pale yellow upon the attenuate portion at the base. As in the genotype, the femora are very much thickened and quite wide in the middle but gradually taper to the narrow apical and basal ends; the base is especially narrowed and spindle-shaped. Pile of hind femora whitish and there are five slender, ventral, apical, widely spaced, sharp black setae. Hind tibiae quite arcuate and flattened with a sharp apical spur. *Wings:* hyaline with a distinct but diffuse, smoky blackish border along both sides of the second vein, from the point of origin of the vein in the middle of the wing, nearly to its junction with the costa. The anterior apical portion of the marginal cell is left clear; the pterostigma is entirely deep sepia-brown. *Abdomen:* subpetiolate in shape and chiefly dull black in color. The first segment is shining black, obscurely yellowish brown in the middle and the segment narrows considerably posteriorly and the second segment continues the constriction of the abdomen for a short distance and then begins to gradually expand so that the posterior end of the second segment is distinctly wider than the base of this segment. The second segment is narrowly and obscurely brownish yellow along the base but this color does not reach the sides. Immediately behind the yellow color the abdomen is nearly opaque black and this opaque black is gradually replaced by faintly shining bluish or greenish black. Third segment slightly wider posteriorly than basally and this segment is about as long as wide, its color faintly shining greenish to brassy black. Fourth segment together with the hypopygium forming a wide convex club-shaped arrangement. It is, however, not wider than the third segment; its pile is entirely short, appressed and yellow. All of the pile of the third segment is appressed and yellow except for a small area in the middle of the segment on the posterior half where the pile is blackish. The pile of the second segment is entirely black except for the long fine scattered hairs on the lateral margin. Pile of first segment whittish, long and fine upon the sides.

Female. Similar to the male in every respect except that the third antennal segment is not fissiform. The third segment is, however, quite long and slender and seems to be at least as long as the lower branch of the male. The abdomen is similar except that the second segment is not quite as much constricted basally.

Holotype: male, Chanchamayo, PERU, August 16, 1948, J. Schunke; *allotype:* female with the same data. In the author's collection.

In 1930 the author erected the genus *Cacomyia* with *cressoni,* from Mexico, as genotype, from a female specimen in which the third antennal segment was broken away at the base. The genus was based upon the peculiarities of the face, abdomen and hind femora. The name was changed by the author in 1936 to *Cacoceria* as the name *Cacomyia* was found to be preoccupied.

To the generic characterization of the genus then we now must add that the males are dichoptic and the third antennal segment deeply fissicorn in this sex.

Mesogramma rhea n. sp.

Related to *hieroglyphica* Schiner. This pretty species is distinguished by the polished black abdomen in which the sides are narrowly light yellow, for most of the basal length of each segment and there is a distinct, opaque, elongate, wedge-like black spot in the middle of the second, third and fourth segments. Length 6 mm.

Male. *Head:* face and front light yellow, the face short, the narrow cheeks blackish, the scant pile white except opposite the antennae where it is blackish. Lower sides of the face with a large triangle of white pubescence. Antennae reddish brown, paler ventrally except upon the outer two-thirds of the third segment. Arista blackish. Vertex violaceous with blackish pile. Occiput black with metallic reflection and greyish white pollen and pile, the latter but slightly flattened. *Thorax:* mesonotum metallic black with sharply defined shining blue medial stripe overlaid by faint grey pollen. The humeri are pale yellow, the notopleura and remainder of the lateral margin metallic blackish. Scutellum brassy black, the posterior margin yellow, the yellow not extending to the base. Pile of mesonotum fine and yellow; scutellar pile of the same color and longer with five or six long, black hairs on the margin; the posterior half of the mesopleura and a large spot on the upper sternopleura yellow, the remainder of the pleura shining black, in places with brassy reflections. Squamae yellowish white, the halteres reddish orange. *Legs:* anterior femora yellow with wide, diffuse, subapical band, their tibiae pale yellow with a brown spot in the middle ventrally and their tarsi brown. Middle femora yellow with still wider subapical brown annulus and with a subbasal, dorsal, brown spot. The yellow tibiae are faintly brownish just beyond the middle, the base of the basitarsi yellowish and the remainder brown. Hind femora pale yellow on the basal third, narrowly at the apex, but widely shining black between. These femora a little thickened. The hind tibiae are entirely black except quite narrowly at the base, the tarsi entirely blackish sepia. *Wings:* hyaline, pterostigma pale brown, the alulae narrow but wider than the basal section of the costal cell. *Abdomen:* slender, slightly increasing in width to the end of the fourth segment, the first segment shining black except linearly along the lateral anterior margin and with a medial, opaque black vitta and there is a narrow, yellow vitta or stripe lying upon the lateral margin reaching neither the base nor the apex. Third segment shining black with opaque black medial vitta and with more prominent, sharply marked, yellow lateral stripe which runs from the base two-thirds the length of the segment. Fourth segment in every way similar to the third. Fifth segment similar but shorter, the lateral yellow stripe not quite so large and the opaque medial spot absent. Hypopygium shining black apically but otherwise yellowish brown.

Female. Similar to the male, the middle of the front metallic black, the face faintly brownish in the middle, the abdomen a little wider and faintly oval with the same pattern of yellow spots and opaque medial vitta. Fifth segment with an oval, opaque black spot in the middle.

Cotypes as follows: 3 males, Nova Teutonia, BRAZIL, Fritz Plaumann, one female, same data.

Baccha lucretia n. sp.

A dark sepia blackish species with yellow face and four slender yellow vittae upon the third, fourth and fifth segments of the abdomen. Related to *notata* Loew. Length 8 mm.

Male. *Head:* the vertex dully shining black with a single row of black hairs. The front is pale yellow upon the sides with the yellow margins meeting at the junction of the eyes and with a large, black, faintly shining triangle in the middle of the front which anteriorly rests upon the large yellowish pre-antennal callosity and emits short, lateral, arms enclosing the upper portion of the callosity. In the center of the callosity is a large, shining black, anteriorly angular, posteriorly rounded, black or purplish black spot. The face is pale yellow with a reddish brown wedge medially reaching from the center of the tubercle up to the base of the antennae. Cheeks pale yellow tinged with brown in the middle. Pile of face white and of the front black. The first and second segments of the antennae are pale yellowish brown; the third segment is brownish orange below, blackish above, narrowly towards the base and widely towards the apex. Arista narrowly reddish at the base and blackish upon the remainder. Occiput grayish yellow pollinose with a single row of fine, non-flattened, yellow hairs. *Thorax:* mesonotum brassy black with the lateral margins narrowly but continuously pale yellow including the humeri and the post calli. Middle of mesonotum with a pair of widely separated, relatively narrow, light reddish brown pollinose vittae which become evanescent one-fourth of the length of the mesonotum measured from the scutellum. The scutellum is light yellow with the disc becoming brownish, which is more evident when viewed from the side. The pile upon the surface of the scutellum is very fine, scanty and comparatively short. I can find no evidence of ventral fringe hairs. Mesonotal pile also short, scanty and pale brownish or reddish in color. There is no anterior collar. The pleura are metallic black with the propleura, the posterior margin of the mesopleura and a spot upon the upper sternopleura yellow. Halteres sepia, squamae with border and fringe also dark sepia. *Legs:* anterior pair entirely light yellow; the middle legs are the same color except that their femora tend to be pale brown subbasally. The hind femora, their tibiae and the basal two-thirds of the hind basi tarsi are dark sepia brown. Viewed in some lights, the hind femora in some individuals are a little lighter than their respective tibiae but have a wide, blackish, subapical annulus. The remainder of the hind tarsi are pale brownish orange or yellow. *Wings:* moderately wide and wholly and uniformly dark sepia-brown. The alulae are quite slender and only at the apex are they wider than the basal section of the costal cell. Preanal spuria faint. Third vein straight but very slightly carried down at the apex of the wing by the costa. Subapical cross vein gently sigmoid, the lower ends of subapical and lower cross veins each with well developed spur. Anal vein quite straight. *Abdomen:* slightly spatulate and deep sepia-brown, almost black, with conspicuous, sharply defined, light yellow vittae. The first segment is yellow on the sides and brownish black in the middle, especially posteriorly. Anteriorly the lateral yellow spots are sharply pointed and angular and extend towards the middle of the segment. The second segment is subcylindrical, brownish black and about two and one-fourth to two and one-half times as long as its posterior width; the sides are almost parallel but the segment is slightly wider anteriorly. Just past the middle there are a pair of nearly transverse, yellow, medially enlarged spots which are narrowly separated. Third segment about one and a half times wider posteriorly than basally and a little longer than twice its basal width. It is brownish black with a pair of slender, posteriorly rounded, but wider and widely separated, submedial yellow vittae. Lying outside of these vittae posteriorly are two short, yellow, wedge-like spots. All four of these vittate spots end a considerable distance from the posterior margin of the segment but the submedial pair are slightly longer. Fourth segment similar in general pattern to the third, the segment equally wide anteriorly and posteriorly, the submedial vittae of the same position, width and thickness but extending closer to the posterior margin, the outlying pair of vittae also originating at the base of the segment, extending two-thirds the length of the segment and distinctly but slightly curved towards the medial vittae leaving the concavity lateral. The fourth segment is about one-fourth to one-third longer than wide. The fifth segment is half as long as the fourth, the middle pair of vittae slightly convergent, the outer pair like those upon the fourth segment originating at the base but wider basally than the submedial pair and much shorter; they, therefore, appear as acute wedge-shaped spots. Hypopygium polished brassy or brownish black. Pile of abdomen everywhere blackish.

Female. Similar in nearly every respect to the male, the front is widely blackish in the middle with narrow, yellow, lateral margins which reach as far as the anterior ocellus. The wings are perhaps slightly wider but tend to be a little paler, leaving a slightly accentuated, very large, brown, quadrate, darker spot in the middle. This is perhaps due to tenerality of which there is some evidence. However, the last section of the first posterior cell as measured by a transverse line through the lower end point of the subapical cross vein is shorter. This cross vein is then more sigmoid. *Abdomen:* similar to the male, the second segment is not quite twice as long as wide, the third and fourth are a little shorter. The fifth is somewhat longer and larger and the sixth is about one-fourth as long as the fifth and is transverse with the posterior margin in the middle a little bit rounded and elevated. The total width of the abdomen is slightly greater.

Holotype: male, Chanchamayo, Peru, August 19, 1948, J. Schunke. *Allotype:* female with the same data, but August 11, 1948. *Paratypes:* three males, June 20–Aug. 11, and Aug. 19, 1948. In the author's collection.

Salpingogaster urania n. sp.

Related to *compressa* Curran. This species is distinguished by the subapical spur upon the second vein and the absence of a brownish yellow border upon the second cubital vein. Length 15.5 mm.

Male. *Head:* face and cheeks pale yellow, the front very dark shining red, prominent and protuberant with a narrow, conspicuous, bright yellow margin along the eyes, meeting at the eye junction but confined to the upper half of the front only. Preantennal callus concolorous with front. First antennal segment of the same color. Second and third segments brownish red, the third smoky brown on the dorsal half, the arista light brown at the base, dark brown apically. Pile of front short, subappressed and black. Pile black on the upper part of the face, short, fine and yellow below. Vertex shining black. Occiput black except ventrally where it is yellow, the pollen pale grey, the pile yellowish white becoming more reddish above. *Thorax:* mesonotum dark reddish brown except as follows: the humeri, a wide band along the notopleura to the transverse suture, a spot medial and adjacent to the humeri and the posterior calli, all light yellow. The posterior portion of the mesonotum also becomes more yellowish pollinose. Also on the mesonotum there are three, quite obscure, narrow, dark reddish sepia vittae. The outer pair are a little expanded where they cross the suture and all three are narrowly continued to within a short distance of the scutellum. Scutellum pale yellow with a faint, transverse, light brown band occupying most of the disc except the immediate base. Mesonotal pile short, subappressed and yellowish. Scutellar pile still shorter, sparse, yellow with a few minute microscopic black setulae. Pleura reddish brown, a diagonal yellow stripe confluent with the notopleural band runs down the posterior margin of the mesopleura and ends in a small spot on the upper sternopleura. Squamae dark brown, upper squamae more reddish. Halteres yellow, the knob sepia. *Legs:* anterior and middle femora and tibiae entirely rich light yellow, their basitarsi more yellow, their remaining tarsi more of a pale orange brown, their coxae reddish sepia. Hind femora yellowish in the middle and apically, diffusely reddish brown basally and subapically. Hind tibiae entirely yellow with yellow pile. Hind tarsi orange brown. *Wings:* nearly hyaline, the entire costal cell, the subcostal cell as far as the pterostigma, the marginal cell as far as the pterostigma yellow in color. The basal portion of the upper half of the first basal cell, the narrow margin along the cubital vein as far as the mediocubital cross vein, narrowly margined with yellow. The pterostigma is very dark sepia, almost blackish. The marginal cell from the base of the pterostigma outward and the end of the submarginal cell is also dark sepia. The end of the marginal cell, in both wings, in five specimens, has a distinct short spur. The loop of the third vein is extremely deep, suboblique and rounded. The subapical cross vein bulges far outward on its apical two-thirds and is deeply kinked inward on the basal portion. Alulae narrow and pale, scarcely wider than the basal section of the costal cell. First segment of abdomen pale yellow, narrowly reddish along the posterior margin, except laterally, second segment quite long and subcylindrical, light red in color, except narrowly on the basal margin which is pale diffusely yellowish. The third segment is narrow basally and reddish brown becoming widely expanded posteriorly and dark reddish sepia. Fourth segment a little wider basally than posteriorly and also dark reddish sepia throughout. Fifth segment of the same color but less than half as long as the fourth segment. The fourth segment is barely shorter than the third and the third segment is approximately three-fifths as long as the second. Hypopygium light brownish red, conical and ending in a rather sharp point posteriorly. The fifth sternite turns straight downwards in two brownish red lobes, densely beset with rather long, stiff, bristly black hairs.

Holotype: male, Chanchamayo, PERU, June 8, 1948. *Paratypes:* 3 males with the same data and one paratype male, May 1948, J. Schunke. In the author's collection.

Ladybird Beetle Feeding Notes

By GEORGE F. KNOWLTON, Utah State Agricultural College, Logan

A five-spotted ladybird beetle, *Hippodamia quinquesignata* Kirby, was found to be feeding on a tiny wingless aphid, *Phorodon menthae* (Buckton), on *Mentha spicata* at Nephi, Utah, June

26, 1945. An adult of this ladybird also was observed at Wellington, Utah, June 14, 1945, feeding on a wingless aphid, *Capitophorus elongatus* Knlt., on rabbitbrush, *Chrysothamnus nauseosus.* An adult five-spotted ladybird also was found to be feeding on a pea aphid, *Macrosiphum pisi* (Kalt.), in net sweepings made in an alfalfa field at Freemont, in Wayne County, Utah, on July 10, 1943. In the same net, an *Orius tristicolor* Wh. was feeding on a winged western flower thrips, *Frankliniella moultoni* Hd., which was quite abundant in the field. At Amalga, Utah, June 27, 1938, ladybird adults and larvae, syrphid larvae and other predators of aphids were moderately abundant in a field of canning peas which was suffering pea aphid injury. Both a five-spotted and a convergent ladybird beetle were observed to feed on pea aphids. At Avon, Utah, both these ladybird beetles and also ladybird larvae were moderately abundant on July 17, 1945, on sugar-beets raised for seed and on which the green peach aphid, *Myzus pericae* (Sulzer), was moderately abundant. Here an adult five-spotted ladybird was found to be eating a winged *persicae*, while at Cedar City, Utah, on July 3, 1946, an adult specimen of this predator species fed on a mature wingless hollyhock aphid, *Macrosiphum coessigi* Knlt. Ladybird beetles of several species were present among a heavy infestation of this injurious aphid. At Axtell, Utah, May 14, 1943, a five-spotted ladybird was observed to be eating a small alfalfa weevil larva. A convergent ladybird, *H. convergens* Guerin, was eating a *Capitophorus elongatus* on *Chrysothamnus,* ten miles north of Panguitch, Utah, June 28, 1945. Aphids of this species were abundant and three species of ladybird beetles were present on this infested rabbitbrush. An adult *Coccinella transversoguttata* Fald. was found while feeding on an *Aphis helianthi* Monell on a sunflower leaf at La Point, Utah. An *Anatis lecontei* Csy., collected in Logan Canyon, July 5, 1943, ate 399 pea aphids in nine days, with a maximum of 78 fourth instar *Mac. pisi* eaten in one day.

The two-spotted ladybird beetle, *Adalia bipunctata* (L.), was observed to feed on the following insects: *Capitophorus elongatus* on *Chrysothamnus nauseosus* at Circleville, Utah, July 11, 1942;

on *Myzocallis tiliae* (L.), on *Tilia americana* at Brigham City, Utah, June 21, 1943; on *Macrosiphum coessigi* on heavily infested hollyhock plants which apparently had been stunted by the severe aphid attack, at Provo, Utah, July 16, 1946, and again to be eating an aphid of the same species at Lethbridge, Alberta, Canada, July 27, 1946; and *Phorodon menthae* on ditchbank spearmint at North Farmington, Utah, July 9, 1947. For several weeks this *Mentha spikata* was heavily infested with this little aphid which in turn was attacked by numerous larval and adult ladybird beetles of several species, as well as by large numbers of *Orius tristicolor,* besides fewer *Anthocoris melanocerus* Reuter, and syrphid and aphid-lion larvae.

An *Adalia frigida* (Schw.), collected at Echo, Utah, June 29, 1943, was brought into the college laboratory. Although offered 19 fourth-instar pea aphids, it ate only one and died on the third day.

Obtaining, Reading and Filing Microfilm

By Kathryn M. Sommerman, Washington, D. C.

A film library seems to be the solution to some of the difficulties I have encountered in taxonomic work in entomology. In many instances I have found it impossible to procure reprints of needed articles and in some cases I have not been able to obtain journals from the library, or often they are in use when needed.

The U. S. Department of Agriculture Library, Washington 25, D. C. has a Photocopying Service for private individuals. Articles are furnished on 35 mm. film, or as photoprints. Request forms for Photocopying Service are mailed upon request. A separate Request Form is required for each article. The completed forms (as complete as possible) giving: "Author, Title, Periodical Title, Volume, No., Date and Pages inclusive" are mailed to the Library along with Library Coupons, Check or Money Order. When ordering, I request the numbers under which the order is processed, which makes it easy to keep track of the film because it is not always all returned at one time. It is also convenient to refer to back orders by number instead of repeating the whole reference, in case errors are made in the filming process. Under "Pages inclusive" I also request "Title page" so there will be no question later when citing the reference for publication.*

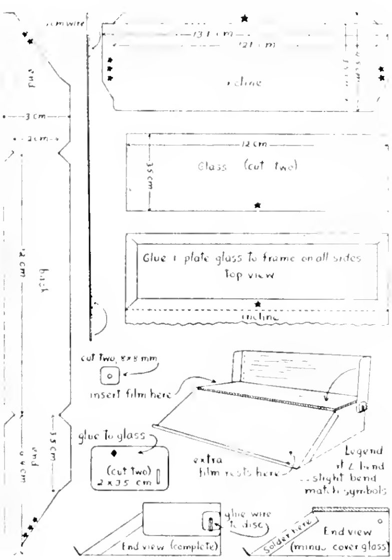

FIG. 1.

When the film is carefully checked I cut it into sections, each strip containing three exposures (6 pages), and tie the strips together with a double loop of loose thread through the sprocket holes near the upper left corner. The complete reference is typed on a 3 × 5 Manila envelope, with flap and opening on the three-inch right side. The strips are put in the envelope and filed in a standard 3 × 5 card file.

The articles are read on the simple reader, Fig. 1, with the aid of the mirror and the low power lens combination of a stereoscopic microscope. The reader is made of copper sheet

* EDITOR'S NOTE. Microfilming service may also be obtained from most of the larger libraries in the country, where special order forms are not required, though references must be complete. Prompter service may also usually be obtained at other libraries such as those listed in Gregory's Union List of Serials.

and an old photographic glass plate cut to the proper size, see diagram. The gadget is held together with solder, glass-metal household cement, and a short piece of wire. The film strips not in use at the moment rest on the incline and the upper glass holds flat the strip being read.

This system is particularly convenient when one is studying type material, for the necessary literature, the reader and the microscope can be packed in the microscope case and all carried as a unit.

Notes on Ixodes scapularis Say with an Additional Lizard Host

By Richard B. Eads, Bureau of Laboratories, State Department of Health, Austin, Texas

Ixodes ricinus Linnaeus and the closely related species *I. scapularis* Say and *I. pacificus* Cooley and Kohls exhibit little host specificity, particularly in the immature stages. Various authorities list a wide range of hosts for these species, including representatives of the Classes Mammalia, Aves and Reptilia.

Parasitism of reptiles by ticks of the genus *Ixodes* appears confined to the *ricinus* complex. Nuttall and Warburton (1911), after various authorities, chiefly Neumann (1899), list this species from lizards taken in the following countries: Italy—immature forms from *Lacerta muralis* and *L. viridis;* Spain—lizards of different species; Albania—larvae, nymphs and adults from *Lacerta agilis, L. arenicola* and *L. vivipera;* Africa—larvae and nymphs from *Lacerta ocellata* and *Tropidosaurus algirus;* and Asia—from lizards.

Nuttall and Warburton (1911) also record the adults of *Ixodes ricinus* from a wide variety of mammalian hosts and larvae and nymph from avian and mammalian hosts.

In the United States lizards have been reported as hosts of the immature stages of *I. scapularis* and *I. pacificus.* Bishopp and Trembley (1945) give the lizard, *Sceloporus occidentalis,* as host for nymphal *I. pacificus.* Cooley and Kohls (1945) report larvae and nymphs of *I. pacificus* from *Gerrhonotus scinci-*

cauda, G. coeruleus, G. multicarinatus, Sceloporus occidentalis and *Cnemidophorus* sp. in California. Gregson (1942) records larvae and nymphs of this species commonly parasitizing *Gerrhonotus principis* in British Columbia.

Bishopp and Trembley (1944) give one record of a larva and nymph of *I. scapularis* being recovered from the lizard, *Sceloporus undulatus.* During studies on Bullis fever in Bexar and Comal Counties, Texas, Brennan (1945) recovered nymphs and larvae of this species from the lizards: *Leiolepisma unicolor, Sceloporus olivaceus* and *S. undulatus.* Hixon (1941) records 123 larvae and 8 nymphs of *I. scapularis* from two *Plestiodon fasciatus* and 42 larvae and 6 nymphs from *Sceloporus undulatus.* The hosts were collected near Gainesville, Florida.

Since no larval and few nymphal records of *I. scapularis* from birds or mammals have been made by personnel of this Laboratory, we were particularly interested in the recovery February 19, 1949, by Tom Moore, Texas Fish, Game and Oyster Commission, of an *I. scapularis,* partially engorged nymph, from a glass-snake lizard, *Ophisaurus ventralis* Linnaeus, taken on the Aransas Federal Game Refuge, Aransas County, Texas. Verification of the identification of the tick was made by Drs. J. C. Bequaert, Harvard Museum of Comparative Zoology, Cambridge, Massachusetts, and G. M. Kohls, Rocky Mountain Laboratory, Hamilton, Montana. The specific determination of the lizard was made by Tom Moore.

State Department of Health records indicate the black-legged tick, *Ixodes scapularis,* to be the most common *Ixodes* in Texas. In the southern and eastern part of the state adults have been commonly taken from deer, raccoon, gray fox, red wolf, tree squirrel and bobcat.

Twenty-six deer trapped by the Texas Fish, Game and Oyster Commission on the Aransas Federal Game Refuge were examined for ectoparasites in December, 1948. The animals were uniformly infested, particularly about the head, with adult *I. scapularis.* Deer taken from this refuge are sent to other Texas counties, other states and possessions of the United States. Consequently it was considered advisable that they leave the heavily infested game refuge in a tick-free condition, if possible. With this objective in mind the twenty-six deer were sprayed with a one per cent wettable DDT at the rate of a pint per animal. Before spraying, each animal was parasitized by twenty to twenty-five *I. scapularis.* Twenty-four hours after spraying only an occasional tick was found which could still feebly move its legs.

Summary: A nymphal *Ixodes scapularis* has been taken from an apparently new lizard host, *Ophisaurus ventralis.* Adult *I. scapularis* were controlled on deer by spraying individual animals with a pint of one per cent wettable DDT.

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A New Oak Aphid from Utah

By G. F. Knowlton and L. L. Hall, Utah State Agricultural College, Logan

Several species of aphids infest oak in Utah. One of the species which infest oak, received for identification from Dr. C. Lynn Hayward of the Brigham Young University, Department of Zoology and Entomology, appears to be undescribed.

Myzocallis youngii n. sp.

Alate vivipara: Body color pale to slightly dusky; body 2.5 to 2.6 mm. long; abdomen 1.17 wide; antennal tubercles moderately developed, exceeding vertex; antennae 2.12 to 2.26 mm. long, dusky, to darker on antennals I and II, distal portions of III, IV, and most of V and VI; antennal III, .64 to .76 mm long with 6–9 conspicuous circular sensoria; IV, .38 to .46; V, .38 to .4; VI, .174 to .206 plus .19 to .258 mm., with unguis longer than base; ocular tubercles prominent; rostral IV + V dusky, darker at apex, .15 mm. long; prothorax with two pair of finger-like dorsal tubercles, the second pair are much the longest, being .07 mm. long; wing venation normal, all veins distinct, dusky-brown, with darkened areas where veins terminate at margin of wing; hind tibia dusky with darker area at apical end 1.31 to 1.49; hind tarsus dusky, .138; abdomen paler than rest of body, with seven pairs of finger-like dorsal tubercles which decrease in length toward caudal end of series; cornicles truncate, dusky, .12 mm. long, broadly flanged; cauda blackish, distinctly knobbed, .17, with 3 pairs of prominent lateral hairs and 3 dorsal hairs; anal plate dusky, distinctly bilobed, each lobe margin with 3 or 4 conspicuous hairs.

Collection: On *Quèrcus gambelii* on "Y" Mountain near Provo, UTAH, May 22, 1945, by C. Lynn Hayward. Type in the collection of the senior writer.

Taxonomy: Myzocallis youngii runs to *M. californicus* Baker in Baker's Key (Jour. Econ. Ent. 10: 421–424, 1917), from which it differs in having longer antennal V, longer base and unguis of antennal VI, more sensoria on antennal III, and more than 3 pairs of finger-like tubercles on dorsal surface of abdomen; also *youngii* possesses two pairs of dorsal tubercles on the prothrorax. It resembles *M. fumipennellus* (Fitch) in having two pair of prothoracic tubercles, but in *M. youngii* the front pair are larger and longer than the second, while the opposite is the case in *fumipennellus*, which is a much darker species.

Notes on the Lace Bug, Gargaphia iridescens Champion

By George P. Wene, Texas Agricultural Experiment Station, Weslaco

The lace bug, * *Gargaphia iridescens* Champion, was first found severely injuring young tomato plants on March 23, 1947, in a single field near Mission, Texas. In mid September this insect was found in small numbers on black-eye peas and canning beans in the dry land area around Harlingen. On September 26 of the same year heavy infestations occurred on all varieties of beans near Weslaco. A few days later young lima bean plants collected in the Brownsville area had from 5 to 10 lace bugs per leaf.

Injury occurred only on very young bean plants and was first noticed on bean plants in the 3 or 5 leaf stage. The first symptom is usually a yellowing of a portion of a leaf. On the underside of the leaf can be found numerous black excrement spots about the size of a pencil point. As the feeding progresses the entire leaf turns yellow, slowly wilts, and finally drops off, resulting in a stunted and sometimes a dead plant. Even a single lace bug could severely stunt a young bean plant that had only the two cotyledon leaves.

The nymphal stage is passed on the young bean plant. As many as 30 nymphs have been found on a single leaf. As a rule most of the nymphs will be found on a single leaf of a plant. Migration to the other parts of the plant usually takes place after the adult stage is reached. Both nymphs and adults prefer to feed on the younger and more tender leaves of the bean plant, and practically always on the lower surfaces.

Heavy infestations of this insect have also been found on young volunteer cotton plants during September and there is information available that indicates destructive infestations on local experimental plantings of guayule during 1944 and 1945.

* Thanks are due to Dr. R. I. Sailer of the U.S.D.A., Division of Insect Identification, for the identification of this insect.

So far, the author has been unable to find any uniform infestations of lace bugs. Heavy and damaging infestations were found in areas up to one-tenth of an acre in size distributed at random throughout the field. These areas were so numerous in many fields that growers were forced to dust with 5.0 per cent DDT in order to save their bean crops. No lace bug infestations were seen during the 1948 season. It will be interesting to see if this insect will become a serious pest of vegetables at some future date.

Diplops desertorum a Scorpion Synonym

By Herbert L. Stahnke, Poisonous Animals Research Laboratory, Arizona State College, Tempe, Arizona

The scorpion, *Diplops desertorum,* designated as a new species by Stanley Mulaik and Harold G. Higgins in Entomological News, Vol. IV, No. 9, November, 1944, must be considered as a synonym of *Superstitionia donensis,* designated and described by the author in the Iowa State College Journal of Science, Vol. XV, No. 1, October 1940, pp. 101–103. In the same publication this species was placed in the family Chactidae and a new subfamily created, Superstitioninae.

A full description of both the new species and new subfamily was given in an Iowa State College doctor's dissertation entitled, "The Scorpions of Arizona," 1939.

The authors, Mulaik and Higgins, were unaware of the existence of the Iowa State Journal article and should be complimented on their very excellent description. It is so clear that there can be no question as to the species designation being a synonym.

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1949 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

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Entomon

Through an oversight, the name of the publisher of the new journal "Entomon" was omitted from the description of it in our October issue (p. 223). The publisher is: Verlag Sebastian Lux, Murnau vor München, Germany. The addresses of the editors are as follows: Hermann Bollow, Englschalkingerstrasse 67, München 27 (for morphology, systematics, faunistics) and Dr. Herbert Brandt, Königenstrasse 36, Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, München 23 (for physiology, ecology and applied entomology).

EXCHANGES

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

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

Tingidae (Heteroptera) of the world wanted, in alcohol, with host and other ecological data. Will collect other orders in exchange. N. S. Bailey, 16 Neponset Ave., Hyde Park 36, Mass.

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Saturnidae of the world. Will purchase individual specimens or cocoons. F. E. Rutkowski, St. Bede College, Peru, Illinois, U. S. A.

Butterflies of New England, principally from New Haven, Conn., for exchange. Louis Clarke, 28 W. Elm St., New Haven 15, Conn.

Wanted—Proc. Ent. Soc. Phila., vols. 1–6; Proc. Cal. Acad. (Nat.) Sci., 1–7; Proc. Acad. Nat. Sci. Phila., 1–8; Trans. Amer. Ent. Soc., 1–5; Bull. Buff. Soc. Nat. Sci., 2–3; Psyche, 11, 13, 15. C. F. dos Passos, Mendham, N. J.

Miridae (Capsidae)—American species wanted, with locality labels, in exchange for British species. D. Leston, F.R.E.S., 6 Frognal Rise, London N. W. 3, England.

Wanted—Entomological microscope in good condition; Spencer, Bausch & Lomb, or other standard make. David G. Shappirio, 4811 17th St., N.W., Washington 11, D. C.

Coleoptera—Large quantities of Cicindelidae, Buprestidae, Lucanidae, Cerambycidae wanted in exchange for all families of Coleoptera from Ill., Ind. and Mo. Joseph B. Hayes, 1905 N. Pulaski Rd., Chicago 39, Ill.

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ENTOMOLOGICAL NEWS

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ENTOMOLOGICAL NEWS

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A Pictorial Review of the North American Chipmunk Fleas

By C. Andresen Hubbard, Vanport College, Portland 3, Oregon

Foreword: Chipmunks have long been favored pets among small boys and girls in this country. Usually they are trapped by the youngsters in the fields and forests about and kept either in cages or on a string to crawl about the person and hide in the pockets. At times pet shops feature chipmunks for children's pets. In certain localities over the country both the chipmunks and certain of their fleas have been found plague positive. The chipmunks and their fleas should, therefore, be watched carefully by health agencies. It is because of the plague possibilities involved that this paper becomes of importance.

Part One—Monopsyllus eumolpi (Roths.); with four new subspecies.

Close to the turn of this century Brooks and Wenmann were collecting fleas in British Columbia and Alberta, Canada for Charles Rothschild, who was working them in England as a hobby and probably for relaxation from the business worries of the great banking concern bearing his name. Among other fleas to arrive in England was a series off Canadian chipmunks. Rothschild studied these until 1905, during which year he described them as *Ceratophyllus eumolpi* but which are known today as

Monopsyllus eumolpi (Rothschild).
1905 *Ceratophyllus eumolpi* Rothschild, Nov. Zool., 12:161.

This, the parent species, of what in this paper involves 6 subspecies, has the following pattern and characteristics in the modified segments. Male: Finger roughly rectangular to ham-shaped, with characteristic armature consisting of 3 spiniforms on the posterior border, the lower one long, the two upper ones short and either straight or hooked, the 3 usually, but not always, equidistant. The writer doubts that the exact position of the middle spiniform or the straight or hooked condition is of any taxonomic value. Process P. is apically dome shaped. Female: The apical outline of the VII sternite is with upper lobe only, the lobe half round to squarish. The spermatheca is barrel-shaped with bent, finger-like appendix. The bursa is very prominent and readily marks these female fleas from others.

The normal hosts for this group of North American fleas are members of the rodent genera Tamias and Eutamias and are commonly known as chipmunks. However, gray and red squirrels are about as frequently infested by these fleas and the predators of the three groups also carry them.

As one views the six subspecies here considered, side by side, it is evident that the face of the modified segment 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 6 here represented, the one with the greatest expanse of modified segment is

Monopsyllus eumolpi charlestonensis, a new subspecies.

There are before the writer at this time the holotype male, the allotype female, a paratype female and 4 paratype males, taken off Palmer's Chipmunk (*Eutamias palmeri*) (type host) at the base of Charleston Peak in Kyle Canyon, Spring Mountains (type locality) 25 miles northwest of Las Vegas, Clark County, NEVADA on 25 June 1945. They bear the writer's collection number 2395.

Modified Segments: Male. Finger ham-shaped, slender and longest of the series. Distance from long spiniform to articulation with Process longest in the series, the angle the greatest. Process, high dome-shaped and narrow apically, posterior apical angle rounded. Female. Lobe on VII sternite very large and low down, squarish, with posterior border turned up. Bursa is long, slender and coiled; inconspicuous.

Length: Both male and female measure about 2.25 mm.

Range: Probably throughout Spring Mountains in western Clark County, Nevada.

Deposits: Holotype and allotype on one slide in U. S. National Museum, paratypes in Depositories maintained by writer.

This flea bears the name of the mountain upon which it was collected.

The second of the series shall be called

Monopsyllus eumolpi wallowensis, a new subspecies.

There are before the writer at this time the holotype male, the allotype female and a series of paratypes collected at Wallowa Lake, Wallowa County, OREGON (type locality) off Orange-bellied Chipmunk (*Eutamias a. luteiventris*) (type host) on 13 July 1939. They bear the writer's collection number 1618.

Modified Segments: Male. Finger ham-shaped, broad and slightly shorter than in preceding subspecies. Distance from long spiniform to articulation with Process shorter and the angle less than in preceding. Process dome-shaped but broad and low and with posterior apical angle angulate. Female. Lobe of VII sternite long, narrow and low down on outline. The angles are rounded. Bursa is the most prominent of the series.

Length: Both male and female are just under 3 mm.

Range: This flea is found in the Wallowa Mountains of northeastern Oregon and probably in the Blue Mountains of northeastern Oregon and southeastern Washington.

Deposits: Holotype and allotype on one slide in U. S. National Museum, paratypes in Depositories maintained by the writer.

This flea bears the name of the Oregon county in which it ranges.

Note: During the War years Hubbard was unable to secure type slides from Abroad, therefore he could not compare chipmunk fleas collected in the West with the types. In "Fleas of Western North America," page 237 illustrations under item 122. *M. eumolpi eumolpi* are of this new subspecies as are the "Records" for Oregon on page 238.

The third of the series is

Monopsyllus eumolpi cyrturus (Jordan) 1929.
1929 *Ceratophyllus eumolpi cyrturus* Jordan, Nov. Zool., 35: 34.

Through the kindness of Dr. Karl Jordan of the Tring Branch of the British Museum there are before the writer 2 pairs of paratypes from Paradise, Cochise County, ARIZONA collected 19 October 1913 off skunk by O. C. Duffner. The writer has personally collected materials from the South Gate of Grand Canyon National Park, Arizona taken off Gila Chipmunk on 4 July 1945. While the collection localities are some 200 miles apart the male fleas are similar but the outline of the VII sternite female differ somewhat. The writer doubts the differences enough to create two valid subspecies.

Modified Segments: Male. The finger becomes less ham-shaped to approach the rectangular shape of the following subspecies. Jordan claimed for one of the characteristics the more flattened apical border. The distance between long spiniform and articulation with Process is shorter than in the preceding and the angle is less. The Process is apically high, narrow and dome-shaped. Female: VII sternite of paratype from type locality has small rounded lobe high up on border but specimens taken by the writer at Grand Canyon have a larger upper lobe which is angulate. The bursa is prominent.

Length: Both sexes measure about 2.50 mm. in length.

Range: Known only from Arizona south and east of Grand Canyon.

Deposits: The types are in the Tring Branch of the British Museum.

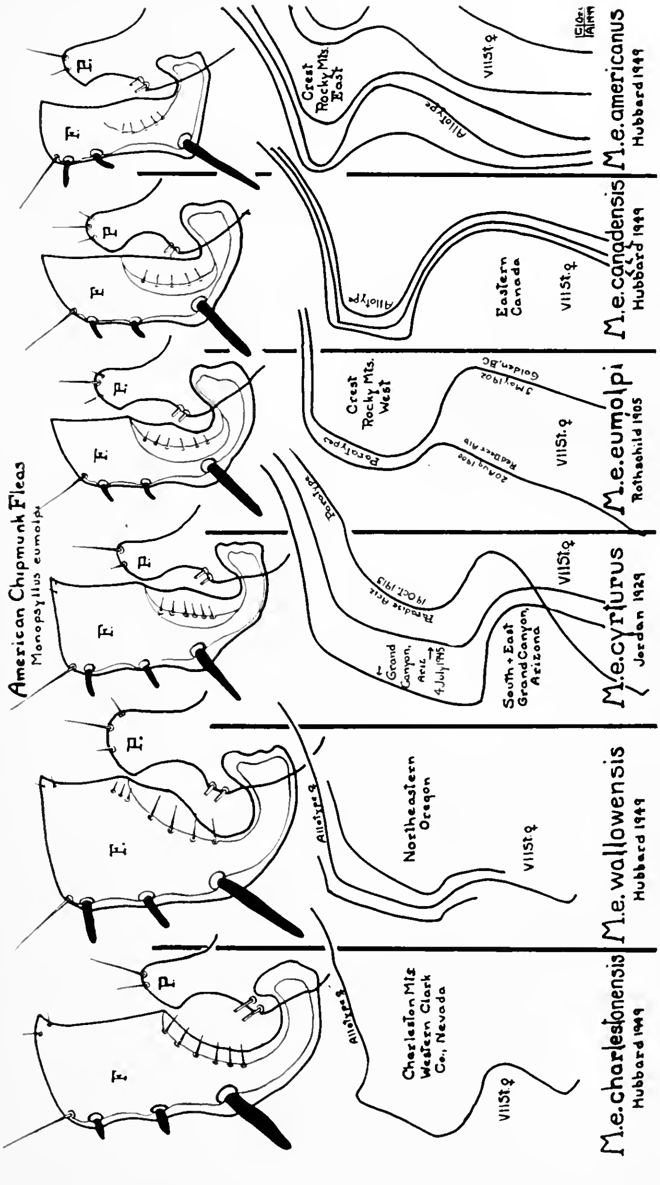

FIG. 1. *Monopsyllus eumolpi* (Rothschild).

Note: Hubbard writing on page 238 in Fleas of Western North America, item 123. *M. e. cyrturus* should have referred all collection records except those under Arizona to *M. e. eumolpi* and the accompanying illustration 123. *M. eumolpi cyrturus* is not an illustration of *cyrturus* but of *M. e. eumolpi*.

The fourth of the series is

Monopsyllus eumolpi eumolpi (Rothschild) 1905.
1905 *Ceratophyllus eumolpi* Rothschild, Nov. Zool., 12: 161.

There are before the writer 2 pairs of paratypes through the courtesy of Dr. Jordan, the large collection of slides of this subspecies in the collection of the Rocky Mountain Laboratory, through the courtesy of Dr. William Jellison, those in the collection of the Plague Suppressive Measures Laboratory, through the courtesy of Frank Prince and Harold Stark, specimens from Wyoming collected by John Wiseman and specimens from Utah collected by Vernon Tipton. The writer's own collection contains hundreds of specimens of these fleas from all over the West.

Modified Segments: Male. The finger is less ham-shaped and approaches the rectangular. The apical border presents quite an angle. The distance from the long spiniform to articulation with the Process is much shortened and the angle less than in the preceding subspecies. Process is apically nicely rounded and dome-shaped with posterior apical angle angulate. Female: VII sternite with lobe variable, high up on outline and either wide or narrow and usually apically rounded. The bursa is prominent.

Length: Males and females around 2.50 mm. in length.

Range: Extensive, north of Grand Canyon, Arizona in Rocky Mountains into Alberta, Canada; west to Crest of Cascade Mountains and in favorable locations as in the Siskiyou Mountains of southern Oregon and northern California on almost to the Pacific Ocean; north from southern Nevada and central Sierra Nevada Mountains of California to and into British Columbia, Canada.

Deposits: Types are in the Rothschild Collection of the British Museum.

Note: All of the records offered by Hubbard in Fleas of Western North America under subspecies of *Monopsyllus eumolpi* are of this subspecies with the exception of specimens from Arizona and Wallowa County, Oregon. These records appear on pages 238 to 241 inclusive.

In the fifth of the series the proportions of the modified segments again become reduced, the finger becoming smaller, the outline VII sternite female with long narrow lobe. It shall be called

Monopsyllus eumolpi canadensis, a new subspecies.

There are before the writer at this time the holotype male, the allotype female mounted on a single slide and 2 pairs of paratypes also mounted a male and female to the slide. The specimens were collected in Ontario, Canada (type locality) off chipmunk (type host) 19 July 1947 by W. Watson.

Modified Segments: Male. Finger is suggestive of preceding but is apically more rectangular. The apical border is still at quite an angle. Distance between long spiniform and articulation with Process shortest of the series so far discussed and the angle is less. The Process is apically high dome-shaped with posterior apical angle well rounded. Female: Lobe of VII sternite high on outline and long and fairly narrow, apically angulate but rounded in the allotype. Bursa weak yet evident.

Length: Both sexes measures a little over 2.00 mm.

Range: Eastern Canada and probably northeastern United States.

Deposits: Holotype and allotype in U. S. National Museum; paratypes in British Museum and Canadian National Museum.

This flea bears the name of the country from which it was described.

The sixth of the series represents *M. eumolpi* with the modified segments in their most diminutive size. It shall be called

Monopsyllus eumolpi americanus, a new subspecies.

There are before the writer at this time the holotype male, the allotype female mounted on one slide personally collected in Painted Desert, Coconino County, ARIZONA (type locality) off Desert Chipmunk (*Eutamias amoenus*) (type host) on 7

July 1945 and the following paratypes: 4 males and 10 females from the collection of the Rocky Mountain Laboratory collected in south central COLORADO and 1 male and 5 females collected by Harold Stark in southeastern UTAH in San Juan County.

Modified Segments: Male. Finger most rectangular of the series. Apical border almost at right angles with anterior and posterior borders. Distance from long spiniform to articulation with Process and its angle shortest of the series, the angle almost a right one. Process while still dome-shaped is very low and flat. Posterior apical angle very noticeable and angulate. Female: Lobe VII sternite most reduced in the series, in the allotype finger-like and high, in paratypes, high, from long finger-shaped to small rounded. Bursa the most reduced in the series, inconspicuous.

Length: In spite of the reduced size of the modified segments this flea is as big as the others in the series and measures about 2.50 mm. in length in both sexes.

Range: East Approaches of the Rocky Mountains north of Little Colorado River. Probably also found in the Great Plains where chipmunks are found.

Deposits: Holotype and allotype are deposited in U. S. National Museum. Paratypes are returned to owners.

Key to Subspecies of *Monopsyllus eumolpi* by Range

1. Northeastern United States and adjacent Canada. *M. e. canadensis*
2. Western Great Plains and east Approaches of Rocky Mountains north of Little Colorado River...... *M. e. americanus*
3. North of Grand Canyon, Arizona from Crest of Rocky Mountains west to Crest of Cascade Mountains. *M. e. eumolpi*
4. South and east of Grand Canyon, Arizona.... *M. e. cyrturus*
5. Isolated in Spring Mountains, western Clark County, Nevada.......................... *M. e. charlestonensis*
6. Isolated in Wallowa Mountains, Wallowa County, northeastern Oregon...................... *M. e. wallowensis*

Conclusions: The writer feels that the degree of difference in the above six warrants subspecific separation. There is little doubt that as new isolated areas are found and studied new differences will appear and new subspecies. Also there are minor differences within the above six but as the writer views them now he is disinclined to make more separations.

In 1943 Ewing and Fox removed *eumolpi* from the genus *Monopsyllus* and placed it in the genus *Trichopsylla*. Few American flea students have accepted this change and most siphonapterists hold that Ewing and Fox are in error and the change was not warranted.

Enrique Schmidt (1864–1948)

The death of Enrique Schmidt in December 1948 in San José, Costa Rica, marked the passing of one of the outstanding collectors of Tropical American insects.

Enrique, or Henry, as he was better known to his American correspondents, was born January 20, 1864, at Stargard, Pomerania, Germany, the son of Julius and Albertine Schröder Schmidt. In 1891 he came to America, staying first at New York, later going to Galveston, Texas, where he worked for five years for the late Colonel E. M. House, friend and adviser of President Woodrow Wilson. In 1906 he removed to Costa Rica where he was to spend the remainder of his life. Since 1911 he lived and worked as a horticulturist on the largest coffee plantation in Costa Rica, "La Caya," 8 kilos to the west of San José, lying on the Pacific watershed at an altitude of about 1150 meters. La Caya lies between two rivers, the Rio Virilla and the Rio Torres, very broken mountainous country that provided wonderful insect collecting over the many years.

From his earliest days in America, Schmidt was a capable and most energetic collector of insects. Throughout his life he suffered from tuberculosis of the bones which in 1927 necessitated the removal of his right leg. Later he lost the sight of one eye, the hearing of an ear, and suffered the removal of several diseased ribs. Despite all such physical handicaps, he continued his collecting of insects virtually to the end of his life. In 1927, following the loss of his leg, he attempted to earn his livelihood through the collecting and sale of insect specimens. Schmidt concentrated his attention on certain groups, among them the Thysanura, Collembola, Thysanoptera, Corrodentia, micro-Diptera, micro-Coleoptera, and the Hymenoptera, particularly the ants and bees. About 1913 he became particularly interested in ant guests. A short time before his death Schmidt wrote that "when I began collecting not a single ant guest was known from all Costa Rica while now we know them by the hundreds."

Schmidt himself published little or nothing, but his vast collections have been used in hundreds of publications by others. It is estimated that at least one hundred species of insects that he discovered bear the specific name "schmidti."

C. P. ALEXANDER

Dr. Hermann A. Eidmann

Notice has been received of the death of Dr. Hermann A. Eidmann, Professor of Zoology at the University of Göttingen, on September 4, 1949 at Mittenwald, Oberbayern. Dr. Eidmann's interests among entomological subjects were wide; besides a well-known general textbook, he has published numerous articles on forest entomology and on ecology with special reference to insects. In the last decade of his life, he wrote many fine ecological studies of exotic ant faunas, and it is for this work with the ants that he is perhaps best known in the United States, although his earlier morphological studies are also highly regarded here.

At the time of his death, Dr. Eidmann was at work on a number of projects, including an ecological survey of the ant fauna of Tibet and neighboring areas. He was noted for his ability to cooperate with other specialists throughout the world, and I am sure that others besides the present writer will feel keenly the loss of such an accomplished counselor.

Dr. Eidmann is survived by his wife, Hilde, and two daughters.

W. L. BROWN, JR.

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1949 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Abbott, M.—The life of William T. Davis. Cornell University Press, Ithaca, N. Y., $3.50. **An.**—The need for an Annual Review of Entomology (Editorial). [37] 42: 859–60. **Blackwelder, R. E.**—Synonyms and genotypes. [Coleopt. Bull.] 3: 73–75. Studies on the dates of books on Coleoptera. II. **Borgmeier, T.**—Filippo Silvestri 1873–1949. [102] 20: 556. Leica, Contaxe Kine-exacta na entomologia. *Ibid.* 531–34. Genotipo or generotipo? *Ibid.* 630. Sobre a prioridade de página. *Ibid.* 630. Jose Francisco Zikán (1881–1949). (Obit., autobiogr. and bibliography.) *Ibid.* 647–52 (portrait). Que se endende por "publicação? *Ibid.* 653–54. **Boudreaux, H. B.**—A technique for mounting aphids and other soft bodied insects on slides. [37] 42: 846–47. **Bretschneider, L. H.**—A simple technique for the electron-microscopy of cell and tissue sections. [Kon. Nederlandsche Akad. Wetensch.] 52: 654–55, ill. (figs. Odonate muscles). **Casanges, A. H., E. R. McGovran and J. V. Chiles**—Rearing of Anopheles quadrimaculatus and Aedes aegypti in the laboratory. [52] 9: 112–17, ill. **Cole, L. C.**—The measurement of interspecific association. [26] 30: 411–24. **Doutt, R. L.**—The spermatozoon as a diagnostic tool in mealybug taxonomy. [37] 42: 835. **Dove, W. E.**—John B. Hull, 1906–1949. [37] 42: 869. **Grandi, G.**—In memoriam Carlo Menozzi. [Boll. Ist. Ent., Bologna] 14: 193–94, ill., 1942–43. Dedication of Vol. XV to Fillipo Silvestri, with portrait. *Ibid.* 15: v, 1944–46. **Grison, P.**—Alimentation artificielle des insectes phytophages. [Ann. Sci. Nat. Zool.] 10: 59–65, 1948. **Hemming, F.**—El futoro immediato de la nomenclatura en zoologia. [Ann. Soc. Cien. Arg.] 148: 3–8. **Hood, J. D.**—Revista de

Entomologie: An appreciation. (With portrait of Thomaz Borgmeier O. F. M.) [102] 20: 1–2. **Polivka, J. B.**—The use of fluorescent pigments in a study of the flight of the Japanese beetle. [37] 42: 818–21. **Solomon, M. E.**—The natural control of animal populations. [36] 18: 1–35. **Small, J.**—Quantitative evolution. XV. Numerical evolution. [Acta Biotheoretica] 9: 1–37. **Snyder, T. E., and J. M. Miller**—Andrew Delmar Hopkins—1857–1948. [37] 42: 868–69. **Steinhaus, E. A.**—The principles of insect pathology. McGraw-Hill Book Co., New York, Toronto, London, xi, 747 pp., $8.00. **Steyskal, G. C.**—An indexing system for taxonomists. [Coleopt. Bull.] 3: 65–71. **Torres, B. A.**—Notas preliminares sobre insectos coleccionados en goya. [Notas Museo de la Plata] 14 (118): 61–78, ill. **Varley, G. C.**—Population changes in German forest pests. (Review of two articles by F. Schwertfeger.) [36] 18: 117–22.

ANATOMY, PHYSIOLOGY, MEDICAL—Atkins, E. L., Jr.—A study of the ptilinum and ptilinal musculature of the pomace fly, Drosophila melanogaster. [5] 42: 245–57. **Barth, R.**—Vergleichend morphologische Studien über die Duftschuppen der Pieriden Pieris brassicae und P. rapae und der Satyrine Coenonympha pamphilus. [Zool. Jahrb. (Abt. Anat.)] 70: 397–426. **Berner, L.**—A report on two mayfly gynandromorphs. [31] 32: 105–09, ill. **Caspari, E. W.**—Physiological action of eye color mutants in Ephestia kühniella and Ptychopoda seriata. [Quart. Rev. Biol.] 24: 185–99. **Chaudonneret, J.**—Le labium des Thysanoures. [Ann. Sci. Nat. Zool.] 10: 1–27, 1948. **De Bach, P., C. A. Fleschner and E. J. Dietrick**—Population studies on the long-tailed mealybug and its natural enemies on citrus trees in southern California, 1947. [37] 42: 777. **Doutt, R. L.**—(See under General.) **Dupeut-Raabe, M.**—Les chromatophores de la larve de corethre. [Arch. Zool. Expt. Gen., Notes et Rev.] 86: 32–39. **Evans, H. E.**—The strange habits of Anoplius depressipes: a mystery solved (Pompil.). [65] 52: 206–08. **Ferguson, W. C., and C. W. Kearns**—The metabolism of DDT in the large milkweed bug. [37] 42: 810–19. **Georgiana, M.**—Longevity of the parasitic wasp Habrobracon juglandis. [3] 83: 39–48. **Grandi, G.**—Morfologia ad etologia della larve di tre Coleotteri delle famiglia dei Crisomelidi e dei Curculionidi. [Boll. Ist. Ent., Bologna] 11: 1–16, 1938–41. Contributi allo studio dei Neurotteri Italiani. Myrmelea inconspicuus ed Eurleon nostras. [Boll. Ist. Ent., Bologna] 14: 131–92, ill., 1942–43. Note di morfologia e di comparata su alcune specie Betidi, Efermerellidi ed Eptagenidi (Neuropt.). *Ibid.* 12: 1–62. 1940–41. **Grandi, M.**—Contributi allo studio degli Efemeroidei italiani. VI. Indagini morfologische comparativa su due specie de genere Ecdyonurus. [Boll. Ist. Ent., Bologna] 15: 103–28, ill., 1944–46. Gli scleriti ascellaria degli Odonati, loro morfologia e miologia comparati. [Boll. Ist. Ent., Bologna] 16: 254–78, ill., 1947. **Grassé, P. P., et C. Noirot**—Sur le nid et la biologie du Sphaerotermes sphaerothorax. [Ann. Soc. Nat. Zool.] 10: 149–66, ill., 1948. **Hinman, F. G., T. A. Brindley, and R. Schopp**—Hibernation of the pea weevil. [37] 42: 746–53. **Hochrainer, H.**—Der Wassergehalt bei Insekten und die Faktoren, die denselben bestimmen. [Zool. Jahrb. (Abt. Physiol.)] 60: 387–436, 1942. **Horsfall, W. R.**—Hatching eggs of floodwater mosquitoes in media that promote plant growth. [80] 110: 504–06. **Krombein, K. V.**—Two new gynandromorphs, with a list of previously recorded sexual aberrations in the scolioid wasps. [71] 100 (3257): 55–59. **Leslie, P. H., and T. Park**—The intrinsic rate of natural increase of Tribolium castaneum. [26] 30: 469–77. **Ludwig, D., and F. Rothstein**—Changes in the carbohydrate and fat content of the Japanese beetle (Popillia japonica) during metamorphosis. [Physiol. Zool.] 22: 308–17. **Pardi, L.**—Richerche sui Polistini. VII. La "dominazione" e il ciclo ovarico annuale in Polistes gallicus. [Boll. Ist. Ent., Bologna] 15: 25–84, ill., 1944–46. **Park, O.**—Application of the converse Bergmann principle to the carabid beetle, Dicaelus purpuratus. [Physiol. Zool.] 22: 359–72. **Phipps, J.**—The structure and maturation of the ovaries in British Acrididae. [88] 100: 233–47, ill. **Ribbands, C. R.**—The foraging method of individual honey bees. [36] 18: 47–66. **Richard, G.**—Les reactions phototaxiques des termites. [Ann. Sci. Nat., Zool.] 10: 67–73, 1948. **Sarkaria, D. S., and R. L. Patton**—Histological and morphological factors in the penetration of DDT through the pulvilli of several insect species. [83] 75: 71–82. **Schaller, F.**—Zur Ökologie der Collembolen in Kalksteinböden (nebst einigen Bemerkungen über Proturen). [Zool. Jahrb. (Abt. Syst.)] 78: 623–93. Notiophilus biguttatus (Col.) und Japyx sulifugus (Diplur.) als spezielle Collembolenräuber. *Ibid.* 294–96. **Tuzet, O., et C. Bessière**—La spermiogenèse du Potamobius astacus (Crust.). [Ann. Sci. Nat., Zool.] 10: 167–70, 1948. **Vandel, A.**—L'intersexualite chez les Isopodes terrestres. [Bull. Mus. Hist. Nat., Marseille.] 7: 170–74. 1947. **Whitehouse, R. H., and A. J. Grove**—The dissection of the cockroach. 73 pp., 34 figs., London (Univ. Tutorial Press, Ltd.), 1949. Price: 3s 9d.

ARACHNIDA AND MYRIOPODA—Bristowe, W. S.—The distribution of harvestmen (Phalangida) in Great Britain and Ireland, with notes on their names, enemies and food. [36] 18: 100–14. **Cloudsley-Thompson, J. L.**—On spiders from northeast Greenland. 6 ser. 12, 2: 398–400. **Jenkins, D. W.**—Trombiculid mites affecting man. IV. Revision of Eutrombicula in the American hemisphere. [5] 42: 289–318. **Muma, M. H., and K. E.**—Studies on a population of prairie spiders. [26] 30: 485–503. **Smith, L. M., and F. M. Summers**—The structure and biology of the red spider predator "Hypoaspis" macropilis (Acarina, Lelapt). [65] 51: 209–18. **Vandel, A.**—(See under Anatomy.)

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DIPTERA—Alexander, C. P.—New or little known Tipulidae from São Paulo, Brasil, IV. [102] 20: 461–98. Records and descriptions of Tipulidae from tropical America. Pt. VII. *Ibid.* 589–616. **Armitage, H. M.**—The Oriental fruit fly from the mainland viewpoint. [37] 42: 713–16. **Atkins, E. L., Jr.**—(See under Anatomy.) **Casanges** *et al.*

—(See under General.) **Coher, E. I.**—A note on synonomy in Mycetophilidae and Neoepicypta, n.n. [102] 20: 172. **Darsie, R. F., Jr.**—Pupae of the anopheline mosquitoes of the northeastern United States. [102] 20: 509–30, ill. (*). **Dupeut-Raabe, M.**—(See under Anatomy.) **van Emden, F. I.**—The scientific name of the common tachinid parasite of Distraea spp. (Lep.: Pyral.) in Central and South America, with notes on related species. [102] 20: 499–508. **Fluke, C. L.**—Some Alaskan Syrphid flies with descriptions of new species. [71] 100 (3256): 39–54. **Hardy, D. E.**—Studies in Hawaiian fruit flies. [65] 51: 181–205 (k). **Hennig, W.**—Die Larvenformen der Dipteren. I Teil. Akademischer Verlag, Berlin, 1948, 185 pp., 63 figs., 3 Taf., DM 22.00. **Horsfall, W. R.**—(See under Anatomy.) **Hull, F. M.**—New American syrphid flies of the subfamily Eristalinae. [73] 56: 120–38. **Jenkins, D. W.**—Toxorhynchites mosquitoes of the United States (Culic.). [65] 51: 225–29. **Levi-Castillo, R.**—Notas sobre Haemogogus panarchys. [102] 20: 165–71. **Paramanov, S. J.**—Revision of the species of Lepidophora (Bombyl.). [102] 20: 631–43 (k). **Schmitz, H.**—Die artenlos errichteten Gattungen und die alten Familien-namen der Phoridae. [102] 20: 237–52. **Wilcox, J.**—The genus Itolia Wilcox (Asilid.). [60] 24: 191–93, 1948 (*).

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Stenelmis from Nevada (Dryop.). [65] 51: 218–24. **Leslie and Park**—(See under Anatomy.) **Ludwig and Rothstein**—(See under Anatomy.) **Marshall, G. A. K.**—New Brazilian Curculionidae. [6] ser. 12, 2: 321–36. **Munrós, F.**—Descripcion de seis nuevas Chlamisinae neotropicales (Chrysom.). [102] 20: 617–29. **Ochs, G.**—A revision of the Gyrinoidea of Central America. [102] 20: 253–300. **Park, O.**—(See under Anatomy.) **Paulian, R.**—Observations sur les Coléopteres commensaux d'Annoma nigricans en Côte d'Ivoire. [Ann. Sci. Nat., Zool.] 10: 79–102, 1948. **Polivka, J. B.**—(See under Anatomy.) **Reichensperger, A.**—Beitrag zur Kenntnis der amerikanischen Paussiden. [102] 80: 89–92. **Schaller, F.**—(See under Anatomy.) **Schedl, C. E.**—Fauna neotropical I 89. Contribución a la morfología y sistemática de los Scolytoidea. [Notas Museo de la Plata] 14 (116) : 35–43 (*). **Werner, F. G.**—Additions to Epicauta with new synonomy and a change of names (Meloid.). [73] 56: 93–111, ill.

HYMENOPTERA—De Bach, *et al.*—(See under Anatomy.) **Evans, H. E.**—(See under Anatomy.) **Faggioli, D.**—Appunti entomologici. VI. Osservazioni biologische sull'Habrobracon hebetor (Braconid.). [Boll. Ist. Ent., Bologna] 12: 165–70, 1940–41. **Georgiana, M.**—(See under Anatomy.) **Headley, A. E.**—A population study of the ant Aphaenogaster fulva ssp. aquia (Formic.). [5] 42: 265–72. **Johansen, C.**—Meteorus argyrotaeniae, a new species of Braconidae parasitic on the orange tortrix. [5] 42: 319–20. **Kempf, W. W.**—A new species and subspecies of Procyrtocerus from Esperito Santo, Brasil (Formic.). [102] 20: 423. **Krombein, K. V.**—(See under Anatomy.) **Michener, C. D.**—A revision of the American species of Diceratosmia (Megachil.). [5] 42: 258–64 (k). **Moure, J. S.**—Notas sobre algunas abejas de Tacanas, Tucumán, Argentine. II. (Apoidea) (Collet., Xylocop., Eugloss., Bomb.). [102] 20: 437–60 (k*). **Pardi, L.**—(See under Anatomy.) **Paulian, R.**—(See under Coleoptera.) **Ribbands, C. R.**—(See under Anatomy.) **Smith, M. R.**—A new Leptothorax commonly inhabiting the canyon live oak in California (Formicid.). [73] 56: 112–15. **Soyka, W.**—Monographie der Mymar-Gruppe, mit den Gattungen Mymar, Synanaphes, Ferrierella, Anaphoidea, Hofenederia, Fulmekiella und Yungaburra (Chalci., Mymarid.). [102] 20: 301–422. **Townes, H. K., and M. C.**—A revision of the genera and the American species of Tryphonini (Ichneumon.). Part I. [5] 42: 321–95 (k*).

EXCHANGES

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

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

Tingidae (Heteroptera) of the world wanted, in alcohol, with host and other ecological data. Will collect other orders in exchange. N. S. Bailey, 16 Neponset Ave., Hyde Park 36, Mass.

Bombidae, nearctic and neotropical, wanted for exchange, identification, or purchase. Will exchange in other groups for bumblebees. Barth Maina, Dept. Zool., Univ. of Chicago, Chicago 37, Ill.

Saturnidae of the world. Will purchase individual specimens or cocoons. F. E. Rutkowski, St. Bede College, Peru, Illinois, U. S. A.

Butterflies of New England, principally from New Haven, Conn., for exchange. Louis Clarke, 28 W. Elm St., New Haven 15, Conn

Wanted—Proc. Ent. Soc. Phila., vols. 1–6; Proc. Cal. Acad. (Nat.) Sci., 1–7; Proc. Acad. Nat. Sci. Phila., 1–8; Trans. Amer. Ent. Soc., 1–5; Bull. Buff. Soc. Nat. Sci., 2–3; Psyche, 11, 13, 15. C. F. dos Passos, Mendham, N. J.

Miridae (Capsidae)—American species wanted, with locality labels, in exchange for British species. D. Leston, F.R.E.S., 6 Frognal Rise, London N. W. 3, England.

Wanted—Entomological microscope in good condition; Spencer, Bausch & Lomb, or other standard make. David G. Shappirio, 4811 17th St., N.W., Washington 11, D. C.

Coleoptera—Large quantities of Cicindelidae, Buprestidae, Lucanidae, Cerambycidae wanted in exchange for all families of Coleoptera from Ill., Ind. and Mo. Joseph B. Hayes, 1905 N. Pulaski Rd., Chicago 39, Ill.

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The Genus Allaporus Banks (Hymenoptera, Pompilidae): Notes and Descriptions

By HOWARD E. EVANS, Kansas State College,
Manhattan, Kansas

The curious North American Pompilid genus *Allaporus* has been considered to contain but a single species, the several other described species having been correctly placed in synonymy with *rufiventris* Cresson by Bradley (1944). Recently, however, several specimens have come to my attention which are undoubtedly specifically distinct from the widely distributed *rufiventris*, and represent two new species which are here described. Both of these are at present known from the female sex only. The species of *Allaporus* now known may be separated by the following key.

KEY TO THE SPECIES OF ALLAPORUS (FEMALES)

1. Vertex distinctly extended above the tops of the eyes, the posterior ocelli about equidistant from each other and from the crest of the vertex, which is quite sharp; mandibles unusually broad, somewhat angled about one-third the distance from the base, thereafter flat and polished.........*amabilis* new species

Vertex not or scarcely extended above the tops of the eyes, the posterior ocelli much nearer the vertex than to one another; mandibles normal, not modified as above..................2

2. Front femora slightly incrassate, their maximum width about .4 their length; crest of the vertex rather sharp; front only slightly convex in profile, below forming a prominence on the lower side of which are located the antennal orbits
............................*mexicanus* new species

Front femora not incrassate, their maximum width about .3 their length; vertex crest rounded; front strongly convex in profile view .... *rufiventris* (Cresson)

Allaporus amabilis new species

Length 7 mm.; fore wing 5.3 mm. Color black, except as follows: abdomen ferruginous except for the extreme base of the first tergite, which is black; all the legs beyond the trochanters dusky-ferruginous; mandibles dark ferruginous; clypeus and scape with a tinge of ferruginous. Wings hyaline, lightly infuscated on the apical fourth. Entire body clothed with a fine, pale, more or less silvery pubescence.

Mandibles broad, with two weak teeth on the inner margin; shaft of mandible bent slightly inward about one-third the distance from the base, the outer portion of the mandible with a flat, shining surface, in a plane oblique to that of the clypeus when the mandibles are closed. Clypeus elevated, plate-like, about twice as broad as high, its apical margin truncate. Front broad, at the middle about .68 times the maximum width of the head; eyes converging slightly above, the distance between the eyes at the top .9 the distance between them at the bottom. Front in profile only slightly convex, the spatium frontale (the lower median part of the front, just above the antennal orbits) not prominent, not overhanging the bases of the antennae. Vertex elevated considerably above the tops of the eyes, in anterior view very slightly arched, almost straight across; crest of the vertex thin and acute. Posterior ocelli about as close to the crest of the vertex as to each other, and slightly closer to each other than to the margins of the eyes. Antennae of moderate length, the first four segments in a ratio of about 3 : 1 : 2 : 2; scape slender, about three times as long as thick, slightly curved.

Propodeum rather long, with a short, oblique posterior declivity, the sides of which are distinctly transversely rugulose. Front femora slender, the maximum width .25 times the length. Legs very weakly spinose for the genus, the spines on the middle and hind tibiae very minute. Apical abdominal sternite strongly compressed.

The single topotypic paratype resembles the type closely in all details, except that the legs are a somewhat brighter ferruginous.

Holotype: ♀, Potwisha, Sequoia National Park, Tulare County, CALIFORNIA, 2000–5000 feet, 2 June 1929 (E. C. Van Dyke) [California Academy of Sciences]. *Paratype:* ♀, same data as type except taken on 16 July 1931 [United States National Museum].

Allaporus mexicanus new species

Length 7.5 mm.; fore wing 5 mm. Color black, except as follows: abdomen bright ferruginous, except the extreme base of the first segment, which is black; hind femora and tibiae dusky-ferruginous; apex of mandibles dusky-ferruginous. Wings subhyaline, lightly infuscated on the apical fourth. Entire body clothed with a conspicuous pale, more or less silvery pubescence, except on the upper front, vertex, and thoracic dorsum, where it is brownish.

Mandibles of the usual shape in the Pompilinae, not modified as in the preceding species, the shaft curving gradually, the outer apical portion shining, but not presenting a broad, flat surface; inner margin with two weak teeth. Clypeus nearly three times as broad as high, its apical margin truncate, the disc not elevated but on the same plane as the lower front. Eyes very narrow, the front broad between them, in the middle about .72 times the maximum breadth of the head; inner orbits not converging above, the distance between the eyes at the top the same as at the bottom. Front in profile only slightly convex, the spatium frontale, however, quite prominent, forming a V-shaped elevation somewhat overhanging the antennal orbits. Vertex in anterior aspect straight across, in fact very slightly concave, elevated only very slightly above the tops of the eyes; crest of the vertex rather sharp. Posterior ocelli close to the vertex crest, much closer than they are to each other; post-ocellar line equal to the ocello-ocular. Antennae short, the first four segments in a ratio of about 3 : 1 : 2 : 2.3; scape stout, only slightly more than twice as long as thick.

Propodeum rather long, with an oblique, slightly concave posterior declivity, on the sides of which the propodeum is slightly transversely rugulose. Front femora slightly incrassate, the maximum width .38 times the length. Legs moderately spinose, the middle tibiae in particular with rather strong spines. Apical abdominal sternite scarcely compressed.

The single paratype closely resembles the type, but the middle tibiae and femora are ferruginous, and the front legs brownish; it is 6.5 mm. long, the fore wing 4.5 mm.

Holotype: ♀, Cuernavaca, Morelos, Mexico, May 1945 (H. L. H. Krauss) [United States National Museum]. *Paratype:* ♀, Brownsville, Texas, 8 June 1937 (R. H. Crandall) [Cornell University].

Allaporus rufiventris (Cresson)

The synonymy and a redescription of this species have been given recently by Bradley (1944). In addition to the localities cited by Bradley, I have seen this species from Pennsylvania (Pittsburgh), Georgia (Rockmart), and from Berkeley, California.

On the Systematic Position of Allaporus

This genus was assigned by Bradley (1944) to the tribe Aporini, and placed systematically between the genera *Chelaporus* and *Rhabdaporus.* However, it differs markedly from these genera and from all Aporini in the structure of the hind wing. The radial vein is very short to the point where it meets the transverse cubital; the cubital vein is also unusually short before its junction with the transverse cubital vein; the transverse median vein leaves the anal at an angle, rather than forming an arch as in most Pompilidae. Furthermore, the anal lobe is slender, and deeply separated from the remainder of the wing. These features are not shared by any Aporini known to me; they are, however, diagnostic of certain Old World genera placed by Arnold (1936, 1937) in the tribe Idopompilini. In fact, *Allaporus* keys readily to this tribe in Arnold's key to the tribes and genera of Psammocharinae (1937, p. 75). Specimens of *Microphadnus pumilus* Costa, a member of the Idopompilini, are before me, and compare favorably with the species of *Allaporus,* although there are a number of generic characters by which they differ. Many structural features of the body, and the venation of the fore wing, as well as the unusual venation of the hind wing, suggest a close relationship of *Allaporus* with the Idopompilini. If the Idopompilini are maintained as a tribe distinct from the Aporini, the balance of characters would appear to place *Allaporus* in the former tribe. In any event, note should be taken of the close similarity of *Allaporus* to *Microphadnus* and certain related Old World genera.

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A Collection of Xystodesmid Millipeds from Kentucky and Tennessee

By Nell Bevel Causey, Fayetteville, Arkansas

Mr. Henry Hansen collected the millipeds listed and described in this paper in the Kentucky Ridge State Forest, Pineville, Kentucky, and in the Great Smoky Mountains National Park, Tennessee–North Carolina, in June and July, 1947. Type specimens will be deposited in the collection of the Acadamy of Natural Sciences of Philadelphia.

Nannaria scutellaria Causey 1942

Great Smoky Mountains National Park: Greenbriar Cove, Double Spring Gap, Ramsey Prong, Cherokee Orchard, a site between park headquarters and Gatlinburg. Forty-eight larvae of the 4th, 6th, and 7th stadia; 43 adults. All of the larvae and some of the adults were dug from the soil.

Tucoria dynama Chamberlin 1947

Kentucky Ridge State Forest. Two males. Faded trimaculate.

Apheloria roanea Chamberlin 1947

Kentucky Ridge State Forest. One male and one female. Trimaculate; after two years in alcohol the keels are bright yellow, the median spots cream color.

Mimuloria georgiana (Bollman)

Great Smoky Mountains National Park: Rainbow Falls Trail, a site near Gatlinburg, a burnt over area on trail to Siler's Bald, Indian Gap, Greenbriar Cove, Porter Creek Flats, Double Spring Gap, Bullhead Trail, beech orchard on trail to Siler's Bald. Sixteen males, two of which were dug from the soil. The median dorsal spots in some individuals were smaller than the colored areas on the keels; in others they were low wide triangles confluent with the colored keels; and in some there was a colored band across the posterior margin of most of the tergites.

Dixioria bidens (Causey 1942)

Great Smoky Mountains National Park: Porter Creek Flats. One male.

Aporiaria deturkiana Causey 1942

Great Smoky Mountains National Park: Rainbow Falls Trail, Rocky Springs Gap, Greenbriar Cove, Double Spring Gap. Twenty-seven males, 19 females, 7 larvae. All of the larvae and some of the adults were dug from the soil.

Brachoria hansonia sp. nov.

Kentucky Ridge State Forest, Pineville, Kentucky. One male (type); length 49 mm., width 11 mm. Three females, length 51 mm., width 11 mm., from the same site are assigned tentatively to this species. The shape is typical of the genus, wide keels and moderately arched dorsum.

Color in life unknown; faded brown type suggests brightly colored keels and wide bands across posterior margin of tergites and completely around the collum. Legs and venter light.

Coxae posterior to gonopods spined. Sternum bluntly spined.

The telopodite of the gonopods (Fig. 1) has an inconspicuous transverse ridge about midway of its length. Otherwise it forms a wide smooth curve, resembling the telopodite in species of *Apheloria*. The gonopods most closely resemble those of *sequens;* in that species the telopodite is crossed by two transverse ridges, while there is only one in *hansonia*. The telopodite is sparsely setose on the outer curve below the ridge and smooth beyond it. The simple acuminate median blade is shorter than the longest of the hairs in the basal tuft.

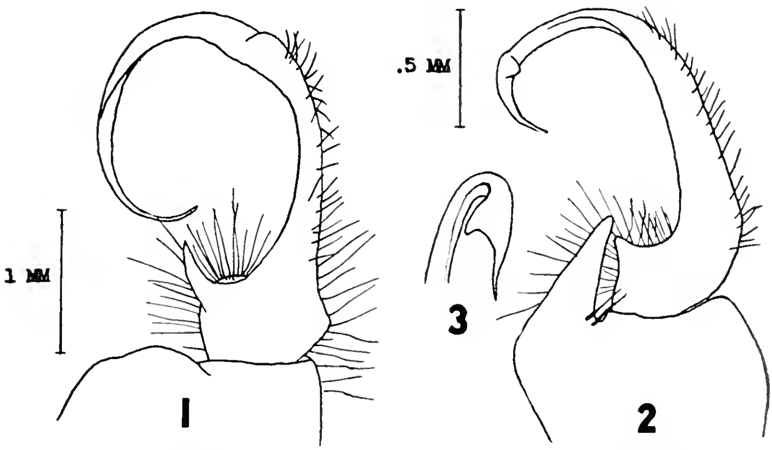

FIG. 1. *Brachoria hansonia*, left gonopod, ventro-lateral view.
FIG. 2. *Deltotaria brimleardia*, left gonopod, subcephalic view.
FIG. 3. *Deltotaria brimleardia*, end of telopodite of right gonopod, sublateral view.

Deltotaria brimleardia sp. nov.

Great Smoky Mountains National Park, Tennessee: Ramsey Prong. One male (type); length 27 mm., width 6.2 mm. The body is relatively wide and only slightly arched.

Color in life unknown. The type was dug from the soil before the adult colors had developed.

Coxae spined. Sternum not spined.

The gonopods closely resemble those of *brimleii*, but they can be distinguished by the shape of the free end of the telopodite and the distribution of the setae on it (Figs. 2, 3). The telopodite forms a smooth curve and ends in an acuminate process subtended by a thin rounded lobe. In *brimleii* the acuminate process is bent back toward the lobe, forming an apical hook. The middle half of the telopodite is setose on the outer curve. The large coxal peg is typical of the genus and is entirely distinct from the medial coxal hook or *hüfthörnchen.*

A Review of the Genus Pseudolithobius (Chilopoda: Gosibiidae)

By Ralph Crabill, Jr., Cornell University, Ithaca, New York

Among the material collected during the summer of 1948 by Mr. George Ball and Dr. Howard Evans, to whom I am greatly indebted, is a new member of the endemic Nearctic genus, *Pseudolithobius.* This new species is of particular interest because it is the second to be placed in the genus since its erection in 1875 by Stuxberg.

Pseudolithobius (Stuxberg)

Lithobius Stuxberg, Öfvers. K. vet.-akad. Förhandl., XXXII (2), p. 69 (1875); Ann. and Mag. Nat. Hist., XV (4), p. 190 (1875).

Lithobius (*Pseudolithobius*) Stuxberg, Öfvers. K. vet.-akad. Förhandl., XXXII (3), p. 14 (1875).—Latzel, Myr. Ost-Ung. Mon., I, p. 35 (1880).—Bollman, Bull. U. S. Nat. Mus., 46, p. 164 (1893).—Verhoeff, Bronn's Klass. u. Ord., V, p. 240 (1925).

Pseudolithobius (Stuxberg), Chamberlin, Pomona Coll. Journ. Ent. and Zool., II, p. 369 (1910); Bull. Mus. Comp. Zool. Harvard, LVII, p. 227 (1917).—Attems, in Kükenthal's Handbuch Zool., IV, p. 383 (1930).

Genotype: *Lithobius megaloporus* Stuxberg, 1875 [= *Pseudolithobius megaloporus* (Stuxberg)]. Monobasic.

The present genus is distinctive within the Gosibiidae in having the last five pairs of coxae with ventral pores. All other known genera of Lithobiomorph centipedes, with the exception of the Henicopid genus, *Zygethobius*, bear coxal pores on only the last four pairs of legs. *Pseudolithobius,* which has been known since 1875 from a single species, *megaloporus*, has only been taken on the west coast of the United States. With the discovery of the new Arizonan form, *festinatus,* described below, the areal distribution of the genus is considerably increased.

Generic Diagnosis. Fulvous or reddish brown forms, ranging in size to 41 mm. Lateral head margins essentially continuous, no true marginal breaks occurring, although an indistinct line visible where the usual breaks would occur. Ocelli in two or three series; posterior ocellus largest; entire eye area small, elongate. Antennae short, consisting of twenty to twenty-two articles. Prosternal teeth recurved, 3–3 to 4–4; ectal spine setiform. Tergites rugose, roughened; the ninth, eleventh, and thirteenth produced posteriorly, or none so produced. Coxal pores on last five pairs of legs. Female gonopod claw large, entire. Basal spines stout, 2–2, 3–3, or 4–4. First article of gonopod broad, well chitinized mesally, constricted basally on inner side. Fifth article of penult and ultimate legs of the male conspicuously modified. (The penult and ultimate legs of *megaloporus* show such sexually dimorphic characteristics, it is assumed that when a male of *festinatus* is found, it too will exhibit such modifications.)

Pseudolithobius megaloporus (Stuxberg)

Lithobius megaloporus Stuxberg, Öfvers. K. vet.-akad. Förhandl., XXXII (2), p. 69 (1875); Ann. and Mag. Nat. Hist., XV (4), p. 190 (1875).

Lithobius (Pseudolithobius) megaloporus Stuxberg, Öfvers. K. vet.-akad. Förhandl., XXXII (3), p. 14 (1875); Proc. Cal. Acad. Sci., VII (1), p. 137 (1877).

Pseudolithobius megaloporus Chamberlin, Pomona Coll. Journ. Ent. and Zool., III, p. 470 (1911); Bull. Mus. Comp. Zool. Harvard, LVII, p. 229 (1917).

Dorsum brown; head darker, more reddish. Antennae short, articles twenty to twenty-two. Ocelli five to seven in two or three series. Prosternal teeth recurved, 3–3 to 4–4. Tergites nine, eleven, and thirteen with posterior outer corners distinctly pointed and produced posteriorly. The last five pairs of legs with coxal pores. Last two pairs of legs with coxae laterally armed. Ventral spinulation of the tenth to penult pairs of legs, 0, 1, 3, 3, 3, the penult legs sometimes 0, 1, 3, 3, 2. That of the first to tenth pairs of legs, 0, 0, 3, 3, 3. Ventral spinulation of the ultimate legs, 0, 1, 3, 3, 1, with two terminal claws, the second one minute. Dorsal spinulation of first to ninth pairs of legs, 0, 0, 3, 3, 2, of the tenth to the ultimate pairs of legs, 1, 0, 3, 3, 2. Basal spines of female gonopods 3–3 or 4–4.

Pseudolithobius festinatus sp. n.

Like the Californian, *megaloporus*, this new species has coxal pores on the last five pairs of legs, but it may be readily distinguished from *megaloporus* in having none of the tergites produced posteriorly and in having only the last pair of coxae laterally armed. Furthermore, *festinatus* has only two basal spines on each female gonopod as opposed to three or four in *megaloporus;* the adult female specimen of *festinatus* is only 13.5 mm. in length, and the ultimate leg spinulation is dorsally 1, 0, 3, 1, 0, ventrally 0, 1, 3, 2, 0, thus contrasting significantly with that of *megaloporus*, viz. dorsally 1, 0, 3, 2, 2, and ventrally 0, 1, 3, 3, 1.

Type. ♀; 16 miles southwest of Show Low, Navajo County, ARIZONA on U. S. Highway 60, August 10, 1948. (George E. Ball and Howard E. Evans; under a rock.) In author's collection; C–483.

Total length 13.5 mm.

Antennae pale yellow becoming paler distally; 21 articles; 4.3 mm. long; second article longest; last article elliptical, its length to preceding two articles in alcohol 18:19; proximal articles sparsely beset with pale setae becoming more numerous distally. *Cephalic plate* bright tan-yellow, darker than first tergite; areolate; 1.3 mm. long, as long as wide; widest at midlength; lateral head marginal breaks essentially continuous, no true disjunctures; very sparsely beset with setae; frontal suture distinct. *Eye* consisting of a single large ocellus, ventrally pointed, and eleven smaller ocelli arranged in three series, viz. 1–5, 4, 2; organ of Tömösvary large, located beneath anterior-most ocellus of second series; beneath anterior-most ocellus of first series a stout, dark, seta. *Clypeus* bluntly pointed at apex; with 4 apical setae, the two inner setae on apex, these stouter and longer than two outer setae which are located slightly lateral and anterior to the inner setae. *Prehensors* bright tan-yellow; each trochanteroprefemur with an incomplete oblique suture extending from inner prehensorial margin 1/5 the distance to outer margin and roughly paralleling the side of the prosternum. *Prosternum* same color as cephalic plate; areolate; distinctly split longitudinally by a pale suture. *Anterior prosternal projections* with 3–3 prosternal teeth, these triangular, blunt, a line through their apices distinctly recurved, innermost tooth smallest on side of diastema, outermost tooth longest, ectal spines setiform, longer than nearest tooth, pale, curving mesally; diastema narrowly V-shaped, slightly rounded at bottom; prosternal projections beset with dark, stout setae; distance taken between apices of outermost teeth to interval between prehensorial-trochanteroprefemoral articulations is 7:33; chitin lines distinct for entire length. *Tergites* whitish-yellow from second to about fifth, thereafter becoming darker tan-yellow; areolate; rugose; all finely punctate; no tergites produced; tenth widest; ratio of tenth plate to first is 42:35; no tergite completely surrounded by marginal elevations; first tergite with sides slightly converging posteriorly, the posterior margin very slightly medially excised, its width to head is 35:37; tergites 2, 7, 9, 11, and 13 with the posterior margins straight, posterior margins of tergites 1, 3, 5, 6, 8, 10, 12, and 14 excised, becoming more distinctly so progressing posteriorly; relative widths progressing posteriorly from first to fourteenth 35, 31, 36, 34, 37, 36, 40, 41, 37, 42, 37, 39, 35, 34. *Sternites* anteriorly whitish becoming distinctly yellow by 7th sternite; areolate; very sparsely beset with setae; sides moderately converging posteriorly; just mesad of each posterior corner is an oblique short, clear sulcus which becomes more abbreviated on succeeding sternites until it vanishes on the fifteenth. *Coxal pores* 3, 3, 3, 3, 3; circular; small, the innermost one the smallest, the outermost two progressively of greater diameter. *Female gonopods* with the first article of each slightly excavate mesoproximally; light yellow; the inner surfaces more strongly chitinized; beset with numerous brown, long setae ventrally; basal spines 2–2 on each first article, outer spines straight, with parallel sides, the distal $\frac{1}{3}$ gradually acuminate, equal in length to inner spines, inner spines slightly curved outward, equal in width to outer spines; gonopod claw entire, distally dark brown, strongly curved mesally. *Legs* lighter anteriorly, becoming darker yellow posteriorly, generally same color as associated tergite; only last pair of coxae laterally armed, penult and ultimate legs relatively crassate; ultimate leg femur to tibia lengths 52:60 from dorsal aspect; ultimate legs with single large claw; penult legs with minute accessory spine in addition; all other legs with apical claw plus a smaller inner claw as well as a ventral outer accessory spine; spinulation of first to sixth leg pairs $\frac{00222}{00232}$; of seventh to eleventh leg pairs $\frac{00322}{00232}$; of the twelfth leg pairs $\frac{00312}{00232}$; of the thirteenth $\frac{10311}{00332}$; of the penult $\frac{10311}{01332}$; of the ultimate $\frac{10310}{01320}$.

Two Synonymic Notes (Hemiptera: Coreidae, Corixidae)

By Roland F. Hussey, Lakeland, Florida

I

Acidomeria cincticornis Stal 1870, Enum. Hem. 1: 183.
Anasa sapiicola Hussey 1935, Bull. Brookl. Ent. Soc. 30 (1): 23. *New synonymy.*

Comparison of paratypes of my 1935 species with specimens which I determined in 1925 as *A. cincticornis* leaves me no doubt of this synonymy.

II

Students and cataloguers of the aquatic Hemiptera, without exception, appear to have overlooked the fact that Champion himself renamed his *Corixa sexlineata* in a footnote under the List of Plates on p. xvi of Volume II of the Biologia, where he wrote: "This name is preoccupied in the genus, and is here changed to *sexcincta*." Because of this oversight the species was renamed by Kirkaldy in 1909, and it was again renamed in 1927 by Jaczewski who overlooked both the previous corrections. In this country it has generally been known as *Trichocorixa naias* (Kirkaldy), and appears under this name in Sailer's recent monograph of Trichocorixa (Kans. Univ. Sci. Bull. 32: 335, 1948). The full synonymy of the species is:

Corixa sexlineata Champion, Biol. Centr.-Amer., Hem.-Het. 2: 379, Tab. XXII, fig. 22, Feb. 1901. [Name preoccupied.]
[*Corixa*] *sexcincta* Champion, op. cit., p. xvi, footnote, June 1901. [New name.]
[*Arctocorisa*] *naias* Kirkaldy, in Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash. 10(3/4): 196, 1909. [New name for *sexlineata* Champ.]
"*C*[*orixa*]" (now with all probability *Trichocorixa*) *championi* Jaczewski, Ann. Zool. Mus. Polon. Hist. Nat. 6 (3): 257, footnote 2, 1927. [New name for *sexlineata* Champ.]

When I called this to the attention of Dr. Sailer, he replied, "The fact that Champion's note . . . has been missed by so many workers who have used this volume as a principal reference for almost half a century is most remarkable." I concur in this; but I cannot except myself from the list of those who missed it, for I used this volume of the Biologia for nearly thirty years before this footnote caught my eye.

It may be noted here that 1908 is generally cited as the date of publication of "A catalogue of American aquatic and semi-aquatic Hemiptera," by Kirkaldy and Torre-Bueno, in which Kirkaldy proposed the name *naias* for this species. It was published in the September–December, 1908, issue of the Proceedings of the Entomological Society of Washington; but Torre-Bueno noted in 1911 (Can. Ent. 43: 226, footnote) that it did not appear until June or July of 1909. The author's extras bear the date May 17, 1909.

Charles F. Adams

Dr. Charles F. Adams, M.D., 72, dipterist and Public Health official, died on January 21, 1950 at his home in Jefferson City, Missouri. From 1903 to 1908 he published on the taxonomy of Diptera, including two articles contributed to ENTOMOLOGICAL NEWS (15: 303–304; 16: 108–111), and the keys to the genera of Dexiidae and Tachinidae in the third edition (1908) of Williston's "Manual of North American Diptera." Though for many years his professional career was in Public Health Administration, as Director of Laboratories for the Indiana State Board of Health (1927–1934) and Missouri Division of Health (1934–1949), he continued his keen interest in Diptera and maintained a large collection and library. At the time of his death he was Acting Director of the Missouri Division of Health.

Dr. Adams was a kindly and lovable gentleman who will be sincerely missed by those privileged to be his friends.

CURTIS W. SABROSKY

In Behalf of Dr. Hermann Weber

The "Lehrbuch der Entomologie," published in 1933 by Dr. Hermann Weber, is generally considered to be the outstanding general text-book of our science. Dr. Weber is also known for his "Biologie der Hemipteren," without doubt the finest example of a combined morphological and biological treatment of an individual order of insects, and for his "Grundriss der Entomologie," an unsurpassed shorter text-book, now in its second edition. Dr. Weber has indeed done much for entomology and for entomologists, and he is now asking for help in order that he may continue his labors more effectively.

Undiscouraged by the loss of his library, his collection, his reprints, and all his possessions, Dr. Weber is presently engaged in preparing a second edition of his famous text-book. The scientific library facilities at Tübingen are limited, and Dr. Weber writes that he would be enormously helped if entomologists would send him reprints of their scientific papers, their recent ones as well as any they may have directed to him before 1945. In addition, papers on all zoological subjects are needed for he is collaborating with Prof. A. Kühn on a revision of the

Claus-Grobben "Lehrbuch der Zoologie," and writing the chapters on morphology and ecology and the special part except Protozoa and Coelenterata. Address: Zoologisches Institut, Hölderlinstrasse 12, (14) TÜBINGEN, French Zone, Germany. [Postage rates, from U.S.A., on reprints and books: 1½ cents for each two ounces up to 6 pounds; packages over 6 pounds go as parcel post at 14 cent per pound.]

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1949 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Bachofen-Echt, A.—Der Bernstein und seine Einschlüsse. Wien, Springer Verlag, 1949, 204 pp., 188 ill. $4.80. **Beaver, P. C. and O. K. Fletcher, Jr.**—An improved insect collecting cage. [52] 8: 176–77, ill. **Benjamin, R. K. and L. Shanor**—Discovery of dioecism in Laboulbenia formicarum (Ascomycete). [80] 111: 33–34. **Berg, C. O.**—Limnological relations of insects to plants of the genus Potomogeton. [84] 68: 279–91. **Charles, L. L.**—Léon Lhomme. (Obituary with portrait.) [Rev. Franç. de Lep.] 12: 65–67. **Curle, R.**—Arcana entomologica; or illustrations of new, rare and interesting insects. By J. O. Westwood (London 1845). [Jour. Soc. Bibliogr. Nat. Hist.] 2: 167–68. W. Wood: Index entomologicus; or a complete illustrated catalogue consisting of 1944 figures of the lepidopterous insects of Great Britain. (London, 1839.) *Ibid.* 169–70. **Gontarski, H.**—Giftige Bienenpflanzen. [Natur u. Volk] 79: 180–86. **Janse, A. J. T.**—The methods and aims of taxonomic study in entomology, with special reference to Lepidoptera. [S. Afr. Jour. Sci.] 45: 107–12. **Kalmus, H.**—Simple experiments with insects. 132 pp., Wm. Heinemenn, London and Toronto, 1948, 7s 6d. **Lees, A. D.**—The arthropod fauna of the soil. (Review of papers by Salt, Hollick, Raw and Brian.) [Science Progress] 37: 723–24. **Lempke, B. J.**—Rebel's edition of Berge's "Schmetterlingsbuch." [Jour. Soc. Bibliogr. Nat. Hist.] 2: 171–72. **McAtee, W. L.**—Numerical abundance as the criterion for successful species. [58] 49: 169–72. **Menozzi, C.**—In morte di Bruno Finzi. (With bibliography.) [Mem. Soc. Ent. Ital.] 20: 190–92, 1941. **Reuter, E.**—Index generum et specierum seriei Notulae Entomologica, Vol. 1 (1921)–25 (1945). [Not. Ent.] Index 1–25: 1–190. Helsengforeiae, 1949. **Richter, R.**—Einführung in die zoologische Nomenklatur durch Erläuterung der internationalen Regeln. 2 Aufl., Frankfurt a. M., 1948, 252 pp. **Röber, H.**—Insekten als Indikatoren des Mikroklimas. [Naturw. Rundschau] 2: 496–98. **Roepke, W.**—In memoriam J. P. A. Kalis (1899–1949). [Ent. Berichten, Amsterdam] 12: 425–27. **Roonwal, M. L.**—Studies in intraspecific variation. III. Body-size and biometrical ratios in various types of individuals of the desert locust Schistocerca gregaria (Forsk.). [Rec. Indian Mus.] 45: 149–65. IV. The role of some variations, e.g., eye stripes, etc., as "population indicators" in the desert locust and their practical importance. *Ibid.* 167–80. **Steering Committee, Nomenclature Discussion Group, Washington, D. C.**—Basic issues in the controversy on zoological nomenclature. [80] 110: 594. **Viette, P. E.**—R. P. Joseph de Joannis (1854–1932). (Biogr.) [Lep. News] 3: 72. **Williams, C. B.**—Insect flight and distribution. [53] 164: 904–05.

ANATOMY, PHYSIOLOGY, MEDICAL—Beatty, R. A.—Studies on reproduction in wild-type and female-sterile mutants of Drosophila melanogaster. [Proc. Roy. Soc. Edinb., B] 63: 249–70. **Beier, M.**—Körperbau und Lebensweise der Larve von Helodes hausmanni (Col., Helodid). [Eos] 25: 49–100. **Bertani, G.**—Contributo allo studio de pH intranucleare nelle cellule delli ghiandole salivari di Chironomus thummi. [Rendiconti, Cl. Sci. Mat. e Nat., Milano] 77: 427–36, 1943–44. **Bonhag, P. F.**—The thoracic mechanism of the adult horsefly (Dipt., Tabanidae). [Cornell Univ. Agr. Expt. Sta. Memoirs] 285: 1–39, ill. **Butt, F. H.**—Embryology of the milkweed bug Oncopeltis fasciatus (Hemip.). [Cornell Univ. Agr. Expt. Sta. Memoirs] 283: 1–43, ill. **Day, M. F.**—The distribution of ascorbic acid in the tissues of insects. [Australian Jour. Sci. Res.] 2: 19–30, ill. The distribution of alkaline phosphate in insects. *Ibid.* 31–41, ill. Midgut epithelium regeneration as a means of studying insect digestion. [53] 164: 878–79. **Edwards, G. H.**—La determination du lieu et du mode d'action d'un agent chimique (la ryanodine) chez l'insecte. [110] 5: 92–97. **Finlayson, L. H.**—The life history and anatomy of Lepinotus patruelis (Psocoptera, Atropidae). [72] 119: 301–23, ill. **Franz, J.**—Über die genetischen Grundlagen des Zusammenbruchs einer Massenvermehrung aus inneren Ursachen. [Zeitschr. f. angew. Ent.] 31: 228–60. **Froussart**—Essai de fabrication de cartons à insectes. [110] 5: 111–14. **Gantès, H.**—Morphologie externe et croissance de quelques larves de Formicides. [Bull. Soc. d'Hist. Nat. l'Afr. Nord] 40: 71–97. **Goodwin, T. W. and S. Srisukh**—The biochemistry of locusts, I. The carotenoids of the integument of two locust species (Locusta migratoria migratorioides and Schistocerca gregaria). [Biochem. Jour.] 45: 263–68. **Hammond, G. H.**—Soil pH and intensity of Phyllophaga infestation. [79th Ann. Rpt. Ent. Soc. Ont.] pp. 13–18. **Heller, J. and W. Swiechowska**—Investigations on insect metamorphosis. Pt. XIII—The macroscopical aspect of metamorphosis (Lep., Sphingid.). [Zool. Poloniae] 4: 73–82, 1948. **House, H. L. and M. G. Traer**—An artificial food for rearing Pseudosarcophaga affinis, a parasite of the spruce budworm Choristoneura fumiferana. [79th Ann. Rpt. Ent. Soc. Ont.] pp. 50–53. **Iuoff, N. A.**—A consideration of embryological development of ichneumons (Pseudophycus sp.). (In Russian.) [22] 60: 1477–80, ill., 1948. **Kalina, B. F.**—Development and viability of Drosophila melanogaster on a medium containing DDT. [80] 111: 39–40. **Khalifa, A.**—The mechanism of insemination and the mode of action of the spermatophore in Gryllus domesticus. [74] 90: 281–92. Spermatophore production in Trichoptera and some other insects. [88] 100: 449–471, ill. **Kowarzyk, H. and J. Rymar**—The experimental aberrations of Vanessidae (Lepid.). [Zool. Poloniae] 4: 83–106, ill., 1948. **Krombein, K. V.**—Two new gynandromorphs, with a list of previously recorded sexual aberrations in the scolioid wasps. [71] 100 (3257): 55–59. **Kühnelt, W.**—Über Vorkommen und Verteilung reduzierender Stoffe im Integument der Insekten. [Österr. Zool. Zeitschr.] 2: 223–41. **Lecomte, J.**—L'interattraction chez l'Abeille. [C. R. Acad. Sci., Paris] 229: 857–88. **Lees, A. D.**—Polarization of light as a factor in the orientation of the honey bee. (A review of papers by K. v. Frisch in Naturwiss. 35: 12, 38 and in Experientia 5: 142) [Science

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ARACHNIDA AND MYRIOPODA—Chickering, A. M.—The Gnaphosidae (Araneae) of Panama. [84] 68: 314–31 (*). **Cloudsley-Thompson, J. L.**—The significance of migration in Myriopoda. [6] ser. 12, 2: 947–62. **Delpy, L.-P.**—Essai critique de synonymie du genre Hyalomma C. L. Koch 1848 depuis Linne, 1778. [Ann. de Parasit.]

24: 464–94, ill. **Mello, Leitão, C. de e J. de Araujo Feio**—Notas sôbre pequena colecção de aracnidos do Peru. [Bol. Mus. Paraense Emilio Goeldi] 10: 313–24 (*). **Soares, B. A. A. e H. F. de Almaeda Carmago**—Aranhas coligidas pela Fundação Brasil-Central (Araneae). [Bol. Mus. Paraense Emilio Goeldi] 10: 355–409, ill.

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Reviews

American Spiders. By Willis J. Gertsch. D. Van Nostrand Co., New York. 1949. Pp. xiii, 285. 32 colored pls., 32 gravure pls., 6 text figs. Price $6.95.

Except to a few specialists, spiders are a little-known group of animals, and their lives are often strange and complex, and nearly always of absorbing interest. The introductory chapter of this work states that, "This book treats of the spiders of the United States and Canada and is concerned almost wholly with their habits and life histories, their morphology and peculiarities and also with their numbers and kinds." The author is one of our few specialists who has a sufficiently comprehensive background to have written this book.

It is not intended as a work to be used for the identification of spiders, though a classification system for families and higher systematic divisions is given. Its strength lies in the large mass of meticulous observations on the life histories of spiders, the relation of their habits to their morphological structure and to their association with other forms of life. The references to folk lore, legend and superstition, as they relate to spiders, will be found an attractive addition to the volume.

Besides the introduction, there are chapters on: the place of spiders in nature; the life of the spider; silk spinning and handiwork; courtship and mating; evolution of spiders; economic and medical importance; the North American spider fauna; and a chapter each on the tarantulas, the cribellate spiders, the aerial web spinners and the hunting spiders. The very fine illustrations, both colored and black and white add much to the book. A glossary and short bibliography are given.

This is the first volume of a new series to be called *The Illustrated Naturalist*. If the quality is maintained on the level of this book, it will be a very fine series.—M. E. PHILLIPS.

WEBS IN THE WIND. The Habits of web-weaving spiders. By Winifred Duncan. The Ronald Press, New York. 1949. Pp. xv, 387. 74 pls., 101 text figs. Price $4.50.

The author admits in the preface of this work that it was written in an unorthodox fashion, but she has done it very charmingly. She says that she started out with no knowledge of spiders and with a resolve to rehash no information from other books, but rather to put down simply her personal day by day observations on the life and habits of spiders.

Most professional biologists would probably not entirely approve of this method of research, and as a matter of fact the author did not completely follow it. In this case also, her methods have apparently resulted in the assembly of much data not previously recorded. While valuable observations are presented in an exceedingly interesting manner, the scientist will occasionally be disappointed to read of the details of the habits of a species only to have its exact identity remain a mystery. However, this is not a serious shortcoming for the descriptions and figures will probably permit the specialist to identify the forms referred to. On the other hand this book can be a very definite inspiration to the amateur naturalist to embark upon studies of his own, for one is left with the impression that the author had a lot of fun.

Special attention is given, as indicated by the title, to spider webs and their construction. The reader is led to the full realization that here is a group of animals in which has been developed a different and very special dexterity all its own. Many tedious hours of observation have reaped rich rewards in this part of the work. The engineering skill, the capricious conduct and the wide range of methods used by the subjects form a fascinating account. The illustrations, by the author, are made with skill and artistic feeling.—M. E. PHILLIPS.

NOTICE. The December, 1949 issue of ENTOMOLOGICAL NEWS was mailed at the Post Office at Lancaster, Pa., on February 17, 1950.

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

1. American Midland Naturalist. Notre Dame, Indiana.
2. American Museum Novitates. New York, N. Y.
3. American Naturalist. Garrison-on-Hudson, New York.
4. Annals of Applied Biology. London.
5. Annals of the Entomological Society of America. Columbus, Ohio.
6. Annals and Magazine of Natural History. London.
7. Annales Academia Brasileira Sciencias. Rio de Janeiro.
8. Anales del Instituto de Biologia Mexico. Mexico City.
9. Anatomical Record. Philadelphia.
10. Arkiv för Zoologie. K. Svenska Vetenkapsakademien i. Stockholm.
11. Arquivos de Higiene e Saude Publica. São Paulo.
12. Biological Bulletin. Woods Hole, Massachusetts.
13. Bios, Rivista Biol. Geneva.
14. Boletin de Entomologia Venezolana. Caracas.
15. Boletin del Museo de Historia Natural "Javier Prado." Lima, Peru.
16. Boletin do Museu Nacional do Rio de Janeiro. Brasil.
17. Bull. Acad. Sci. (Izvestia Akad. nauk) U S S R (S. biol.).
18. Bulletin of the Brooklyn Entomological Society. New York.
19. Bulletin of Entomological Research. London.
20. Bulletin of the Museum of Comparative Zoology. Cambridge, Mass.
21. Bulletin of the Southern California Acad. of Sciences. Los Angeles.
22. C. r. Acad. Sci. (Doklady Akad. nauk) U S S R. Leningrad.
23. Canadian Entomologist. Guelph, Canada.
24. Canadian Journal of Research. Ottawa, Canada.
25. Ecological Monographs. Durham, North Carolina.
26. Ecology. Durham, North Carolina.
27. Entomologica Americana. Brooklyn Ent. Society, New York.
28. Entomological Monthly Magazine. London.
29. Entomological Record and Journal of Variations. London.
30. The Entomologist. London.
31. Florida Entomologist. Gainesville, Florida.
32. Frontiers. Philadelphia, Pennsylvania.
33. Great Basin Naturalist. Provo, Utah.
34. Iowa State College Journal of Science. Ames, Iowa.
35. Journal of Agricultural Research. Washington, D. C.
36. Journal of Animal Ecology. London.
37. Journal of Economic Entomology. Geneva, New York.
38. Journal of the Elisha Mitchell Science Society. Chapel Hill, N. C.
39. Journal of Entomology and Zoology. Claremont, California.
40. Journal of Experimental Biology. London.
41. Journal of Experimental Zoology. Philadelphia, Pennsylvania.
42. Journal of Heredity. Baltimore, Maryland.
43. Journal of the Kansas Entomological Society. Lawrence, Kansas.
44. Journal of Morphology. Philadelphia, Pennsylvania.
45. Journal of the New York Entomological Society. New York.
46. Journal of Parasitology. New York.
47. Journal of the Tennessee Academy of Sciences. Nashville, Tenn.
48. Journal of the Washington Academy of Sciences. Washington, D. C.
49. Memorias do Instituto Oswaldo Cruz. Rio de Janeiro.
50. Microentomology. Stanford University, California.
51. The Microscope and Entomological Monthly. London.
52. Mosquito News. Albany, New York.
53. Nature. London.
54. Nature. Washington, D. C.
55. La Naturaliste Canadien. Quebec.
56. Natural History. New York.

57. Occasional Papers, Mus. of Zool., Univ. of Michigan. Ann Arbor.
58. Ohio Journal of Science. Columbus, Ohio.
59. Opinions and Declarations. Intern. Com. Zool. Nomencl. London.
60. Pan-Pacific Entomologist. San Francisco, California.
61. Parasitology. London.
62. Proceedings of the Academy of Natural Sciences. Philadelphia.
63. Proceedings of the Biological Society of Washington. Wash., D. C.
64. Proceedings of the California Academy of Science. San Francisco.
65. Proceedings of the Entom. Soc. of Washington. Washington, D. C.
66. Proceedings of the Hawaiian Entomological Society. Honolulu.
67. Proceedings of the National Acad. of Sciences. Washington, D. C.
68. Proceedings of the Royal Entomological Society of London. Ser. A.
69. Proceedings of the Royal Entomological Society of London. Ser. B.
70. Proceedings of the Royal Entomological Society of London. Ser. C.
71. Proceedings of the U. S. National Museum. Washington, D. C.
72. Proceedings of the Zoological Society of London. London.
73. Psyche, A Journal of Entomology. Boston, Massachusetts.
74. Quarterly Journal of Microscopical Science. London.
75. Quarterly Review of Biology. Baltimore, Maryland.
76. Revista Academia Columbiana de Cien Exact. Fis. y Nat. Bogotá.
77. Revista Chilena de Historia Natural. Valparaiso, Chile.
78. Revista Instituto Salubridad y Enfermedades Tropicales. Mexico.
79. Revista Sociedad Mexicana de Historia Natural. Mexico City.
80. Science. Washington, D. C.
81. Scientific Monthly. New York.
82. Smithsonian Miscellaneous Collections. Washington, D. C.
83. Transactions of the American Entomological Society. Philadelphia.
84. Transactions of the Amer. Micros. Soc. Menasha, Wisconsin.
85. Transactions of the Illinois State Academy of Sciences. Springfield.
86. Transactions of the Kansas Acad. of Sci. Manhattan, Kansas.
87. Transactions of the Royal Canadian Institute. Toronto.
88. Transactions of the Royal Entomological Society. London.
89. U. S. Dept. of Agric., Farmer's Bulletins. Washington, D. C.
90. U. S. Dept. of Agric., Technical Bulletins. Washington, D. C.
91. University of California Publications in Entomology. Berkeley.
92. University of California Publications in Zoology. Berkeley.
93. University of Kansas, Science Bulletins. Lawrence, Kansas.
94. Ward's Natural Science Bulletin. Rochester, New York.
95. Zoologica. New York.
96. American Journal of Public Health. Boston.
97. American Journal of Tropical Medicine. Baltimore.
98. Annals of Tropical Medicine and Parasitology. Liverpool.
99. Canadian Journal of Research. Section E, Medical Sciences, Ottawa.
100. Evolution. New York.
101. Mitteilungen der schweitzerischen entomologischen Gesellschaft, Bern.
102. Revue de Entomologie. Rio de Janeiro, Brasil.
103. Procedings of the Royal Society of London.
104. Anales de la Escuela Nacional de Ciencias Biologicas. Mexico.
105. Journal of Cellular and Comparative Physiology. Philadelphia.
106. Redia. Florence, Italy.
107. Annales de la Société Entomologique de France. Paris.
108. Bulletin de la Société Entomologique de France. Paris.
109. Notulae Naturae. Philadelphia.
110. L'Entomologiste. Paris.
111. Revista Brasiliera de Biologie. Rio de Janeiro.
112. Eos, Revista Española de Entomologia. Madrid.
113. Minist. de Agri. de la Nación, Inst. Sanidad Vegetal, Buenos Aires.

EXCHANGES

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

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

Bombidae, nearctic and neotropical, wanted for exchange, identification, or purchase. Will exchange in other groups for bumblebees. Barth Maina, Dept. Zool., Univ. of Chicago, Chicago 37, Ill.

Saturnidae of the world. Will purchase individual specimens or cocoons. F. E. Rutkowski, St. Bede College, Peru, Illinois, U. S. A.

Butterflies of New England, principally from New Haven, Conn., for exchange. Louis Clarke, 28 W. Elm St., New Haven 15, Conn.

Wanted—Proc. Ent. Soc. Phila., vols. 1-6; Proc. Cal. Acad. (Nat.) Sci., 1-7; Proc. Acad. Nat. Sci. Phila., 1-8; Trans. Amer. Ent. Soc., 1-5; Bull. Buff. Soc. Nat. Sci., 2-3; Psyche, 11, 13, 15. C. F. dos Passos, Mendham, N. J.

Miridae (Capsidae)—American species wanted, with locality labels, in exchange for British species. D. Leston, F.R.E.S., 6 Frognal Rise, London N. W. 3, England.

Wanted—Entomological microscope in good condition; Spencer, Bausch & Lomb, or other standard make. David G. Shappirio, 4811 17th St., N.W., Washington 11, D. C.

Coleoptera—Large quantities of Cicindelidae, Buprestidae, Lucanidae, Cerambycidae wanted in exchange for all families of Coleoptera from Ill., Ind. and Mo. Joseph B. Hayes, 1905 N. Pulaski Rd., Chicago 39, Ill.

American Sarcophagidae—wanted for identification. H. R. Dodge, 291 Peachtree Street, Atlanta 3, Georgia.

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ENTOMOLOGICAL NEWS

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

By Charles P. Alexander, University of Massachusetts, Amherst, Massachusetts

The preceding part under this general title was published in Entomological News 60: 39–45. At this time I am discussing some additional novelties that were collected by myself in various parts of California in 1947 and 1948. The types of these species are preserved in my personal collection of the Tipuloidea.

Pedicia (Tricyphona) bidentifera new species

Allied to *simplicistyla;* thorax uniformly light yellow, unpatterned; halteres and legs pale yellow; wings pale yellow, restrictedly patterned with pale brown; male hypopygium with the interbase appearing as a powerful flattened blade, at apex split into two subequal teeth, with a smaller spine or flange on the face at near midlength.

♂. Length about 12–13 mm.; wing 10–12 mm.

Rostrum yellow; palpi brownish black. Antennae short, yellow throughout. Head light yellow.

Thorax uniformly light yellow, unpatterned. Halteres and legs pale yellow, the outer two tarsal segments darkened. Wings with the ground pale yellowish subhyaline, restrictedly patterned with darker, including the pale brown costal border that extends to the wing tip; further slightly darker spots along the cord, origin of *Rs,* outer end of cell *1st* M_2 and over vein R_2 and the supernumerary crossvein beneath it; veins yellow, including those in the darkened areas. Venation: Radial field variable, R_{2+3+4} being present to virtually lacking, in the latter case cell R_3 subsessile; a supernumerary crossvein in cell R_3, virtually in alignment with vein R_2; *m* at or before the fork of M_{1+2}.

Abdomen with the tergites brownish yellow, paler laterally; sternites and hypopygium light yellow, the outer ends of the appendages of the latter darker. Male hypopygium with the caudal border of the ninth tergite very gently emarginate, the edge and the low lobes densely setuliferous. Basistyle extended into a stout lobe, the apex of which is densely set with pale brown spinous setae and a few longer pale setae, the latter more numerous on the mesal face, on the proximal end forming a tuft of long yellow setae; interbase appearing as a powerful flattened blade, at apex split into two subequal teeth, with a smaller spine or flange on the face at near midlength; surface of interbase with microscopic appressed setulae. Dististyle simple, longer than the apical lobe of the basistyle, constricted on outer margin at near midlength, the apex narrowly obtuse. Phallosome with the apophyses separated from the longer dark-colored aedeagus.

Habitat. CALIFORNIA. *Holotype:* ♂, Hatchet Pass, Burney, altitude 4,200 feet, July 9, 1947 (C. P. Alexander). *Paratopotypes:* 1 ♂, with the type; 5 ♂♂, August 12, 1948 (C. P. Alexander).

While generally similar to *Pedicia* (*Tricyphona*) *simplicistyla* Alexander, the present fly is quite distinct in the structure of the male hypopygium, particularly of the interbase.

Dicranota (Rhaphidolabis) tehama new species

Thorax brownish gray, the praescutum with three darker brown stripes; legs black, the femoral bases narrowly obscure yellow; wings with a grayish tinge, the stigmal area scarcely differentiated; *Sc* moderately long, Sc_1 ending approximately opposite the fork of *Rs; r–m* approximately one-half its own length before the fork of *Rs*, R_{2+3} perpendicular at origin; *m–cu* at or close to fork of *M*; cell *2nd A* relatively long and narrow.

♀. Length about 7 mm.; wing 5.2 mm.

Rostrum short, brownish gray; palpi black. Antennae black throughout; flagellar segments short-oval. Head grayish brown.

Pronotum dark brownish gray. Mesonotal praescutum brownish gray, with three darker brown stripes; posterior sclerites of notum and the pleura dark gray; dorsopleural membrane dark buff color. Halteres with stem white, knob slightly more infuscated. Legs with the coxae gray; trochanters brownish gray; remainder of legs black, the femoral bases narrowly obscure yellow. Wings with a grayish tinge, the prearcular field narrowly yellow; stigmal area scarcely differentiated; veins pale brown. Venation: *Sc* moderately long, Sc_1 ending about opposite to shortly beyond the fork of *Rs*, Sc_2 at near three-fifths the length of *R* beyond the arculus; *Rs* strongly arcuated, with *r–m* from one-third to about two-thirds its own length before the fork; R_{2+3+4} subequal to the distal section of *Rs*; R_{2+3} perpendicular at origin; R_{1+2} subequal to or shorter than R_2; cell M_1 shorter than M_3; *m–u* at or close to fork of *M*; cell *2nd A* relatively long and narrow.

Abdomen elongate; tergites brown, sternites somewhat lighter; cerci elongate, horn-yellow.

Habitat. CALIFORNIA. *Holotype:* ♀, Kings Creek Meadows, Lassen Volcanic National Park, altitude 7,500 feet, July 6, 1947 (C. P. Alexander).

The most similar described regional species are *Dicranota* (*Rhaphidolabis*) *nooksackensis* Alexander and *D.* (*R.*) *nuptialis* Alexander, both of which differ conspicuously in the venation, especially of the radial and medial fields, and in the broad cell *2nd A*. The specific name, *tehama*, is that of an ancient mountain some three miles southwest of Lassen Peak, its remnants persisting as Brokeoff Mountain, Mount Diller and other parts of the former rim of the caldera.

Ormosia (Ormosia) tahoensis new species

Belongs to the *similis* group; general coloration of thorax dark brownish gray; antennae (male) of moderate length, being approximately one-fourth the length of the wing; wings with cell M_2 open by the atrophy of the basal section of M_3; male hypopygium with the phallosome very complex, especially the outer apophyses which are branched to an exceptional degree.

♂. Length about 5 mm.; wing 5.7–5.8 mm.; antenna about 1.3–1.4 mm.

Rostrum gray pruinose; palpi black. Antennae (male) of moderate length, black throughout; flagellar segments subcylindrical or slightly produced on lower face, provided with a dense erect white pubescence; verticils of basal segments long, much exceeding the segments, becoming shorter on the outer ones, small and delicate on the outer two or three. Head brownish gray.

Thorax almost uniformly dark brownish gray, the pretergites obscure yellow; lateral praescutal borders and region of the wing root obscure yellowish brown; pseudosutural foveae black. Halteres with stem weakly infuscated, the apex of knob vaguely more brightened. Legs with the coxae obscure yellow, the fore pair darker; trochanters yellow; remainder of legs brown, the femoral bases yellow. Wings with a weak brownish tinge, the stigmal region infuscated; outer part of cell *C* less evidently darkened; wing base restrictedly yellow; veins brown, yellow in the prearcular field. Venation: Cell M_2 open by the atrophy of the basal section of M_3; *m–cu* at or close to fork of *M*; vein *2nd A* sinuous on outer third.

Abdomen, including hypopygium, brownish black. Male hypopygium with the appendage of the ninth tergite nearly parallel-sided, the apex subtruncate, only weakly notched medially; lobes with fimbriations unusually short. Outer dististyle dilated outwardly, the broad apex truncated, the outer apical angle more produced; surface of style with rows of appressed blackened points, as in the group. Inner dististyle a slender straight rod, on outer margin at near midlength with a small blackened knob, beyond which the style is dilated into a slightly more widened blade, the tip a short point. Phallosome very complex; inner apophyses appearing as flattened blades, the outer margin near apex produced laterad into a point; outer apophyses unusually branched, including an inner axial spine and a longer outer lateral one that bears two sharp spurs, one on the upper surface, the other on the lower margin; nearer the base of the main axis with a further strong arm that is extended into two very unequal spines.

Habitat. CALIFORNIA. *Holotype:* ♂, Truckee River, along small spring-fed rill near Deep Creek, Placer Co., 5,950 feet, July 2, 1947 (C. P. Alexander). Paratopotype: 1 ♂, July 1, 1947.

While generally similar to species such as *Ormosia* (*Ormosia*) *meigenii* (Osten Sacken), the present fly is very distinct in the structure of the male hypopygium, particularly the unusually complicated phallosome.

Ormosia (Ormosia) burneyensis new species

Belongs to the *similis* group; mesonotum dark reddish brown, the pleura more yellowed; antennae (male) elongate, exceeding one-half the length of wing, the flagellar segments nodulose, the basal swellings of the individual segments long-fusiform; cell M_2 open by the atrophy of the basal section of M_3; male hypopygium with the mesal margin of the basistyle produced into a blackened bispinous structure; phallosome on either side of aedeagus produced into two spines, the outer one small.

♂. Length about 4–4.5 mm.; wing 4.5–5.4 mm.; antenna about 3–3.2 mm.

Rostrum and palpi brown. Antennae (male) elongate, exceeding one-half the wing; scape and pedicel yellow, flagellum dark brown; flagellar segments long-fusiform, the basal swellings conspicuous, provided with dense whorls of long pale setae that exceed the segments in length and are considerably longer than the dark verticils. Head dark brown.

Pronotum brown, the pretergites whitened. Mesonotum dark reddish brown; pseudosutural foveae reddish; pleura more yellowed. Halteres pale. Legs with the coxae and trochanters yellow; remainder of legs brownish yellow, the outer tarsal segments slightly darker. Wings with a weak brownish tinge, the stigmal region slightly darker, the prearcular field more yellowed; veins brown, yellow at the wing base. Venation: Cell M_2 open by the atrophy of the basal section of M_3; *m–cu* at fork of *M;* vein *2nd A* sinuous on distal third.

Abdomen, including hypopygium, dark brown. Male hypopygium with the appendage of the ninth tergite unusually wide, the apical emargination very broad and shallow, the lateral lobes correspondingly stout and obtuse, with long pale fimbriations. Outer dististyle with the rows of scabrous points reduced, more or less restricted to the outer fourth. Inner dististyle a little longer, the apex obtuse, weakly darkened. Basistyle on mesal margin produced into a blackened bispinous structure, the lower spine smooth, the outer or axial one stouter, bladelike, the outer margin and apex microscopically serrulate. Phallosome stout, abruptly narrowed into the aedeagus, at point of narrowing each outer lateral angle produced into two spines, the outer one small, the inner long and straight, decussate across the midline.

Habitat. California. *Holotype:* ♂, Hatchet Pass, Burney, altitude 4,200 feet, July 9, 1947 (C. P. Alexander). *Paratopotype:* ♂. *Paratypes:* ♂♀, Castle Crags State Park, Shasta Co., altitude 2,050 feet, August 13, 1948 (C. P. Alexander).

The most similar regional species is *Ormosia* (*Ormosia*) *heptacantha* Alexander, which differs most evidently in the structure of the male hypopygium, as described.

Ormosia (Ormosia) pernodosa new species.

Allied to *albertensis;* general coloration of mesonotum reddish brown, the pleura clearer yellow; antennae of male elongate, exceeding one-half the length of body; flagellar segments very strongly nodose, with long erect pale setae on the enlarged part, with approximately the outer half of the segment glabrous; Anal veins divergent.

♂. Length about 3.5–3.6 mm.; wing 4–4.2 mm.; antenna about 2 mm.

♀. Length about 4–5 mm.; wing 4.5–5.5 mm.

Rostrum yellow; palpi black. Antennae (male) long, exceeding one-half the body; scape obscure yellow, the remaining segments brownish black; flagellar segments unusually nodose, each with a major basal enlargement that is provided with long outspreading setae, additional to a single even longer verticil; longest ordinary seta about as long as the segment; verticils approximately one-third to one-half longer than the segment; distal half or less of segment narrowed, glabrous. In *albertensis,* the segments are fully as long but are narrower basally and not so strongly nodose, with the ordinary setae shorter and distributed over the entire segment with the exception of the outer fifth or sixth. Head infuscated on vertex, the front and orbits yellow.

Pronotum and pretergites yellow. Mesonotum reddish brown, the lateral praescutal borders yellow. Pleura and pleurotergite clearer yellow. Halteres infuscated. Legs with the coxae and trochanters yellow, remainder of legs dark brown. Wings with a brownish tinge, the stigmal region somewhat more infuscated, the basal portions a trifle more yellowed; veins brown. Venation: Sc_1 ending shortly beyond R_2, Sc_2 at about one-third the length of *Rs;* cell M_2 open by the atrophy of the basal section of M_3; *m–cu* close to fork of *M;* anal veins divergent.

Abdominal tergites dark brown, the sternites in male more yellowed; genitalia of both sexes yellow. Male hypopygium about as in *albertensis* or *onerosa.*

Habitat. California. *Holotype:* ♂, Truckee River, along small spring-fed rill near Deep Creek, Placer Co., 5,950 feet, June 30, 1947 (C. P. Alexander). *Paratopotypes,* ♂♂; paratypes, ♂♀, Upper Echo Lake, near Freeborn Cabins, 7,500 feet, July 4, 1947 (C. P. Alexander).

The various species that center about *Ormosia (Ormosia) mesocera* Alexander, including besides the latter, *O. (O.) albertensis* Alexander, *O. (O.) onerosa* Alexander and the present fly, are all closely inter-allied, as well shown by the very uniform structure of the male hypopygium. However there are well marked differences in the structure of the antennae, ranging from the short inconspicuous structures of *onerosa* to the condition found in the present fly. The most nearly allied species is *albertensis* where the basal swellings of the flagellar segments are much less developed, as described above.

First Record of Adult Mountain Midges from North America. (Diptera: Deuterophlebiidae)*

By Robert W. Pennak, Department of Biology, University of Colorado

Although the larval and pupal stages of mountain midges have been collected from the substrates of rapid streams in Colorado, Utah, Wyoming, Oregon, and California (probably all *Deuterophlebia coloradensis* Pennak), the imagoes have not heretofore been recorded from North America. Of the several Asiatic and Japanese species, the imagoes of only three have been briefly described.

At 8:00 A.M. on July 19, 1948, however, the writer was fortunate enough to collect about 200 dying, dead, and disintegrating adult males and 2 adult female *D. coloradensis* floating in small side eddies of North St. Vrain Creek near the town of Lyons, Colorado, at an altitude of 5320 feet. Many larvae and pupae had previously been collected from this foothills stream.

Although the streamsides in the area and farther upstream were examined carefully, not a single adult specimen could be found on the vegetation, on the rocks, or in the abundant cobwebs. This fact strengthens the contention of other investigators that mountain midges are poor fliers that cannot do more than flutter about weakly and briefly above the water after emergence. They soon fall to the surface of the water and die. Late morning and afternoon collections from North St. Vrain Creek have never yielded imagoes, and it appears probable that they emerge only in the early morning hours. Nothing is known about their copulation and oviposition habits.

Detailed descriptions of the adult male and female are in preparation.

* Contribution No. 16, Limnology Laboratory, Dept. of Biology, University of Colorado.

Two New Polydesmoid Diplopods

By Nell Bevel Causey, University of Arkansas, Fayetteville, Arkansas

Type specimens of the species described in this paper have been deposited in the collection of the Academy of Natural Sciences of Philadelphia. The collections were made by the author.

Euryuridae

Auturus florus n. sp. Figs. 1 and 2.

This species is close to *A. mimetes* in size, coloration, and the general shape of the gonopods. It differs from *A. mimetes* in that the lamina ectad of the hooked blade of the gonopods is roughly pointed rather than rounded.

The color of adult specimens is dark grey with orange keels and median spots. Antennae, legs, and underparts are white.

The last tergite is roughly quadrilateral with the caudal margin slightly convex and the sides subparallel. The keels of the 18th and 19th tergites are rounded; posterior corners of the preceding tergites are a little acute. The keels are thickened on the edges, with the pore lateral and about midway, its site marked by a slight swelling or sometimes by a slight excavation. The usual small tooth is just posterior to the anterior corner of the keels.

The gonopods *in situ* hang down, directed slightly forward, with the amber colored ends overlapping. Distally they are flattened with the edges forming a rough trough open medially and terminally. The distal margin has a thin rounded hooked process medially and a longer rough peak laterally. The distal one-fifth of the gonopods is glabrous and of a bright amber color; the remainder is the usual cream color and the surface is setose, thickly so on the medial and ventral surfaces.

Length of male holotype 29.5 mm., width 3.4 mm. Length of female allotype 30 mm., width 4 mm.

Locality. Arkansas: Hemmed-in-Hollow, Compton, Newton County, July 13, 1940. In the collection there were three males, four females, 15 larvae of the 7th stadium and six of the 6th stadium. Others have been taken at Pyatt in Marion County and at several places in Washington County.

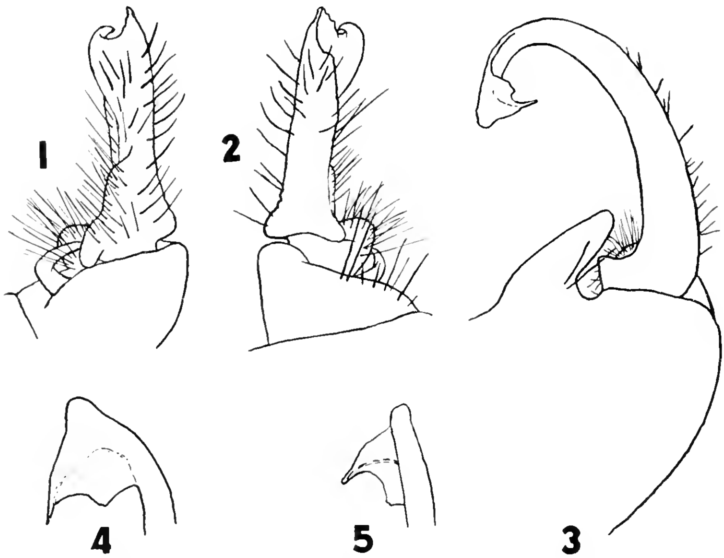

FIG. 1. *Arturus florus* n. sp. Left gonopod of male holotype, caudal view, × 28.
FIG. 2. Same, cephalic view, × 28.
FIG. 3. *Deltotaria tela* n. sp. Left gonopod of male holotype, subcephalic view, × 28.
FIG. 4. Right gonopod of male holotype, distal end of blade, cephalic view, × 55.
FIG. 5. Same, subcaudal view, × 55.

XYSTODESMIDAE

Deltotaria tela n. sp. Figs. 3, 4, and 5

This species resembles *D. brimleii*, but it can be distinguished by the differences in the thin expanded end of the gonopods. See figs. 3, 4, and 5. The gonopods of the male paratype showed great similarity to those of the holotype at low power magnification, but at medium power the differences were very noticeable.

The preserved specimens are brown, and the light colored keels are confluent with wide bands of color across the posterior margins of the tergites.

The dorsum is moderately arched. The keels are wide, slightly overlapping; their margins are thickened, and the pores are on the upper surface behind the middle. The head and first three segments are much narrower relatively than in most of the other broad flat members of this family. Posterior coxae are sharply spined; sternites are unarmed in the male, but very bluntly spined in the female.

Length of male holotype 36 mm., width 8.2 mm., width of collum 5.6 mm. Length of male paratype 32 mm., width 8 mm., width of collum 5.5 mm. Length of female allotype 38 mm., width 10.2 mm., width of collum 6.5 mm. Another mature female in the collection tentatively assigned to the species has the following dimensions: length 34 mm., width 7 mm., width of collum 5 mm.

Locality. NORTH CAROLINA: Bent Creek Forest Experiment Station. April 30, 1939.

Subventral Tubercles of Saturnioid Larvae—A Supplementary Note

By EUGENE G. MUNROE, Institute of Parasitology, Macdonald College, Quebec

Since the appearance of my recent remarks on this subject I have received two very interesting papers (Travassos and d'Almeida, 1937; Travassos, 1946), which help to fill an important gap in the data then available to me. These papers contain very full descriptions of the larvae of several species of Neotropical Saturnioidea, including those of three species of Agliinae: *Dysdaemonia tamerlan* Maassen & Weymer, *Machaerosema martii* (Perty), and *Copiopteryx semiramis* (Cramer). In all three species the subventral tubercles seem to be lacking in the first and all subsequent instars. A possible exception is in the early instars of *Dysdaemonia,* in which there is said to be a transverse row of prothoracic spines approximated to the head; this may be compared with Packard's (1914:9) description of the first instar larva of *Arsenura richardsoni,* in which there are said to be two subspiracular pairs of tubercles on the prothoracic segment. In both cases a further study of the homologies is desirable.

The remarkable dorsal armature of the young larvae strongly suggests an affinity with the Citheroniinae, and this relationship has been accepted by most recent authors. The similarity to the larva of *Aglia* is very close, and the subfamily is probably a natural one. If this is so, its geographical distribution forms a remarkable parallel to that of the Dismorphiinae, with a restricted and probably primitive genus in the Palearctic region, and a relatively diverse assemblage of strikingly specialized forms in tropical America. The larvae of the Agliinae must be considered more specialized than those of the Citheroniinae not only in the complete suppression of the armature in the final instar but also in the absence of the subventral and ventrolateral rows of tubercles in the earlier stages of development.

In the paper by Travassos and d'Almeida some further Saturnioid larvae are described. *Citheronia phoronea* (Cramer) and *Syssphinx molina* (Stoll) lack the subventral tubercles on all segments in the final instar. The more dorsal series are also considerably reduced in *S. molina,* but in *C. phoronea* these seem to be entirely normal. These two species would thus differ from the Citheroniinae listed in my table.

Two Hemileucinae agree well with those already listed: *Automeris acuminata* Maassen & Weymer has subventral tubercles on thoracic segments 1 to 3 and abdominal 1, 2, and 7 to 9; *Dirphia multicolor* Walker has them on thoracic 1 to 3 and abdominal 1, 2, 7, *and* 9. Both species are described from the fifth (final) instar.

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A New Grass Aphid from Utah

By G. F. KNOWLTON and L. L. HALL
Utah State Agricultural College, Logan

The writers are indebted to Professor M. A. Palmer for calling attention to this apparently undescribed aphid. At times this species has been found to be moderately abundant in meadows where collected.

Thripsaphis utahensis n. sp.

Apterous vivipara: Body color orange to yellowish orange; body 1.9 to 2.03 mm. long; width of abdomen .69 to .725 mm. Frontal tubercles lacking; wart like projection on vertex .05 mm. long; antennae 1.2 to 1.3 mm. long, pale; antennal III, .33 to .36 mm. long, without sensoria; IV, .173 to .206 mm. long; V, .206 to .25; VI, .138 to .14 plus .121 to .138 mm.; unguis shorter than base of VI; ocular tubercles absent; hind tibiae .55 to .65 mm. long and swollen distally; hind tarsi .138 to .155 mm. long; cornicles mere rings; cauda knobbed; anal plate bilobed; the eighth abdominal tergite almost covering cauda.

Alate vivipara: Body orange with dusky lateral areas having a somewhat beaded effect, 1.47 to 1.68 mm. long and .57 wide across the abdomen; vertex very prominent, equaling at least distal end of antennal I; antennae dusky; antennal III, .38 to .43 mm. long and with 7 to 9 circular sensoria; IV, .206 to .26; V, .2 to .258; VI, .138 plus .121 mm. long; rostral IV + V, .086 long, obtuse; wing veins dusky; legs dusky to blackish; hind tibiae .65 to .69, thickened at distal end; tarsi .12 to .13; cornicles pore-like with distinct rim; cauda dusky, knobbed, .21 long, with distal portion somewhat quadrangular; anal plate bilobed.

Collection data: Collected in meadow sweeps made west of Brigham City, May 24, 1945, and Logan meadows, October 15, 1943; Corinne, July 10, 1935; Strawberry Reservoir, July 25, 1945; Devil's Slide, July 24, 1945, in Utah. All material was collected by G. F. Knowlton. Type in the U. S. National Museum; paratypes in the collection of the senior writer.

Taxonomy: *Thripsaphis utahensis* n. sp. aptera differ from *T. verrucosa* Gill. in being orange instead of greenish yellow, and in lacking sensoria on antennal III.

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1949 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

Papers published in ENTOMOLOGICAL NEWS are not listed.

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Review

MEDICAL ENTOMOLOGY, Second Edition; by Robert Matheson; Comstock Publishing Company, Inc., Ithaca, New York; January 1950; 612 pp., ill.; $7.50.

Medical Entomology is an anomalous science which as usually defined includes within its boundaries at least portions of several other sciences, and is a subject on which it is practically impossible to obtain all of the necessary correlated information. Professor Matheson with his long teaching experience has developed, in at least certain portions of the science, the insight which is essential to those working or interested in the field, and much of this has been made available in the present work.

This, the second edition of the book, is completely rewritten following the form of the original edition and includes numerous additional illustrations. Progress in the field is so rapid that any book of this kind is naturally behind the most recent discoveries. This has been duly noted by the author who states that he has attempted to bring together the data available by the end of 1948, a statement which should prove helpful to those desiring to check for the most recent developments. This available information is scattered in such a variety of journals, mainly medical and entomological, but also in those covering more general fields, as well as in separate works, special reports, bulletins and government publications in many different languages that it is a tremendous undertaking to try to bring together the more important facts so that they may be presented in a single volume. A number of the aspects covered in the book are themselves the subject of large separate studies or of well established serial publications.

The present volume deals with the subject from the entomologists' aspect of the problems involved, leaving almost all of the effect on humans to the medical profession. Such parasitology as is included is only that necessary to understand the transmission of pathogens.

Particularly stressed is the taxonomy and morphology of those insects, and certain related groups of arthropods, which either affect man directly by their habits or which act as vectors or carriers of organisms pathogenic for man. Sufficient morphology is discussed, particularly under the various major groups, to give one a general picture of the group, to use the keys presented and to understand the mode of transmission of pathogens. This latter, of course, necessitates in almost all cases a good working knowledge of the morphology and mode of action of the mouthparts and digestive system. In most cases keys are given to separate at least the more important forms that occur in North America. Some of these keys are not strictly dichotomous and it is believed that this may cause some confusion for persons not moderately well acquainted with insect taxonomy. Although in most cases structures mentioned in the text are well illustrated, a short glossary would be helpful to many of those for whom the volume is intended.

General life history information and bionomics are discussed under each major group and then, in most cases, additional more detailed information concerning the more important forms is presented. This style of treatment is used for those found in North America and in some groups for those of equal or of greater importance in other portions of the world. Following this is a section on the relation of the forms discussed to diseases. Most of the major diseases involved are treated in a short summary of the methods of transmission; the known or suspected vectors, reservoirs and hosts are also listed. It is in the information included under bionomics and the relation to disease that so much has been accomplished in recent years. In these sections the author and year are often cited in relation to findings or conclusions but unfortunately in some cases it is not possible to find the complete reference in the bibliographies. This omission will cause some inconvenience to those with libraries available but places those without extensive bibliographic facilities at a distinct disadvantage.

All of the chapters have selected bibliographies as it would be impossible to make any attempt at completeness in a work of this size. This selection appears to be moderately well balanced but does have the limitation above noted, as well as that of including some references that could readily be omitted.

This book is in an easily readable form but unfortunately a number of editorial lapses are noted. In addition the continuity occasionally is not what might be desired. All in all it is a worthwhile addition to the field of Medical Entomology and should prove to be of value to most of those interested in any way in this field.—J. W. H. Rehn.

EXCHANGES

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

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

Bombidae, nearctic and neotropical, wanted for exchange, identification, or purchase. Will exchange in other groups for bumblebees. Barth Maina, Dept. Zool., Univ. of Chicago, Chicago 37, Ill.

Saturnidae of the world. Will purchase individual specimens or cocoons. F. E. Rutkowski, St. Bede College, Peru, Illinois, U. S. A.

Butterflies of New England, principally from New Haven, Conn., for exchange. Louis Clarke, 28 W. Elm St., New Haven 15, Conn.

Wanted—Proc. Ent. Soc. Phila., vols. 1-6; Proc. Cal. Acad. (Nat.) Sci., 1-7; Proc. Acad. Nat. Sci. Phila., 1-8; Trans. Amer. Ent. Soc., 1-5; Bull. Buff. Soc. Nat. Sci., 2-3; Psyche, 11, 13, 15. C. F. dos Passos, Mendham, N. J.

Miridae (Capsidae)—American species wanted, with locality labels, in exchange for British species. D. Leston, F.R.E.S., 6 Frognal Rise, London N. W. 3, England.

Wanted—Entomological microscope in good condition; Spencer, Bausch & Lomb, or other standard make. David G. Shappirio, 4811 17th St., N.W., Washington 11, D. C.

Coleoptera—Large quantities of Cicindelidae, Buprestidae, Lucanidae, Cerambycidae wanted in exchange for all families of Coleoptera from Ill., Ind. and Mo. Joseph B. Hayes, 1905 N. Pulaski Rd., Chicago 39, Ill.

American Sarcophagidae—wanted for identification. H. R. Dodge, 291 Peachtree Street, Atlanta 3, Georgia.

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ENTOMOLOGICAL NEWS

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Ceratomia kansensis new species (Sphingidae)

By Edwin W. Howe and William H. Howe, Ottawa, Kansas

Ceratomia kansensis new species

Ceratomia kansensis offers many analogies to *C. catalpae* Bdv., but some major differences. While differing markedly from *C. undulosa* Wlk., in some respects it more closely resembles this species than it does *C. catalpae*.

The general coloration of the upper side of the wings of both sexes of *C. kansensis* is somewhat similar to that of *C. catalpae*, being a greyish-brown rather than shades of brown. Distinct markings are noticeably absent from the upper surface of both wings of *C. kansensis*, the dark lines found near the apex of the fore-wing of *C. catalpae* being so greatly reduced in the new species as to be vestigial. The under surface of both wings of both sexes of *C. kansensis* is lacking in distinct markings of any sort.

The white fringe spots found along the outer margins of both fore- and hind-wings in both *C. catalpae* and *C. undulosa* are completely lacking in the male of *C. kansensis* in both wings, are lacking in the fore-wing of the female and vestigial in the hind wing of the female *C. kansensis*.

While the general appearance of *C. kansensis* is rather similar to that of *C. catalpae* the shape of the wings is quite similar to that found in *C. undulosa*. The fore-wing in both sexes of *C. kansensis* has the costal margin rather strongly convex, and the inner margin decidedly sinuate. We figure the wings of *C. undulosa*, *C. catalpae* and *C. kansensis* to show this. It will also be noted that the costal margin of the hind wing of *C. kansensis* is decidedly convex. This is true in both sexes.

Fig. 1. *Ceratomia kansensis* n.sp., male.

C. kansensis agrees with Rothschild and Jordans' description of *C. catalpae* in the following respects:

In both sexes of *C. kansensis,* the first segment of the fore-tarsus is slightly longer than the second.

The terminal spur of the hind tibia (both sexes) is less than two-thirds the length of the first tarsal segment.

Collar not edged with buff.

In both sexes of *C. kansensis,* the yellowish area on the metanotum is not distinct, thus agreeing with northern specimens of *C. catalpae.*

C. kansensis differs from *C. catalpae* not only in the shape of the wings, but the stigma is much smaller and is nearly round.

All wing markings are less distinct than in *C. catalpae*. This is particularly true of the underside of the wings, which are devoid of any distinct markings, though a faint band does appear along the basal side of the hind wing in both sexes.

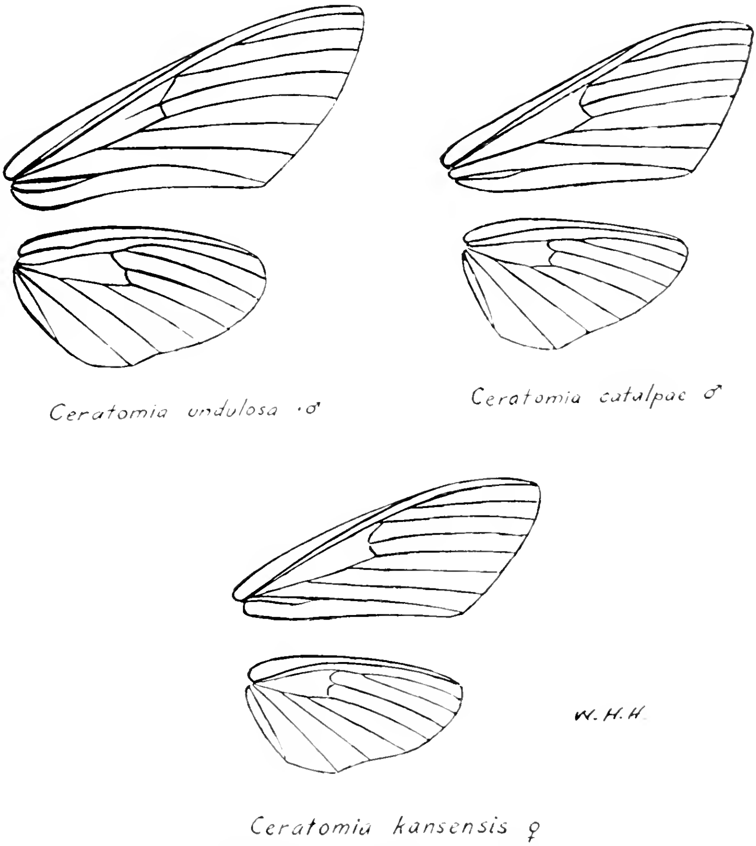


FIG. 2. Wing venation of *Ceratomia undulosa*, *C. catalpae* and *C. kansensis*.

Male: agrees with the description by Rothschild and Jordan of *C. catalpae*—"tenth abdominal segment not quite symmetrical—the asymmetry not conspicuous—tergite less dilated vertically before end than in *C. undulosa;* sternite shorter, the lobe broader than long, sinuate, the right half truncate, the left rounded. Clasper small, narrow, broadest just before end; harpe short, broad almost oblong, upper margin slanting, dentate." Penis sheath with only a moderately long, horizontally curved apical tooth.

Female: the vaginal plate closely resembles that of *C. catalpae.*

Drawings of the wing shape and venation are included for *C. undulosa, C. catalpae* and *C. kansensis* for comparison. The affinities of *C. kansensis* are clearly closest to *C. catalpae,* in general; but the shape of the wings more closely resembles *C. undulosa.*

C. kansensis is known to the describers only from Kansas, but is rare here. We know of only two males and one female so far collected in Kansas. One male was taken at Ottawa, KANSAS, on August 2nd, 1947. A second male was taken at Ottawa, KANSAS, on August 27, 1947. One female was taken at Baldwin Junction, KANSAS, on August 21, 1949. All three specimens were collected after dark and at lights.

The food plant of the larvae, the larvae themselves, and the species distribution are unknown to the describers.

All three specimens listed above were used in making the description. One male, the *type,* is in the collection of the describers at Ottawa, Kansas. The second male, the *paratype,* is in the collection of James Hoffman, Ottawa, Kansas. The female, the *allotype,* is in the collection of Margaret M. Cary, Philadelphia, Pa.

A New Subspecies of Speyeria atlantis (Edwards) from Nevada (Lepidoptera: Nymphalidae)

By Arthur H. Moeck, Milwaukee 7, Wisconsin

Speyeria atlantis greyi, new subspecies

The subspecies of *Speyeria atlantis* (Edwards) (1863, p. 54), described below, was first obtained by the author in 1946, while collecting at high altitudes in the East Humboldt Range, near Wells, Elko County, Nevada. A return trip in 1948 yielded no further specimens, but a week's sojourn in the area in 1949 yielded sufficient material to indicate that this isolated strain is constant, and rather sharply distinct from *atlantis* subspecies hitherto mentioned in the literature.

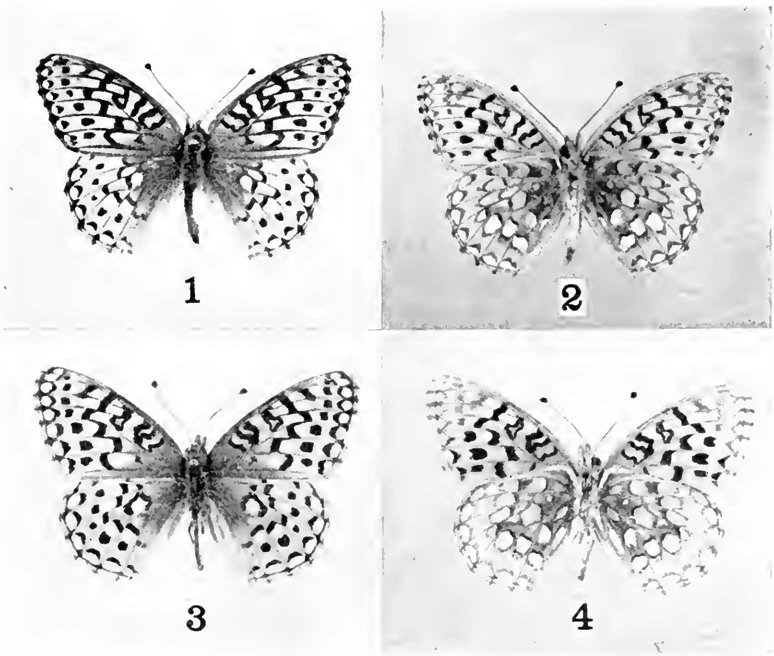
Above, both sexes have the light reddish buff ground color found in the Great Basin *Speyeria*, similar to *atlantis chitone* (Edwards) (1879, p. 82) and *atlantis wasatchia* (dos Passos and Grey) (1945, p. 9), rather than the ruddy hue of Rocky Mountain subspecies such as *atlantis hesperis* (Edwards) (1864, p. 502). The dark pattern markings are reduced, and for *atlantis*, as Grey who checked the genitalia points out, most remarkably subdued. The subspecies *wasatchia* and *chitone* usually are thought of as presenting the extreme of *atlantis* variation toward pallidity, but in both of those Utah races the dark pattern marks are relatively bolder and the basal suffusion more evident than in this Nevada *greyi*.

Below, the color of the discal area of the secondaries is pale brown with dusting of greenish silver overlay, the spots often being edged lightly with pale olivaceous green. In no specimens examined were there any individuals approaching in discal variability to the light brick or sordid red coloration characteristic in other Southwestern *atlantis* populations. This absence of red hues, and the presence of light brown shades similar to those seen in *zerene platina* (Skinner) (1897, p. 154), is a color departure apparently new to observed tendencies of *atlantis* variations. The spots are well silvered; the band is pale straw, usually sharply defined.

Expanse: Small, of a size with the Sierran *atlantis irene* (Boisduval) (1869, p. 601). Holotype, 56 mm., allotype, 58 mm., measured from wing-tip to center of thorax, doubled. The 15 male paratypes showed a size variation from 52 mm. to 58 mm.; the 6 female paratypes a range from 54 mm. to 62 mm., measured as mentioned above.

Type Material: The *holotype* male was taken by the author in Lamoille Canyon, Ruby Mountains, Elko County, NEVADA, on July 24, 1949, at an elevation of about 8,500 feet. The *allotype* female was taken in the same valley on July 27, at an elevation nearer 8,000 feet. There are 21 paratypes, as follows: 10 males and 3 females taken in, near, or above Lamoille Canyon, ranging in elevation from 7,000 to 10,000 feet; 4 males and 3 females taken along the snow of glaciers, close to 10,000 feet, above Angel Lake, East Humboldt Range, Elko County, Nevada, on July 29, 1946; and 1 male at the Angel Lake area on July 29, 1949. It may be of interest that the largest female (62 mm.) was the only specimen of the 23 taken near the 7,000 feet mark, if not actually below, and that the smallest female (54 mm.) was perhaps the only specimen taken at over 10,000 feet. The majority were taken at an elevation of about 8,500 feet. Of the total specimens taken, namely 23, only 7 males and 4 females, or a total of 11, are in good or fair condition, the rest being taken in various degrees of "worn condition."

Remarks: The significance of the departure in coloration of this *atlantis* is interesting, and remains to be evaluated. Our *greyi,* an extreme in atlantis pallidity, was flying sympatrically with an extremely pale *zerene* form identified as *cynna* (dos Passos and Grey) (1945, pp. 4–5), which latter was taken in goodly numbers. As no other *atlantis* forms have so far come to light from among material collected by the author on a dozen mountain "islands" across Nevada, between the Utah border and Lake Tahoe in California, it may well be that *greyi* is deeply isolated, as the distinctive color development would suggest. The author is the process of persuading L. P. Grey to evaluate this mass of material collected across the Great Basin, from the "Mesa" in Colorado to "Tahoe" in the west, with the hope that such an analysis might add to recorded knowledge of *Speyeria* variation. The dos Passos and Grey *Catalogue of Speyeria* (1947, pp. 1–30) has been used as a guide to nomenclature and subspecific relationships. And finally, the author is deeply in-



SPEYERIA ATLANTIS GREYI, new subspecies

1. Holotype ♂ 2. Holotype ♂, underside
3. Allotype ♀ 4. Allotype ♀, underside

debted to Grey, not only for his evaluations and determinations of much of the material mentioned, but equally so for his fascinating correspondence, which has served for a number of seasons as an irresistible challenge to steer yours truly into ever stranger highways and byways in search of the "missing links." The author thus deems it a pleasure to name this new subspecies in his honor.

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A Key to the Genera of North American Blattaria, Including Established Adventives

By John W. H. Rehn[1]

The Blattaria of the United States and Canada are undoubtedly one of the better known groups of insects. This group has been treated comprehensively by Hebard, and studies of the larger genera have been published. However, no concise key to the genera has been prepared, that presented by Hebard being more involved than is necessary to separate the twenty-six known genera.

My thanks are given to Professor V. S. L. Pate of the Department of Entomology of Cornell University for his interest in the preparation of this work. In addition the key has been tested in course work at that institution and its then apparent weakness has, I hope, been removed.

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Key to the genera of North American Blattaria including established adventives

1. Ventral margins of all femora supplied with numerous spines..2
   Ventral margins of femora unarmed, with only a few distal spines, or posterior femora only armed with spines....15
2. Ventro-anterior margin of anterior femora with a row of spines which either decrease gradually in size and length distad, or are of nearly equal length throughout........3
   Ventro-anterior margin of anterior femora with a row of heavy, proximal spines, succeeded by a row of more slender, shorter distal spines.......................10
3. Tegmina reduced or not, if the latter then with longitudinal discoidal (cubital) sectors extending to apex of tegmina..4
   Tegmina not reduced, discoidal (cubital) sectors oblique, extending to posterior margin of tegmina..*Supella* Shelford
4. Ventro-anterior margin of anterior femora with two heavy, distal spines..................................5
   Ventro-anterior margin of anterior femora with three heavy, distal spines..................................6
5. Wings with costal veins strongly clubbed distad...*Cariblatta* Hebard
   Wings with costal veins normal, not clubbed distad...*Symploce* Hebard
6. Tegmina and wings reduced or not, if the latter then the discoidal (cubital) sectors not angulate near base: antennae not densely hirsute basally...................7
   Tegmina and wings fully developed, discoidal (cubital) sectors strongly angulate near base: antennae densely hirsute basally....................*Pseudomops* Serville
7. Male with subgenital plate symmetrical; styles elongate, straight, slender symmetrical processes: female with subgenital plate valvate..............................8
   Male with subgenital plate strongly asymmetrical; styles relatively short and heavy, symmetrical or not; female with subgenital plate simple, not valvate..*Blattella* Caudell
8. Arolia present; size medium to large, over 24 mm........9
   Arolia absent; size medium, under 24 mm..*Blatta* Linnaeus
9. Tegmina represented by subquadrate pads, with inner (sutural) margins weakly overlapping......*Eurycotis* Stål
   Tegmina and wings fully developed, extending beyond apex of abdomen...............*Periplaneta* Burmeister

10. Four proximal tarsal articles each bearing a pulvillus....11
Fourth tarsal article only bearing a pulvillus...........14
11. Ventro-anterior margin of anterior femora with three distal spines.......................................12
Ventro-anterior margin of anterior femora with only one distal spine..............*Leurolestes* Rehn & Hebard
12. Tarsal claws symmetrical...........................13
Tarsal claws strongly asymmetrical....*Latiblattella* Hebard
13. Male with sixth dorsal abdominal segment bearing mesad, at specialization of sixth and seventh segments, two minute, chitinous projections armed dorso-distad with elongate, delicate teeth; styles of subgenital plate not flexed, of very unequal bulk: female with general color solid, shining blackish-brown, limbs ochraceous orange..*Ischnoptera* Burmeister
Male with dorsal surface of abdomen either specialized or not but never showing armed projections or character of specialization mentioned above; styles of subgenital plate slender, deflexed, cylindrical processes, with rounded apices, dextral slightly longer: female with general color never solid, shining blackish-brown with the limbs ochraceous orange....................*Parcoblatta* Hebard
14. Tegmina fully developed (male), considerably reduced but not truncate (female); pronotum shining blackish-brown, margined laterad and anteriorly with buff...*Euthlastoblatta* Hebard
Tegmina considerably reduced, truncate, in both sexes; pronotum buffy, disk submarginally bordered, rather narrowly, with blackish-brown and with a median anchor-shaped marking of this color.......*Aglaopteryx* Hebard
15. Subgenital plate present, distal portion of abdomen not covered; male with at least tegminal rudiments.........16
Subgenital plate absent, distal portion of abdomen covered by the produced seventh dorsal and sixth ventral abdominal sclerites; apterous...........*Cryptocercus* Scudder
16. Tegmina and wings not reduced, anal field of wings folding fan-wise; general surface glabrose..................17
Tegmina and wings reduced or not, at times completely absent, but with anal field not folded, fan-wise; general surface usually hairy.............................21
17. Fourth tarsal article alone bearing a pulvillus; wings with an intercalated triangle or appendicular field.........18
Four proximal tarsal articles each with a pulvillus; wings without an intercalated triangle or appendicular field..19

18. Tarsal claws simple but asymmetrical; wing with an intercalated triangle whose length is equal to not more than one-third the total wing length. . . . *Chorisoneura* Brunner
    Tarsal claws equal but with two microscopic teeth on each internal margin; wing with a reflexed appendicular field whose length is equal to approximately one-half the total wing length. *Plectoptera* Saussure
19. Arolia present; size medium, under 30 mm.; pronotum produced posteriorly obtuse-angulate, apex rounded. 20
    Arolia absent; size extremely large, over 40 mm.; pronotum subelliptical. . . . . *Blaberus* Serville
20. General color brown; tegmina with numerous minute pits proximad. . . . . *Pycnoscelus* Scudder
    General color light paris green; tegmina not pitted. . . . . *Panchlora* Burmeister
21. Tarsi with pulvilli. 22
    Tarsi without pulvilli. 23
22. Tegmina not reaching to middle of abdomen; arolia absent; size large; over 30 mm. . . . . *Hemiblabera* Saussure
    Tegmina and wings surpassing apex of abdomen; arolia present; size small, under 7 mm. . . *Holocompsa* Burmeister
23. Median and posterior femora with a disto-genicular spine. . 24
    Media and posterior femora without a disto-genicular spine. (very hairy) . . . . *Eremoblatta* Rehn
24. Arolia vestigial or absent; male with fully developed tegmina; size small to medium, over 5 mm. (not myrmecophilous) 25
    Arolia large; male with tegmina reduced; size minute, under 3 mm. (myrmecophilous) . . . . *Attaphila* Wheeler
25. Ocelli absent; male with styles of subgenital plate small; female without a transverse clypeal swelling; subgenital plate valvular. . . . . *Compsodes* Hebard
    Ocelli large (male) or ocellar spots present, usually weakly defined (female); male with styles absent from subgenital plate; female with a transverse clypeal swelling; subgenital plate simple. . . . . *Arenivaga* Rehn

A New Species in the Genus Alasagenia Banks (Hymenoptera: Psammocharidae) with a Key to the Species of North America

By R. R. Dreisbach, Midland, Michigan

Banks erected the genus *Alasagenia* to include those species in the Subfamily Auplopodinae which had a distinct petiole, a beard of long hairs under the head on mentum, last joint of mid and rear tarsi bare of spines beneath and on sides, venation very similar to the other genera, with the basal vein in fore wings basad of the transverse median and the subdiscoidal vein in rear wings ending before the origination of the cubitus; and the posterior tibiae with a row of distinct spines above and with a row of short bristles on each side.

The genotype is a species from British Guiana, but at the time of the description of the genotype Banks stated that there were other species from the United States that went in the same genus that had been described in Priocnemis, but that differed from that genus by virtue of the petiolate abdomen.

These species are *A. reynoldsi* (Banks), *A. fulgifrons* (Cresson), *A. incitus* (Banks) and the new species described also belongs here.

At the present time there are no photomicrographs of the genitalia of any of the males available, but when they do become available they will be published.

Alasagenia rubineus n. sp.

Holotype female: Head, thorax, and legs black, with the abdomen completely red; the head, thorax and legs covered with short, glistening, finely appressed whitish hair, the abdomen just as completely covered with similar hair but due to the red color does not show up as prominently as on the head and thorax; the head when seen from in front appears to be longer than wide, but actually the width and length are of the same dimensions; inner orbits parallel; the ocellar triangle stands out very slightly above the otherwise flat vertex; clypeus truncate in front and slight reddish on front edge; when seen from the side the clypeus is slightly raised above the face at base but almost flat from there to tip; the clypeus and face much more closely covered by the glistening white hair than any other part of body; when seen from the side, the nearer ocellus is just visible above the vertex of eye, about one third of the front just back of antennae is raised above the surface of eye; the posterior orbits widest opposite the insertion of the antennae, and there about equal to the eye in width, and narrowing very considerably from there to vertex; fore ocellus slightly more than its diameter from the laterals and these about two thirds as far apart as their distance to eyes; antennae inserted about the lower third of eye, about one third the length of basal joint of antennae from clypeus; head very finely punctured with a slightly granular appearance; a few long hairs on vertex, with quite a few more on clypeus and under clypeus; mandibles slightly reddish at tip; basal antennal joint three times as long as second, but only three fourths as long as third, which is subequal in length to fourth, succeeding joints about the length of third except the last two which are only about two thirds as long; whole antennae covered with stiff short brownish hair, and is very slender; a very prominent beard of hairs under head on mentum which are curved slightly forward; a fairly long flat pronotum which is transverse behind and appears slightly granular; the propodeum slopes in a smooth curve from base to tip; second abdominal ventral segment with a very evident transverse groove; wings almost hyaline but slightly smoky, much more so beyond cells; marginal slightly shorter than its distance to wing tip; third cubital cell about one third longer on cubitus than the second, but the second cubital cell is one third longer on the marginal vein than the third cell; first recurrent vein is received by the second cubital cell at about the middle, while the second recurrent vein joins the third cubital cell slightly beyond the middle. Basal vein in fore wings slightly basad of the transverse, and with a rather deep bend forward just before it meets the cubital vein; the cubitus vein in rear wings arises exceptionally far beyond the subdiscoidal; no spines on femora, fore tibiae with four small spines on under side and about 8–10 at tip; the last two pair of tibiae well spined on outer side and on the dorsal surface, with two or three small ones near tip on under side; very small and short spines on tarsi, smaller and fewer on the first joint, and these becoming larger and more numerous from first pair of legs to last pair; the fourth tarsal joint of the first two pair of legs shorter than the fifth joint without the claw, but this joint in rear legs as long as fifth joint; a fairly large tooth about middle of claw; legs long and slender; longer spur of posterior tibiae about three eighths as long as its metatarsal joint; there are no spines on sides or under the last joint of posterior tarsi.

Size: Head and thorax 3.7 mm., abdomen 3.0 mm., fore wing 8.60 mm., rear wing 3.85 mm.

Holotype female: Washington, District of Columbia, VIII–5–1949, Richard Boettcher. (Collection of David Shappirio.) Will be deposited at Museum of Comparative Zoology at Harvard University.

This species is nearest to *A. reynoldsi* Banks, but differs in a number of characters as given in the following key. It seems strange that new species should turn up in sections as well covered by collectors as Washington, D. C., as I have two more new species from there.

Key to the Females of the Genus Alasagenia Banks

1. Body entirely red or yellowish, with the wings light yellow with the tip blackish . . . . *reynoldsi* (Banks)
1. Whole body not red, at least some black on head or thorax . . 2
2. Abdomen entirely red, head and thorax black; face and thorax with appressed, glistening whitish hair; pronotum hardly angulate, propodeum not striate on the sides, but slightly granular . . . . *rubineus* n. sp.
2. Abdomen black or bluish 3
3. Face, below the antennae, with dense, appressed, golden pubescence; long hair on pronotum and on front of fore coxae, white; spurs white or whitish . . *fulgifrons* (Cresson)
3. Face without the dense, golden, appressed pubescence; long hairs on front dark, but body silvery, sericeous; third joint of antennae much longer than the fourth; anterior ocellus nearly twice its diameter from the laterals; first recurrent vein received by the second cubital cell beyond the middle, second recurrent vein slightly sinuate and meeting the third cubital cell at middle; spurs dark . . . . *incitus* (Banks)

Genus ALASAGENIA Banks

Alasagenia Banks, Zoologica, N. Y. Zool. Soc., XXIX, 1944, p. 106. Genotype: *A. erichsoni* Banks. (British Guiana)
Alasagenia Dreisbach, Mich. Acad. Sci. Arts and Letters, XXXIII, 1949, p. 65. (key)

Alasagenia fulgifrons (Cresson)

Pompilus (Priconemis) *fulgifrons* Cresson, Trans. Amer. Ent. Soc., I, 1867, p. 114. Female (o.d. W. Va., Amer. Ent. Soc.)
Priocnemis fulgifrons Cresson, Trans. Amer. Ent. Soc., 2, 1887, p. 272. Female (Cat. W. Va.)
Cryptocheilus fulgifrons Banks, Jr. N. Y. Ent. Soc., XIX, 1911, p. 235. (key)
Priocnemis fulgifrons Banks, Bull. Mus. Comp. Zool., LXI, 1917, p. 101. (part desc.)
Priocnemis fulgifrons Brimley, Jr. Elish. Mitch. Soc., 52, 1936, p. 117. Female (N. C. key)
Priocnemis fulgifrons Brimley, Insects of N. C., 1938, p. 432. (N. C.)

This species is very easily distinguished by virtue of its beautiful golden pubescence.

Alasagenia incitus (Banks)

Cryptocheilus incitus Banks, Jr. N. Y. Ent. Soc., XIX, 1911, p. 234. Female (o.d. Texas. key. Birkman coll.)
Priocnemis incitus Brimley, Insects of N. C., 1938, p. 432. (N. C.)

This species has the body silvery sericeous, and is entirely black.

Alasagenia reynoldsi (Banks)

Priocnemis reynoldsi Banks, Psyche, XL, 1933, p. 12. Female (o.d. Colo. MCZ.)

This insect as noted in the key is entirely red or yellowish all over and has no black markings, which easily distinguishes it.

All these species have the characters as given in the description of the genus, including the beard of long hair on the mentum.

Further Corrections and Additions to the Clemson, South Carolina, List of Scarabaeidae (Coleoptera)

By O. L. Cartwright, United States National Museum

In the past ten years eight more species have been added to the Clemson list of Scarabaeidae (Entomological News, XLV, 1934, pp. 237–240, 268–269; L, 1939, pp. 284–286). Since it is unlikely the writer will have an opportunity for future collecting in this restricted area, these additions are presented below and the list probably closed so far as he is concerned. Determinations of the two unnamed species of Trox in the original list are included. A few corrections are also given. The total number of Scarabaeidae collected at Clemson stands at 169 species and varieties in 52 genera.

Additions:

Canthon laevis (Drury) 30 March 1944, one in flood debris.
Ataenius cylindrus Horn 9 May, 13 July, 17 Aug., 14 Sept.
Ataenius miamii Cartw. 7 May, 7 July, 14, 30 Aug.
Dialytes striatulus (Say) 30 August 1940, one in flood debris.
Trox hamata Robinson 29 Apr., 16 May, 27 June, 23 July.
Trox affinis Robinson 17, 26 May, in Crow and Owl nests.
Osmoderma eremicola (Knoch) 1948, L. M. Sparks.
Macrodactylus subspinosus (Fab.) 5 June 1932.

Corrections:

Canthon bispinatus Robinson in place of *C. nigricornis* (Say).
Ataenius spretulus (Hald.) in place of *A. consors* Fall (synonym).
Ataenius platensis (Blanch.) in place of *A. anticus* Fall (synonym).
Ataenius ovatulus Horn in place of *A. lecontei* Harold (synonym).
Anomala nigropicta Casey in place of *A. saginatula* Casey.
Pleurophorus atlanticus Cartw. in place of *P. batesi* Arrow.
Trox variolatus Melsh. in place of *T. erinaceus* Lec. (synonym).
Trox foveicollis Harold in place of *T. insularis* Chev.

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1950 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

Papers published in ENTOMOLOGICAL NEWS are not listed.

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THE NATURAL HISTORY OF MOSQUITOES. By Marston Bates. The Macmillan Company, 1949, 379 pp., 16 pl., $5.00.

This important volume by Dr. Bates, which was awaited with expectancy by many of those interested in mosquito biologies, brings together much of the published information concerning these insects. It is a work that should prove useful not only to all entomologists but also to those interested in other aspects of natural history as it draws widely on many fields of biological science.

The introductory portion is especially valuable as it deals in biological generalities, and in addition points out where progress has been made and also to those aspects that have been apparently overlooked or not investigated. The following statements are certainly warranted: "Even with all of the work that has been done on mosquitoes, the final impression of such a review is that a great deal more work is needed before we can achieve any real understanding of mosquito behavior." "Perhaps the greatest gap in our general knowledge of mosquitoes lies in the field of genetics. . . ." The use of the term natural history for the studies of the habits of these insects is to be commended and the reviewer thoroughly agrees with the author in his unwillingness to be "handicapped by an organization of science in which field studies are filed in the pigeonhole 'ecology' and laboratory studies in the pigeonhole 'physiology.'"

A major portion of the book deals with the relation between the various stages of the mosquito, during its life cycle, with its environment. With the amount that has been published and with the enormous number of titles in serial and special works in which this information has appeared the task is one that would not be attempted by an individual easily discouraged. The information discussed in some detail includes not only a good deal of the author's and his associates' work but the outstanding information gathered by others. The bibliography is not all that one might desire, and the author apologizes for its incompleteness, but, nevertheless, most of the more important works are listed. Such omissions as may be noted are usually not of great importance, but it does appear that the discussion of autogeny could have been considered in more detail.

The chapter on the classification of larval habitats is interesting, but it would appear that practically any such classification will be modified by those working in the field so as to best serve the local situation.

The discussion of mosquitoes in relation to other organisms as parasites, prey, hosts or vectors is an effective presentation of these relationships which make this family of insects so important to man. A separate chapter on mosquitoes as vectors of viruses is an interesting summary of our information concerning the development and transmission of this group of pathogens. The discussion of malaria is relatively concise, as this particular aspect is such a highly developed and extensively studied field that a whole volume could easily be devoted to it. In addition the author was probably aware that in the recently published Malariology by Boyd (Saunders) there would be discussions of these relationships at a much greater length, than would be possible in the present book.

The short discussion of some of the more interesting species complexes in the mosquitoes is of value, but any attempt to discuss the mysteries involved in such a limited space is more tantalizing than informative.

Summaries of the classification and the distribution of mosquitoes are included and serve a useful purpose in the scheme of the book. Unfortunately the limited method of treatment means that many will have to refer to original discussions instead of being able to answer their questions by consulting the text. The appendix has a systematic list of mosquito species, but with its incompleteness it is liable to be of less value than the author contemplated.

The techniques of mosquito study both in the laboratory and field are outlined, but as these methods are constantly being modified and improvised by many workers the included information represents only a basic skeleton upon which to build. The concluding chapter on the strategy of mosquito research is an attempt to evaluate some of our knowledge and to point the way for further studies.—J. W. H. Rehn.

Selected Invertebrate Types. Edited by F. A. Brown, Jr., Chairman, Biological Science Department, Northwestern University. Contributors: William Balamuth, Frank A. Brown, Jr., John B. Buck, William D. Burbanck, Chauncey G. Goodchild, Libbie H. Hyman, Margaret L. Keister, Lewis H. Kleinholz, John H. Lochhead, Madelene E. Pierce, W. Malcolm Reid, Mary D. Rogick, Talbot H. Waterman, 597 pages. 235 illus. 6 by 9¼. Cloth $6.00.

The dependence of American teachers of invertebrate zoology upon European texts or upon inadequate American ones, has been partially resolved by the appearance of this book. The book is primarily a laboratory manual, but can be used by teachers of invertebrate zoology as a text supplemented by the more generalized lectures.

Representative species belonging to the major phyla and to many of the minor ones, are described in varying detail. The phyla, and in some instances, lesser systematic categories, are dealt with by one or more of the contributors. Thus, in the case of the arthropods, the Xiphosura and Crustacea are presented by J. H. Lochhead; the myriapods, insects and arachnids, by J. B. Buck and M. L. Keister. Some of the contributors have written their sections as morphological accounts, while others have largely devoted their writing to laboratory instructions for the study of the animals. Thus, all sections are not equally informative, and in some instances, the mixture of description and instructions for the disection makes it difficult to follow either. In many cases, brief directions for elementary physiological experiments are given as well as notes on the embryology and life history of the species which is described.

Periplaneta americana was selected for the insect type and twenty pages (pp. 475–495) of description and laboratory directions with four figures are devoted to it. A page comparing *P. americana* and *Blaberus craniifer* is appended to the description. An additional eight pages including one full page plate is utilized for the description of the larva of *Drosophila melanogaster.*

The phyla Coelenterata, Annelida, Arthropoda, and Echinodermata are well written and comprehensive. The other major metazoan phylum, i.e., Mollusca, is not as well handled, and in many places becomes very elementary in approach. It is disappointing to see the words "liver" and "hepatopancreas" still being used in descriptions of molluscs.

This book will prove to be a great aid to teachers of general zoology as well as to those teaching invertebrate zoology.—Nathan W. Riser.

EXCHANGES

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

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

Bombidae, nearctic and neotropical, wanted for exchange, identification, or purchase. Will exchange in other groups for bumblebees. Barth Maina, Dept. Zool., Univ. of Chicago, Chicago 37, Ill.

Saturnidae of the world. Will purchase individual specimens or cocoons. F. E. Rutkowski, St. Bede College, Peru, Illinois, U. S. A.

Butterflies of New England, principally from New Haven, Conn., for exchange. Louis Clarke, 28 W. Elm St., New Haven 15, Conn.

Wanted—Proc. Ent. Soc. Phila., vols. 1–6; Proc. Cal. Acad. (Nat.) Sci., 1–7; Proc. Acad. Nat. Sci. Phila., 1–8; Trans. Amer. Ent. Soc., 1–5; Bull. Buff. Soc. Nat. Sci., 2–3; Psyche, 11, 13, 15. C. F. dos Passos, Mendham, N. J.

Miridae (Capsidae)—American species wanted, with locality labels, in exchange for British species. D. Leston, F.R.E.S., 6 Frognal Rise, London N. W. 3, England.

Wanted—Entomological microscope in good condition; Spencer, Bausch & Lomb, or other standard make. David G. Shappirio, 4811 17th St., N.W., Washington 11, D. C.

Coleoptera—Large quantities of Cicindelidae, Buprestidae, Lucanidae, Cerambycidae wanted in exchange for all families of Coleoptera from Ill., Ind. and Mo. Joseph B. Hayes, 1905 N. Pulaski Rd., Chicago 39, Ill.

American Sarcophagidae—wanted for identification. H. R. Dodge, 291 Peachtree Street, Atlanta 3, Georgia.

T, ~~ M

The April to June issues have been omitted

(See notice on page 88)

ENTOMOLOGICAL NEWS

JULY 1950

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JAMES A. G. REHN

ENTOMOLOGICAL NEWS

Vol. LXI JULY, 1950 No. 4

James A. G. Rehn
Completes Fifty Years of Research

The members of the American Entomological Society have taken a great deal of pleasure in commemorating this year the fifty years of service of one of its oldest and best friends. On June 1, 1900, Mr. James A. G. Rehn joined the staff of the Academy of Natural Sciences of Philadelphia. Although he became a resident member of our entomological society only in 1910, he was an Associate in the Entomological Section of the Academy from almost the same date that he joined the Academy staff. As the Society and the Section were practically synonymous, his services to the Society were virtually in effect since the turn of the century.

In this age of dashing about from one occupation to another, it is gratifying to find a man who decided early in life what he wished to do and who gained an abounding enthusiasm for it which he was able to maintain undiminished for fifty years. Mr. Rehn came to work at the Academy when he was about nineteen years old. In the intervening years he has attained an enviable reputation as one of the world's outstanding orthopterists, and at the same time has served the institution for which he works in many important ways. He has labored successively at the Academy as Assistant Curator; Associate Curator of Insects; and since 1933 as Curator in that department. He has also served as Recording Secretary, Secretary, Secretary of the Council and of the Board of Trustees, and at the present time is Corresponding Secretary. In the latter position he has maintained contact with many of the world's best-known natural scientists.

In the American Entomological Society, Mr. Rehn's activities have been just as constant and varied. For many years he has constantly played some vital role in the conduct of its affairs, having acted at various times as Vice-president, President, Editor of the Transactions, and currently as Treasurer of the organization. The very extensive insect collections of the Society and of the Academy are in his charge, and for a long period he has aided visiting entomologists who have come in large numbers to examine insect material. He has also done the many and varied chores which fall to the lot of the Curator of an important department.

Aside from Mr. Rehn's services at the two Philadelphia institutions, he has been active in many other organizations. He is a fellow and past president of the Entomological Society of America; a charter member of the Society of Mammalogists and of the Society for the Study of Evolution; a member of the Society of Systematic Zoologists and of the Society of Sigma Xi; a fellow of the American Geographical Society and of the American Association for the Advancement of Science; and a fellow and past-president of the Delaware Valley Ornithological Club. During the first World War he served with the Military Intelligence Division of the U. S. Army, Counter-espionage control.

His contributions to scientific literature have been very extensive. Mr. Rehn entered the field of natural science at a period when the old-fashioned naturalist was just about to become extinct; when taxonomists were just entering into the higher and more glorified status of specialists. However, there still remained a remnant of the idea that breadth of knowledge in a general field was a wholesome virtue. Thus we see reflected in his earlier activities, and to some extent in his writing, a greater diversity in subject matter than is often encountered today. His sixteen earlier publications in Mammalogy, and four as joint author, illustrate this point. The order Orthoptera has, however, been his main interest in later years, and about 227 papers stand to his personal credit in this field. In addition, 41 were published jointly with Morgan Hebard and 15 with his son, John W. H. Rehn. This mass of published data places him among the half dozen most productive scientific writers on the Academy staff in the nearly 140 years of its history. No other entomologist who has been a member of this Society has ever achieved this record.

At present Mr. Rehn is engaged—at the request of the Australian government—in the preparation of a comprehensive work on the grasshoppers of Australia. Two volumes, of a possible five or six, are partially completed.

Over a period of many years he has worked on the accumulation of material for a monograph on the Orthoptera of North America. In this work he has been assisted chiefly by Morgan Hebard and by his son, John W. H. Rehn. The work is expected to occupy about four volumes of 500 or more pages each. For a period of over 45 years Mr. Rehn, alone or with his coworkers, has covered most of the United States in a series of many collecting expeditions.

Outside the United States similar expeditions have been numerous, including trips to Africa, Colombia, Costa Rica, Honduras and Brazil. Largely through his efforts, and those of Morgan Hebard, a collection of Orthoptera has been built at the Academy which now exceeds half a million specimens—the finest in the world.

At its last Spring meeting, on May 25, the American Entomological Society devoted its session to a commemoration of Mr. Rehn's 50 years of service. Many friends and their wives were present. A gift was presented by members in appreciation of his work for the Society.

On June 1 the Academy of Natural Sciences called a meeting in its library, of staff members and friends of Mr. Rehn, this being the exact 50-year anniversary of his first official connection with the institution. An engrossed resolution from the Board of Trustees of the Academy was presented by its president, Mr. Charles M. B. Cadwalader. The text of this resolution is reproduced below.

"Whereas Mr. James A. G. Rehn, Curator of Insects of the Academy of Natural Sciences of Philadelphia, on June 1, 1950, will have served the Academy as a member of the staff for fifty years and,

"Whereas Mr. Rehn's scientific attainments expressed in his important research, many publications, collections and expeditions have been recognized by the scientific world, thus bringing honor and distinction to the institution,

"Be it resolved by the Board of Trustees of the Academy of Natural Sciences of Philadelphia that the gratitude and appreciation of the Academy be made a permanent part of the records of this institution by being included in the official minutes, and further be it resolved that the Secretary is instructed to transmit to Mr. Rehn a copy of this resolution."

(Signed by the President and Managing Director.)

The members of the American Entomological Society and Mr. Rehn's many friends wish him long added years of satisfying work.

M. E. P.

Notice

Due to circumstances beyond the control of the editor and of the Society, ENTOMOLOGICAL NEWS has been far behind schedule for a number of years. In order to correct this condition it was decided, with the permission of the Post Office Department, to omit the April, May and June numbers from the current volume, so that the present (July) number will actually appear during its proper month. This July number will then be followed by the usual October, November and December numbers. Although Volume 61 will therefore consist of only seven separate issues rather than the usual ten, we hope to be able to increase the size of these issues in order that the completed volume will approximate normal size.

New Coleoptera with Notes. II. (Buprestidae and Cerambycidae)

By Josef N. Knull, The Ohio State University *

Acmaeodera barri Caz.

Acmaeodera barri Cazier, 1940, The Wasmann Collector 4: 58.

This species was taken on living smoke tree (*Parosela spinosa* (Gray)) in California at Palm Springs, Riverside Co., June 20, Coyote Wells, Imperial Co., July 16 and Topock, Ariz., June 4, by D. J. and J. N. Knull. It breeds in branches of living trees and many adult emergence holes were observed.

Paratyndaris crandalli Knull

Paratyndaris olneyae crandalli Knull, 1941, Ann. Ent. Soc. Amer., 34: 694; Vogt, 1949, Ann. Ent. Soc. Amer., 42: 195.

More material is now available which will justify raising this form to specific rank.

In addition to Starr County, Texas records by Vogt, specimens were taken on dead mesquite branches in Webb Co., ten miles south of Laredo, Zapata Co., and northern Frio Co., Texas, May 20–22 by D. J. and J. N. Knull.

Cinyra prosternalis Schffr.

Cinyra prosternalis Schaeffer, 1904, Jour. N. Y. Ent. Soc., 12: 205; Schaeffer, 1905, Bul. Brook. Inst. Arts & Sci., 1: 128; Chamberlin, 1920, Ent. News, 31: 242; *Psiloptera riograndei* Knull, 1937, Ent. News, 48: 16, new synonymy; Vogt, 1949, Ann. Ent. Soc. Amer., 42: 196.

In addition to records given by Vogt, specimens have been collected on living capote (*Diospyros texana* Scheele) as far west as Pecos River in Val Verde Co., Texas. As pointed out by Vogt, it breeds in healthy capote and living trees in that section show many adult emergence holes. In parts of Texas this tree is frequently allowed to remain along highways for ornamental purposes.

* Contribution from Department of Zoology and Entomology.

Agrilus geronimoi n. sp.

♀. Size, form and color of *A. quercus* Schffr.; color dark brown with aeneous tinge; head and pronotum opaque; elytra and ventral surface shining; head, pronotum around edges and elytra ornamented with short recumbent white pubescence; design of elytra similar to that of *A. lecontei* Saund., elytra with large denuded area back of scutellum, extending along suture and more expanded back of middle.

Head convex, slight trace of median depression; surface finely strigate; antennae serrate from fifth segment.

Pronotum wider than long, narrower at base than at apex, widest in apical third; sides broadly rounded in front, converging toward base, sinuate near base; when viewed from side, marginal and submarginal carinae widely separated in front, joined some distance from base; anterior margin sinuate, median lobe broad; basal margin sinuate, emarginations not deep; disk convex, with broad median depression extending from base to near apex, oblique depression each side along lateral margin; prehumeral carinae faint; surface finely transversely strigate. Scutellum glabrous, transversely carinate.

Elytra at base about as wide as base of pronotum; sides subparallel in front, expanded back of middle, then gradually narrowed to rounded, serrulate apices; disk convex, basal depressions well marked, costae absent; surface finely, transversely strigate near base, rest of elytra finely imbricate.

Abdomen beneath finely punctate, uniformly clothed with short, white, recumbent pubescence; pygidium without projecting carina. Prosternal lobe broadly rounded; prosternal process with sides parallel to behind coxal cavities, then abruptly narrowed to apex. Posterior tarsi shorter than tibiae, first segment not as long as next three united. Tarsal claws similar on all feet, cleft, inner tooth broad and shorter than outer one, apices not turned inward.

Length 5.5 mm.; width 1.6 mm.

Holotype ♀ collected at about 4,000 ft., Chiricahua Mountains, ARIZONA, June 27, 1949, by D. J. and J. N. Knull, in collection of author.

According to Fisher's key[1] this species runs to *A. quercus* Schffr. It is distinguished by elytral design similar to *A. lecontei* Saund., lack of elytral costae and by marginal and submarginal carinae being joined some distance from base.

Megacyllene snowi (Csy.)

Cyllene snowi Casey, 1912, Mem. on Coleop. III, 353; Hopping, 1937, Ann. Ent. Soc. Amer., 3: 443.

Larvae found working in the bases of living locust (*Robinia neomexicana* Gray) saplings in Oak Creek Canyon and Williams, Arizona. The larva works into root of tree, frequently causing it to break off just above ground. Pupation occurs in root just below surface of ground. Adults emerge in August and are quite variable in color pattern.

Elytroleptus immaculipennis Knull

Elytroleptus floridanus immaculipennis Knull, 1935, Ent. News, 46: 99.

Two more specimens of this species convince me that it is distinct from *floridanus* Lec. and is of specific rank. It is shorter, elytral costae less evident and pubescence of pronotum red instead of yellow as in *floridanus*. A female specimen was collected in Davis Mountains, Texas, July 3, 1940, by D. J. and J. N. Knull.

A ♀ collected at same locality and date has basal fourth of elytra reddish yellow and extending obliquely to costal margin, then running along side to near apex. Color of light area on elytra differs from *floridanus*. Light area of pronotum is red as in *immaculipennis*. I propose the varietal name *obliquus* for this form.

Length 7.4 mm.; width 2.8 mm.

Holotype in collection of author.

Elytroleptus lineatus n. sp.

♀. Narrow elongate; shining, head, prothorax, anterior legs all but coxae and tarsi, middle and posterior femora all but bases and apices yellow, rest of ventral surface and legs dark brown, antennae black, elytra reddish yellow.

[1] W. S. Fisher, U.S.N.M. Bul. 145, 1928.

Head convex; surface densely, coarsely punctured, clothed with long yellow pubescence; antennae stout, scape longer than other segments, second segment about as broad as long, third longer than fourth, fifth longer than third, following segments decreasing in length, eleventh longer than tenth, appendiculate, segments five to ten inclusive serrate, first five segments with longer black pubescence.

Pronotum wider than long, widest in middle, wider at base than at apex; sides broadly rounded from base to apex; disk convex, an oblong lateral depression each side, transverse depression at base, apex transversely margined; surface irregularly rugose, with irregular large punctures, long yellow pubescence dense.

Elytra at base wider than pronotum, elongate; sides subparallel near base, gradually widened to apical fifth, then broadly rounded to suture; disk convex with three longitudinal costae on each elytron, rest of surface densely, finely punctured, reddish yellow pubescence dense.

Abdomen beneath shining, minutely punctured, pubescence long, fine. Anterior and middle femora clavate.

Length 8.1 mm.; width 2.4 mm.

Holotype ♀ collected in Davis Mountains, TEXAS, June 21, 1949, by D. J. and J. N. Knull, in collection of author. The narrow elongate form together with the two tone dorsal color will separate this species from our known forms. It should come next to *E. davisi* Knull.

Adetus muticus (Thoms.)

Agennopsis mutica Thomson, 1857, Archives Ent. 1, 302; *pygmaea* Bates, 1866, Ann. Mag. Nat. Hist., ser. 3, 17: 295; *mexicana* Thomson, 1868, Physis II, 153; *Adetus muticus*, Bates, 1872, Trans. Ent. Soc. Lond., 234; Bates, 1880, Biol. Centr. Amer. Col. V: 106, 341, t. 8, f. 4; Belon, 1902, Soc. Ent. Belg. XLVI, 464, 471.

A specimen of what I take to be this species was collected at light five miles north of Nogales, Arizona, July 7, 1949, by D. J. and J. N. Knull. It agrees with determined specimens in the F. R. Mason Collection.[2]

[2] The writer expresses appreciation to J. A. G. Rehn for privilege of studying collections in Phila. Acad. Nat. Sci.

A New Species of the Genus Lissagenia Banks (Hymenoptera: Psammocharidae) from Central America

By R. R. Dreisbach, Midland, Michigan

Banks (1) erected the genus Lissagenia for two South American species which he described as new at the time, *L. flavipennis, L. insignis*, and he also included the species *Priocnemella difformis* Banks. He designated the species *L. flavipennis* as the genotype.

This genus, like Alasagenia, has a beard of hairs on the mentum which are quite long and which bend forward slightly, but it differs from that genus mainly by the absence of small teeth on the posterior tibiae, but has instead, a row of very small spines on the apical half or more of the dorsal surface and a row on each side. There are three other characters which also separate it from Alasagenia, namely: the posterior tibiae, when seen from behind, are much more sinuous, especially at the base on the outer side, the pronotum is slightly angulate on posterior edge, instead of transverse, the ocelli are in a much smaller triangle, and the lateral are twice as far from the eye margins as they are apart, instead of these distances being about equal. The pronotum is also somewhat flatter than in Alasagenia.

Lissagenia hubbelli n. sp.

Holotype female: Completely black all over, with beautiful golden, mat, pubescence, very much like *Alasagenia fulgifrons* (Cresson except that this pubescence is much denser and covers a much greater part of body), over the whole face, front, vertex, and posterior orbits, slightly less dense on neck, pronotum, mesonotum and scutellum; all the coxae, more or less, thorax above middle coxae, base of propodeum, the outer, apical corners of propodeum, and the clypeus, with white sericeous hairs; the clypeus much less densely pubescent than the rest of head, truncate in front, and with a smooth wide reddish border, a slight reddish tinge to the front edge of clypeus just back of the smoothed front edge; clypeus rather long and raised above the mouth parts, slightly raised in the middle, when seen from the side; the vertex is barely raised above the eye surface, when seen from the side, but the whole front from vertex to antennae is considerably raised above the eyes, increasing in amount from vertex to antennae; when seen from in front the vertex rises perpendicularly for a very short distance at the eyes, the rest of surface flat and entirely raised above eyes; a few long upright hairs on vertex and front but more numerous and longer ones on and under the clypeus, with a beard of long hairs on mentum; long white hairs on neck and a few on fore coxae; ocelli in a high, very small triangle, the fore ocellus slightly more than its diameter from the laterals and these twice as far from eye margins as they are from each other; comparative lengths of the first four and last antennal joints: 35 : 15 : 60 : 50 : 30; antennae very long and slender, longer than the head and thorax; maxillary palpi slender with five segments, the first short, the second thicker and somewhat club-shaped; labial palpi, three jointed, thicker and much shorter; pronotum rather short with a slight angulation in middle of posterior edge, almost flat on dorsal surface; mesonotum only slightly longer, with a slightly curved dorsal surface, and narrowing from the tegulae to the scutellum where it and the scutellum are only one-half as wide as the width at tegulae; the propodeum extends in a smooth curve from base to apex, the apical half with fairly broad, low transverse ridges which are stronger on the edges; a few upright hairs on mesonotum and propodeum; the wings beautifully marked and very conspicuous; fore wings with a dark band covering the basal veins and a second broader one covering the marginal, second and third cubital, the apical three-quarters of third discoidal and the basal half of second apical cells, with the tip of fore wings beyond the dark band a deep milky white; the wings between the bands and basad of the basal band, slightly smoky; the rear wings hyaline except that the tip beyond the transverse median vein is smoky; marginal cell large, broader than the second cubital cell and as long as its distance to wing tips; second cubital cell small, one-half as long as third which is large and extends beyond the marginal cell; first recurrent meets the second cubital cell before the middle, and the second recurrent meeting the third cubital cell at the basal two fifths; basal vein in fore wings slightly basal of the transverse, and the subdiscoidal in rear wings meets the discoidal vein before the origination of the cubitus; abdomen definitely petioled, the petiole hour-glass shaped, and the abdomen widest at the apical three-fourths of second tergite from where it tapers to a slender point; the whole surface covered with a fine, powdery, white, sericeous pubescence, somewhat localized over the surface; the last tergite covered with the golden pubescence of head, with numerous long whitish or slightly golden hairs on dorsal surface, sides, and the ventral surface; a deep transverse groove on second ventrite, the segments two to four with a silvery patch of white pubescence at the outer, apical corners; legs very long, no tarsal comb and no spines on fore femora or tibiae except two small spines on under side of tibiae and a semi-circle of long spines on the dorsal tip; no spines on the last two pair of femora but these tibiae have a row of small spines on dorsal surface and on the sides; when seen from behind the posterior tibiae have the outer side incurved at the base; tarsi with fine spines over the whole surface of the first four joints, all the legs with fairly long spines, beneath, the last pair of all legs with no spines underneath, but only hairs; claws rather long and with a fairly long tooth at apical third; ratio of lengths of femora, tibiae, and tarsal joints of hind legs as follows: 40:45:35:15:10:5:7; longer spur of posterior tibiae about one-third length of its metatarsal joint.

Length: Head and thorax 4.3 mm., abdomen 4.7 mm., forewing 7.0 mm., rear wing 5.2 mm.

Holotype female: Dept. Morazon, Cerro Uyuca, Honduras, 5900 ft.–6100 ft., (Cloud forest) VII–24–1948, T. H. Hubbell No. 139 (Mus. Zool. Uni. Mich.).

This is the first record of this genus from North America. It cannot be confused with any of the South American species due to the golden pubescence (somewhat similar to *Alasagenia fulgifrons* (Cresson)), and the two dark bands on the wings.

This will go in my keys (2) to the genera of females for the subfamily Auplopodinae (Pseudageniae) for North America as follows: First part of couplet 5,

5. A group of long curving or straight bristles or hairs on mentum....................5a
5. No such group of hairs on mentum....................6
5a. No distinct teeth on posterior edge of hind tibiae; only small spines hind tibiae when seen from behind with a slight curvature on the outside near the base; pronotum slightly angulate and almost flat; ocellar triangle much smaller, with the lateral ocelli twice as far from the edge of eyes as they are apart....................*Lissagenia* Banks
5a. Distinct, though small, teeth on the posterior edge of hind tibiae; hind tibiae, when seen from behind, hardly curved at the base; pronotum transverse, not at all angulate, and not quite flat; ocellar triangle larger, with the lateral ocelli just about as far apart as they are distant from the edge of eyes....................*Alasagenia* Banks
6. [Proceed as in keys *l.c.*]

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1. BANKS, N. A. Bull. Mus. Comp. Zool., 96, 1946, p. 456.
2. DREISBACH, R. R. Papers Mich. Acad. Sci. Arts and Letters, 1949, p. 65.

Note on the Identity and Distribution of Hemitrichus rufipes Thomson (Hymenoptera: Pteromalidae)

By A. B. GAHAN, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, United States Department of Agriculture, and GEORGE E. WALLACE, Section of Entomology, Carnegie Museum

Hemitrichus rufipes was originally described from Sweden. The U. S. National Museum collection contains a female collected in the vicinity of Vienna and a male from Böheimkirchen, Austria, both identified by F. Ruschka; also 2 females collected by J. Fahringer in the vicinity of Vienna, and 1 female from Angern, Austria, sent in by H. L. Parker and identified by

Gahan by comparing with the Ruschka determined material and with Thomson's description. The last-mentioned specimen bears a label "? Ex Bruchus," indicating a doubtful host record. Nothing further is known concerning hosts and distribution of the species in Europe.

Occurrence of the species in America was recorded in a note by the junior author published in 1949. The specimens upon which this record was based were collected in Pittsburgh, Pa., and were identified by comparing them with the above-mentioned European material. Subsequently, while examining some pteromalids from the collection of the Natural History Survey of Illinois, specimens collected by Wm. A. Nason at Algonquin, Ill., in 1896 were recognized as being *H. rufipes*. Further investigation revealed that in 1896 Ashmead had described what he supposed to be a new genus and new species, *Uriella rufipes* Ashm., based in part upon a series of specimens having the same origin and data as those just mentioned. The actual holotype of *Uriella rufipes* Ashmead, as recorded in the type catalog of the U. S. National Museum, is the specimen mentioned in the description as having been bred by F. M. Webster from *Botis erectalis* Grote, and is from Ohio. The host label on this specimen bears a question mark, indicating that the host association was uncertain. This holotype and the eight paratypes collected by Nason are all alike and appear to be identical in every way with the European material of *Hemitrichus rufipes* Thom. The genus *Uriella* Ashmead must therefore be considered a synonym of *Hemitrichus* Thomson and the species *rufipes* Ashmead a synonym of *rufipes* Thomson.

Two other occurrences of *H. rufipes* remain to be mentioned. One specimen, received from R. R. Driesbach, is labeled as having come from a "pine cone gall" on *Salix* sp. collected in Elizabeth County, Michigan, Sept. 11, 1937. The other record concerns several specimens received for identification from L. C. Kuitert and which were taken by him in Morris County, Kansas, in April 1948 in association with *Ptinus hirtellus* Sturm and *Oryzaephilus surinamensis* (L.) infesting pack-rat droppings. Prof. Kuitert has published an account of his observations on this association in The Florida Entomologist, vol. 33, p. 177, 1949.

It is evident from these records that *H. rufipes* is a widely distributed species. Its real host relationships are not clear. The fact that the host associations listed (some of them as doubtful) include Lepidoptera, Diptera, and Coleoptera would seem to indicate a likelihood that some of these records are wrong.

Kurdjumov (Revue Russe d'Entomologie, vol. 13, pp. 3, 4; 1913) placed *Uriella* Ashm. in synonymy with *Phaenacra* Foerster. Cotypes of *Phaenacra nubigera* Foerst. (the genotype species) are in the U. S. National Museum, and although they superficially resemble the genotype of *Uriella*, the two genera are not closely related. *Phaenacra* belongs to the tribe *Merisini* and is believed not to be separable from *Merisus* Walker. *Hemitrichus* (= *Uriella*) belongs in the tribe *Metastenini*.

Hemitrichus rufipes is easily recognized in both sexes by the following characters: The clypeus is perfectly smooth and shining with a sharp median tooth on its anterior margin; the parapsidal grooves are almost entirely effaced; the propodeum is strongly and nearly uniformly punctate and without either a median carina or lateral folds; the marginal vein is distinctly swollen at base; the posterior tibia has two distinct spurs; the abdomen of the female is conic-ovate with the first tergite perfectly smooth, the others weakly reticulated but shining, the ovipositor sheaths shortly exserted. The color in both sexes is aeneous black, with the scape pedicel and all legs (except their coxae) bright reddish testaceous.

Synonymic Bibliography

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1896 *Uriella rufipes* Ashmead, Trans. Amer. Ent. Soc., vol. 23, pp. 221–223.

1898 *Hemitrichus rufipes* (Thom.) Dalla Torre, Cat. Hymen., vol. 5, p. 88.

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1904 *Uriella rufipes* (Ashm.) Ashmead, *op. cit.*, pp. 323, 392.
1909 *Hemitrichus rufipes* (Thoms.) Schmiedeknecht, Genera Insectorum fasc. 97, p. 287.
1909 *Uriella rufipes* (Ashm.) Schmiedeknecht, *op. cit.*, p. 361.
1923 *Hemitrichus rufipes* (Thom.) Gahan & Fagan, U. S. Nat. Mus. Bull. no. 124, p. 70.
1923 *Uriella rufipes* (Ashm.) Gahan & Fagan, *op. cit.*, p. 151.
1949 *Hemitrichus rufipes* (Thom.) Wallace, Ent. News, vol. 60, no. 2, p. 30.

Ants from Saipan, Marianas Islands

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

Professor R. K. Enders kindly collected for me ants on Saipan during the summer of 1949 while he was engaged in mammal studies for the Pacific Science Board under the auspices of the Office of Naval Research. These ants were principally those species coming to his mammal skinning tables and therefore represent a sampling of the scavenging, adaptable species.

The records are also of interest in representing one of the far-flung Pacific Islands, comparatively few of which have been explored from an entomological point of view until recent years. From Guam, some 125 miles south southwest, Wheeler (1912) listed 21 species of ants. From Bikini Atoll, about 1200 miles east, Cole (1949) enumerates 13 species taken in 1947. There are doubtless numerous collections made in the 1940's whose records are not presently available from this and other islands of the area.

The ants of these three islands reflect the general nature of ant distribution in the Pacific. Each contains tropicopolitan species as the chief element of the fauna. All three contain the large *Odontomachus haematoda*, the sole tropicopolitan species of the primitive ant subfamily, the Ponerinae, although a second species taken by Dr. Enders may represent another ponerine becoming tropicopolitan. Each has two tiny species of *Monomorium* (*destructor* and *floricola*) of the subfamily Myrmicinae. Bikini has a third species of this genus, *pharaonis,* which has a greater distribution than the other two since it is adapted to life in heated apartment houses extending to the very center of the United States while the others are tropical or subtropical. The myrmicine, *Solenopsis geminata rufa,* widespread in the Pacific, is present on Saipan and Guam but absent from Bikini; *geminata* itself is neotropical and spreading. Saipan and Guam have the myrmicine, *Tetramorium guineense,* with the genus represented on Bikini by another tropicopolitan species of the genus, *simillimum,* whose original home was probably Africa. *Tapinoma melanocephalum,* a tiny and widespread member of the Dolichoderinae, occurs on all three islands as does the world-wide and ubiquitous formicine, *Paratrechina longicornis,* along with *Nylanderia bourbonica,* the latter being paleotropical. *Camponotus reticulatus* subspecies and *C. chloroticus,* present on Guam and Bikini but absent from the Saipan collection, did not come to the skinning tables though other species of the genus (as *maculatus*) do so in other tropical areas.

None of the lists contains a clear-cut endemic species. Wheeler, however, described a new variety and a subspecies of widespread species from Guam.

The Saipan ants and their distribution are given below.

1. *Leptogenys* (*Leptogenys*) *maxillosa* (F. Smith)

A species evidently becoming tropicopolitan since known from a number of islands in the Indian Ocean, from South Africa, the Anglo-Egyptian Sudan and several of the West Indian islands. A worker which I took in Cuba of the subspecies *falcata* Roger differs chiefly in having the anterior clypeal margin angulate instead of convex. Arnold's figure of the South African form also shows the clypeal margin angulate although my Sudan specimens have this part convex as in the Saipan ants. The ants are predatory, quick in their movements and sting painfully.

2. *Odontomachus haematoda* (L.)

Tropicopolitan; large, dark brown and stinging painfully; generally carnivorous.

3. *Pheidole,* near *rinae tipuna* Forel

Although Wheeler recorded *P. javana* Mayr from Guam, the present species in the soldier caste is much smaller and less glabrous. It is also much smaller than *oceanica* and *bolabolensis.* The Saipan soldier is close to *rinae* subsp. *tipuna* Forel but has a distinctly shorter head and is also close to the *rinae* subsp. *incensa* Wheeler types in the American Museum of Natural History.

4. *Pheidole* sp.

Workers of a second species, impossible of identification without the soldier caste, differ in being smooth, shiny and dark rather than being densely punctate and pale.

5. *Cardiocondyla emeryi* Forel

One dealate female of this cosmopolitan species.

6. *Vollenhovia pedestris* F. Smith

Not in the Guam or Bikini lists. The workers agree well with Mann's British Solomon specimens; subspecies are known from New Guinea, the Seychelles, Borneo, the Philippines and other paleotropical localities.

7. *Monomorium destructor* (Jerdon)

Tropicopolitan; tiny and reddish yellow.

8. *Monomorium floricola* (Jerdon)

Tropicopolitan; even smaller than the preceding and a shiny dark brown in color.

9. *Solenopsis geminata* subspecies *rufa* (Jerdon)

Showing the mesosternal spine characteristic of this widespread paleotropical form of the cosmopolitan species. I have this also from the island of Samar, Philippines (U.S.N.). Safford (1905) says of this form on Guam that "these little creatures when out on foraging expeditions, travel in lines and sting every animal that crosses their path. Sometimes young chickens are killed by them. They are common in houses, and it is not unusual on turning in at night to find a line of them crossing the bed." I have observed similar habits in the typical neotropical form.

10. *Tetramorium guineense* (Fabr.)

A common tropicopolitan species with generalized habits.

11. *Tapinoma melanocephalum* (Fabr.)

Tropicopolitan and a house pest where it often feeds on greasy substances.

12. *Technomyrmes albipes* F. Smith?

One worker with gaster and petiole missing may well be this paleotropical species.

13. *Plagiolepis* (*Anoplolepis*) *longipes* (Jerdon)

A large, spindly, paleotropical species.

14. *Paratrechina* (*Nylanderia*) *bourbonica* Forel

A species chiefly of the islands of the Indian and Pacific Oceans. A colony with alate females was taken in the packing about radio parts in a box in a warehouse.

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A New Species of Epicauta from Arizona (Col.: Meloidae)

By Lawrence S. Dillon, A. & M. College of Texas

During the course of a study on the Meloidae of Texas, the following new species from Arizona was found among a lot of material received from the museum of the University of Michigan. Up to the present time, *E. ochrea* LeConte was the sole representative of the genus *Epicauta* in North America which possessed moniliform antennae and the form described here is of particular interest in sharing this character. The secondary sexual structures are likewise shared by the males of the two species.

The author is indebted to Dr. Theodore H. Hubbell, Curator of Insects at the Museum of Zoology of the University of Michigan, for his kindness in loaning the specimens.

Epicauta moniliformis n. sp.

Fuscous, shining, sparsely covered with cinereous pubescence. Elytra yellow-testaceous or ferruginous-cinereous, with very indistinct scutellar and humeral maculae. Abdominal sternites in part ferruginous.

Entire upper surface minutely alutaceous and rather densely, finely punctate. Head rounded from vertex to eyes, one-fifth wider than long; eyes large, one and one-half times as long as interocular width, two-thirds wider than infraocular area; antennal callosities slightly prominent, glabrous. Pronotum narrowly campanuliform, as long as wide, one-seventh narrower than head; disk with a deep median sulcus not reaching apex, basal impression shallow, transverse. Protibiae with a single robust spur in male; mesotibial spurs rather short, acute; metatibial spurs acute, tapering, slightly concave on inner face, the inner spur distinctly longer. Protarsi in male with first segment short, contorted, and toothed. Antennae short, scarcely surpassing base of elytra, nearly uniform in thickness, segments from second moniliform; scape strongly arcuate, thickened apically, in male attaining hind margin of eye, in female scarcely attaining middle of eye; second segment as long as third; third about one-fourth as long as first in male, two-fifths as long in female; rest subequal, feebly shorter than third.

Length 11–12 mm.

Holotype male and *allotype* female: Palmerlee, ARIZONA, July 11 (H. A. Kaeber) [University of Michigan].

Remarks: This species has moniliform antennae as found in *E. ochrea* (LeConte), to which species it is quite closely allied. From *ochrea* it is distinct in having the scape reaching just to the hind margin of eye in male, not beyond it, and in female likewise shorter, not attaining middle of eye. In addition, the entire body is fuscous, except the elytra, which are ferruginous, and the body form is much more slender.

Zethus, Pachodynerus and other Southern Wasps from Massachusetts (Hymenoptera: Vespoidea; Sphecoidea)

By KENNETH W. COOPER, Department of Biology, Princeton University

On the old Fay estate at Woods Hole, Cape Cod, Massachusetts, standing in an open field near the margins of a predominantly beech-black oak woods, there is a single, compact, large clump of a cultivated grape (*"Vitis macrophylla,"* according to the gardner) that blooms late in the season. Its flowers prove very attractive to aculeate wasps in early August, and on August 7, 1948, Dr. Jean Pasteels, of the Université Libre de Bruxelles, and myself made a noteworthy capture of three female specimens of typical *Zethus* (*Zethusculus*) *spinipes* (Say). This is believed to be the northernmost record so far published for the species, and the first record of its occurrence in Massachusetts. Dr. J. C. Bequaert, of Harvard University, has a specimen from Buttenwood, Rhode Island. It is known from two Long Island records in New York, and has also been found only rarely in New Jersey. Although by no means a very uncommon wasp in the South, it is definitely a rarity in New England. The capture of three specimens at Woods Hole, along with Dr. Bequaert's recent unpublished record from Rhode Island, makes it very likely that it is a native in New England, and not an infrequent visitor.

The grape remained in flower only until August 10th, but no additional *Zethus* were seen. August 8th a very striking and wholly unfamiliar *red* eumenid (at first mistaken for a *Rygchium*) was taken at the grape blossoms and subsequently identified by Dr. Bequaert to be *Pachodynerus erynnis* (Lepel.). Originally described from the "Carolinas," *P. erynnis* is most commonly taken in Florida. Its known range extends west to Louisiana and north to Georgia. Whether or not the Woods Hole specimen was an accidental introduction onto the Cape can only be surmised. Probably it was, but it should be pointed out that quite a number of wasps, including *Zethus,* more characteristic of southerly climes, live in the sand and pine coastal strip along the southern Cape. For example, among others, *Arachnophroctonus ferrugineus* (Say), *Batazonus interruptus* (Say), *Pompilioides americanus* (Pal. de Beauv.), *Pseudomethoca geryon* (Fox), *Ps. simillima* (Sm.), *Ps. sanbornii* (Blake), *Ephuta puteola* (Blake), *Campsomeris quadrimaculata* (Fab.), *Notogonidea argentata* (Pal. de Beauv.), *Priononyx bifoveolatum* (Tasch.), *Isodontia auripes* Fern., and *Alyson melleus* Say, have all been collected by me at Woods Hole. On this score, C. W. Johnson (1930, Pub. Nantucket Maria Mitchell Assoc., vol. 3) has briefly commented on insects and plants whose normal ranges extend from Georgia and Florida coastwise to Nantucket and even farther to the North.

In addition to the *Zethus* and *Pachodynerus*, the following vespids were also attending the grape: *Eumenes fraternus* Say, *Odynerus* (*Rygchium*) *rugosum* Sauss., *O.* (*R.*) *leucomelas* Sauss., *O.* (*R.*) *hidalgo* var. *boreo-orientalis* J. Beq., *O.* (*R.*) *boscii* Lepel., *Ancistrocerus birenimaculatus* (Sauss.), *A. unifasciatus* (Sauss.), *Monobia quadridens* (L.), *Vespa* (*Vespula*) *arenaria* Fab., and *Polistes fuscatus* (Fab.). One male of *Monobia* had a female stylopid exserted between the fourth and fifth abdominal tergites of the left side.

Arthropods of Possible Medical Significance Collected in Terrell County, Texas

By R. B. Eads and B. G. Hightower, State Department of Health, Austin, Texas

With the Big Bend National Park of Texas rapidly becoming a major tourist attraction, this Department is endeavoring to obtain fairly complete information relative to the medically important anthropods in the area. Consequently, we were greatly appreciative of the opportunity presented the junior author to accompany Dr. W. Frank Blair, University of Texas Mammalogist, and his students on a field trip to West Texas (Terrell County) June 6 to July 8, 1949.

The majority of the mammals collected were examined for ectoparasites. An unexpectedly light mammal population was encountered and the small number of rodents seen were supporting, for the most part, small or no ectoparasite infestations. Some attention was directed toward the collection of arthropods other than ectoparasites. The taxonomic status of this material has been determined and is presented here.

Ectoparasite Index of Hosts

Rodentia

7 *Citellus variegatus* (Rock Squirrel): 11 *Pulex irritans;* 40 *Echidnophaga gallinacea;* 107 *Diamanus montanus;* 1 *Ixodes cookei;* 1 *Dermacentor parumapertus;* 27 *Haemolaelaps glasgowi;* 1 *Neohaematopinus laeviusculus.*

3 *Sciurus niger* (Tree Squirrel): 10 *Orchopeas howardii;* 18 *Neohaematopinus sciurinus.*

10 *Cratogeomys castanops* (Pocket Gopher): 200 plus *Geomydoecus geomydis* (heavy infestation); 4 *Hirstionyssus* sp. (being described by Strandtmann and Hunt); 16 *Haemolaelaps glasgowi.*

7 *Perognathus merriami* (Pocket Mouse): 24 *Androlaelaps* sp. (apparently undescribed).

Lagomorpha

2 *Lepus californicus* (Jack Rabbit): 12 *Haemaphysalis leporis-palustris;* 3 *Dermacentor parumapertus;* 2 *Hoplopsyllus affinis.*

Artiodactyla

2 *Tayassu angulatum* (Javelina): 100 *Juxtapulex porcinus;* 25 *Pecaroecus javalli.*

Chiroptera

5 *Pipistrellus hesperus* (Canyon Bat): 1 *Myodopsylla collinsi;* 5 *Spinturnix* sp.; 5 *Liponyssus haemotophagus;* 4 *Ornithodoros* sp. (larvae).

Carnivora

3 *Bassariscus astutus* (Ring Tailed Cat): 1 *Pulex irritans.*

4 *Procyon lotor* (Raccoon): 95 *Pulex irritans;* 4 *Echidnophaga gallinacea;* 1 *Ixodes cookei.*

Arthropods Not Ectoparasitic

Diptera

Aedes atropalpus—Larvae common in temporary rain water held in rocky depressions. Adults were common.

Anopheles punctipennis—No larvae found. Adults were not numerous.

Anopheles pseudopunctipennis—No larvae found. Three adult females taken.

Callitroga macellaria—Adults of the secondary screw worm fly were commonly encountered about every fresh mammal carcass observed.

Musca domestica—Abundant.

Sarcophaga bishoppi, S. plinthophyga, S. fulvipes triplasia and *S. sueta* were common.

Phorocera tachinomoides—Three of these tachinid flies were taken.

Tabanus sp. and *Silvius* sp.—Tabanids were numerous. *Silvius* were especially common along the Pecos River, viciously attacking humans as well as domestic animals. All specimens of this family were so battered when they reached Mr. H. J. Reinhard, Texas A. & M. College, that he was unable to place them specifically.

Coleoptera

Epicauta atrivitala—A single specimen of this large blister beetle was taken.

Acknowledgments: The following persons kindly assisted in determining this material: George C. Menzies and Dorothy Eben, Texas State Department of Health; H. J. Reinhard, Texas A. & M. College; Glen M. Kohls, Rocky Mountain Laboratory; and R. W. Strandtmann, Texas Technological College. The Javelina lice were determined by the Division of Insect Identification, United States Department of Agriculture. The mammals were identified by W. F. Blair, University of Texas.

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1950 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

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Review of Straub's Work on Odonata

Among papers of European publication received within the last two years, one of the most noteworthy is that by **Eberhard Straub,** from the Zoological Institute of the University of Bonn, entitled STADIEN UND DARMKANAL DER ODONATEN IN METAMORPHOSE UND HÄUTUNG, SOWIE DIE BEDEUTUNG DES SCHLÜPFAKTES FÜR DIE SYSTEMATISCHE BIOLOGIE (Stages and alimentary canal of the odonata in metamorphosis and moulting, as well as the significance of the act of transformation for systematic biology). It appeared in the Archiv für Naturgeschichte, N. F., Bd. 12, Heft 1, Leipzig, 1943, pp. 1–93, 12 tables, 13 figs., 1 pl.

Its scope may be perceived from its table of contents (translated): I. Introduction. II. Fundamentals, A. Material, B. Technique, C. General terms, D. Special object: *Aeschna cyanea* Müller. III. Moulting and transformation stages: A. Derivation of a generally applicable method for the identification of the stages of Odonate metamorphosis, B. External course of metamorphosis of *Ae. cyanea*, C. Moulting stages of *Ae. cyanea*. IV. Alimentary canal, tracheae and transverse muscles of *Ae. cyanea*, A. Technique, B. Alimentary canal in situ before metamorphosis, C. Metamorphosis of the alimentary canal and of the rectal tracheae, D. Metamorphosis of the transverse muscles, E. Functions of the rectum. V. Abdominal cuticle and flight muscles of *Ae. cyanea* in metamorphosis. VI. Generalization and discussion of the processes of metamorphosis. VII. Transformation and moulting of the Odonata. VIII. Systematic-biological results of the study of transformation. IX. Summary. Abbreviation list. List of literature.

These researches began at Basle, at the incitation of Prof. A. Portmann and were based on 18 species, belonging to 7 families. The localities in Switzerland for the species are given with suggestions for the transport and rearing of living larvae and imagos.

The author believes that the greatest exactness and reliability in dealing with the developmental stages is to be attained by the determination of a fixed point in the middle of the transformation period. This ideal fixed point he found in a withdrawal stage of the labium. He chose as zero the moment, in the middle of that period, when the imaginal labium has been withdrawn to one-half the length of the lateral margin of the larval labium, as shown at *Me*½ in fig. 13f (following page 82). From 0 out he designates the days with arabic numerals. After 0 they bear positive signs, before 0 negative signs. The method is illustrated in two elaborate tables: 11. External course of metamorphosis of *Ae. cyanea*, following page 82, and 12. Metamorphosis of the gut of *Ae. cyanea*, anatomical findings, following page 84.

The author's rearing normal is determined by a tolerably constant room temperature of about 20 C., sunlight excluded, and optimal food intensity. Under these conditions, eight larvae of *cyanea* went through the last instar in 28 days (range 26–30).

The morphology of the eye region, its changes and homologies are treated on pp. 20–23, the wing rudiments and the labium pp. 23–27, caudal appendages and abdominal processes pp. 27–29.

As a result of experimental feeding he determined that in no case did larvae of *cyanea* seize Tubifex worms after stage − 4¼ days. The earliest respiration through the spiracles occurred at − ½ day. Reduction of locomotion by expulsion of water from the rectum ("Rückstossschwimmen") took place at stage + 1¼ days at the earliest, but complete cessation not before + 1¾; about 1¼ days before the appearance of the imago the larva has completely lost this peculiar faculty.

The author's histological finds of his study of the transforming gut, tracheae and transverse muscles are promised for a later paper. The terminology of the tracheal trunks employed by authors from Reaumur, 1742, to the present work is shown in Table 3, page 43. The metamorphosis of the rectal tracheae is described in detail, pp. 48–52. Tillyard's terminology of the rectal gills is discussed; his terms simplex and duplex systems, holobranch and hemibranch, are rejected but his undulate, implicate, foliate and lamellate types are retained, pp. 52–54, 77.

The period from the cessation of food intake to the last (transformation) moult is designated as the chief metamorphosis

("Hauptmetamorphose"); in the laboratory it occupied nine days, on an average, in *cyanea;* in this period the chief transformation processes occur. Preceding the chief metamorphosis is a premetamorphosis from about stage — 12, the beginning of larval degeneration. Following the chief metamorphosis is the postmetamorphosis in which the rectal tracheae and some abdominal muscles break down. Table 5, page 64, gives a list of the destructive processes in the larval organs of *cyanea* by stages. Some changes in Odonate metamorphosis, especially in the Libellulinae, approach those of holometabolic insects, pp. 65–66.

Details of transformation of 12 species of European Odonata form Table 8, page 69. Four types of transformation are recognized and illustrated by outline drawings, pp. 70–72: 1. Aeschna type, head hanging down, followed by an upswing, transformation position "c" [1] (*Ae. cyanea, Cordulegaster annulatus, Somatochlora metallica*); 2. Calopteryx type, head hanging down, not followed by an upswing, position "c" (*Calopteryx*); 3. Agrion type, head never hanging down, position "b" [1] below the substrate (*Lestes viridis, Platycnemis pennipes, Agrion puella*); 4. Gomphus type, head never hanging down, position "a" [1] above the substrate (*Gomphus pulchellus* and *vulgatissimus, Onychogomphus forcipatus*), pp. 72–78. Table 9, pp. 78–79, summarizes the results of the author's observations on transformation and on moulting by systematic groups and for the Odonata as a whole. Table 10, pp. 80–81, lists the known representatives of the four types of transformation of Odonata from his own observations and from the literature, while some (e.g., *Basiaeschna janata, Didymops transversa*) are inferred from conditions displayed in exuviae, many of which latter he examined in the collection of Dr. Erich Schmidt. The author knows of no cases which can not be referred to one or other of his four types. He adds: The most important result of my researches

[1] Position "a": Standing on a substrate that is horizontal or that is inclined at any angle up to 90° from the horizontal.

Position "b": Hanging from a verticle substrate, or beneath a substrate that is inclined at any angle up to about 60° from the verticle.

Position "c": The same as "b," but the angle may be as great as 90° from the vertical, i.e., horizontal.

on transformation is the emphatically separate position of the Gomphidae. These constitute an exception in every respect. They are the only Odonata which can transform on flat ground and stretch wings and abdomen on the horizontal. The dissolution of the family Aeschnidae (sensu lato), long ago accepted on morphological grounds, has been supported on biological evidence by Portmann (1921). I find this separation confirmed anew by my observations on the act of transformation.

PHILIP P. CALVERT

Review

PORTIER, P., LA BIOLOGIE DES LÉPIDOPTÈRES. 643 pp., 392 figs. Paul Lechevalier, Paris. 1949. (Vol. 23 of Encyclopédie Entomologique.)

At the age of 84 the author has given us this lengthy book which on close inspection turns out to be an elementary presentation of this one order of insects with emphasis on chemistry and on physiological systems. Anatomical descriptions are limited to what the author considers an indispensible minimum, and classification (including means for making determinations) is omitted. The author aims to present objectively what he considers interesting. In the Preface, he deplores the simple enumeration of facts, and says, "This process permits the accumulation of a considerable mass of data in a relatively small space; it further permits the parading of a great erudition which seems to have been the grand preoccupation of certain savants and in particular of German scholars." In contrast, the present author seeks to duplicate the work on Reaumur, Fabre and Perez in making insects 'live,' and "aspires thus to awaken the love for studying Lepidoptera in the greatest possible number of young Frenchmen." This, the author sets out to do by presenting an elementary physiology which is limited to data obtained from representatives of this one order.

The book is divided into 40 chapters. First, the order is characterized, with a general treatment of insect structure. Then, a chapter on eggs is followed by 18 chapters on the various functional systems (nutrition, respiration, excretion, etc.) and habits of caterpillars, by 4 chapters on pupae, and by 11 chapters on adult butterflies and moths. Finally, 5 chapters are devoted to the action of physical and chemical agents, mimicry, geographical distribution, edible species, and the teaching of the biology of Lepidoptera. Much detailed information is given including tabular chemical data.

Likely some allowance should be made because of the restricted communications during the war years, and also for the author's age, but the fact remains that the emphasis is on old data. Most of the work cited is prior to 1930, and very little of the literature of the last decade is mentioned. Unfortunately a large percentage of the references cited in the text are not included in the relatively short bibliography (a common but deplorable habit of numerous French authors), and the illustrations, being largely copied from standard sources, add little to the literature.

Whether or not this book will accomplish its objective of awakening young Frenchmen to a love of butterflies, it does have a certain amount of usefulness to entomologists in general. For one reared in the American educational system it is difficult to see any considerable usefulness for the volume. Personally, I would prefer that students seeking elementary treatments take more general works, rather than restrict their notions of physiology and ecology to one order of insects, and so get a broader background (ignoring the antiquity of much of the data presented).

A. Glenn Richards

EXCHANGES

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

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

Saturnidae of the world. Will purchase individual specimens or cocoons. F. E. Rutkowski, St. Bede College, Peru, Illinois, U. S. A.

Butterflies of New England, principally from New Haven, Conn., for exchange. Louis Clarke, 28 W. Elm St., New Haven 15, Conn.

Wanted—Proc. Ent. Soc. Phila., vols. 1–6; Proc. Cal. Acad. (Nat.) Sci., 1–7; Proc. Acad. Nat. Sci. Phila., 1–8; Trans. Amer. Ent. Soc., 1–5; Bull. Buff. Soc. Nat. Sci., 2–3; Psyche, 11, 13, 15. C. F. dos Passos, Mendham, N. J.

Miridae (Capsidae)—American species wanted, with locality labels, in exchange for British species. D. Leston, F.R.E.S., 6 Frognal Rise, London N. W. 3, England.

Wanted—Entomological microscope in good condition; Spencer, Bausch & Lomb, or other standard make. David G. Shappirio, 4811 17th St., N.W., Washington 11, D. C.

Coleoptera—Large quantities of Cicindelidae, Buprestidae, Lucanidae, Cerambycidae wanted in exchange for all families of Coleoptera from Ill., Ind. and Mo. Joseph B. Hayes, 1905 N. Pulaski Rd., Chicago 39, Ill.

American Sarcophagidae—wanted for identification. H. R. Dodge, 291 Peachtree Street, Atlanta 3, Georgia.

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

ENTOMOLOGICAL NEWS

OCTOBER 1950

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ENTOMOLOGICAL NEWS

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The Purse-Web Spider, Atypus abbotii (Walckenaer), with Notes on Related Species. (Arachnida: Atypidae)

By Sherman C. Bishop, University of Rochester, Rochester, New York

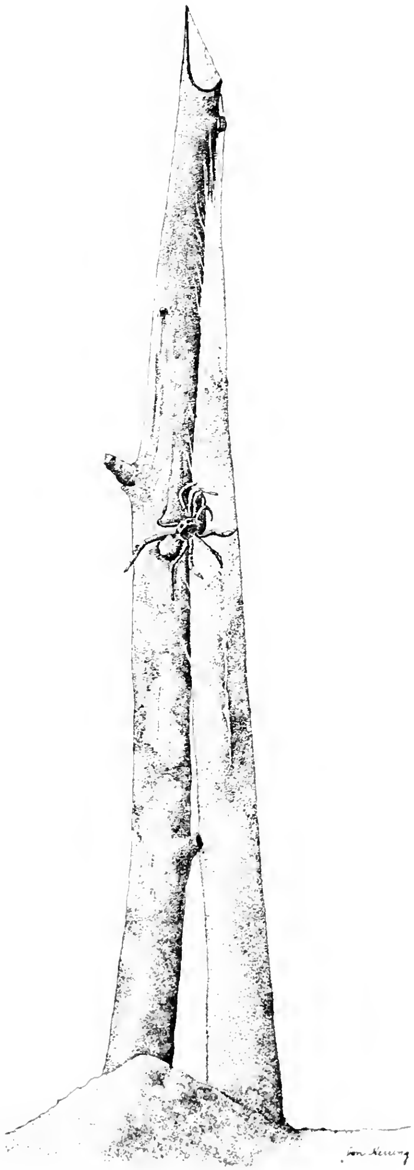
Although some notes on this species were published by H. C. McCook (Proc. Acad. Nat. Sci. Phila., 40: 203–220, 1888), additional information has been obtained on details of web structure and on the habits of the males.

During the summer of 1947 I was introduced to this species in the field by Dr. H. K. Wallace of the Department of Biology, University of Florida, Gainesville. On June 14th we drove to Sugarfoot Hammock, near Gainesville, and Dr. Wallace pointed out webs within a few feet of the car. We found a dozen or more webs within a few minutes and were able to collect adults and juveniles of both sexes and examples of the webs. As in other species of the genus, the webs are tube-like structures attached at their upper ends, and occasionally at the sides, to the trunks of trees or other suitable supports, and continued beneath the surface of the ground varying distances depending on the size and sex of the spiders. The exposed parts of the webs varied in length from a few inches to approximately 15 inches and in width from about one quarter of an inch in webs of juvenile males to seven eighths of an inch in webs of adult females. Webs of very young spiders were not in evidence. The web of one adult female extended five inches below the surface and twelve inches above, in this instance only 41 per cent below the surface as against 60 per cent as reported for the related species, *A. bicolor*, by Martin and Katherine Muma (Ent. News, 56(5): 122–126, 1945). The webs of the males were shorter and more slender than those of the females, as befitting their smaller size. In one instance, the web below the surface of the ground was in two slightly diverging branches.

In order to study the construction of the web, four spiders were removed from their burrows and each confined to a tall glass jar containing several inches of moist sand and a slender stick to serve as a support of the web. A small hole punched in the sand at the base of each stick was promptly adopted by the spider as a retreat. Three of the four captive spiders responded the night of June 14th by beginning the construction of webs. The web of the largest specimen (Fig. 1), a juvenile male, was 1¾ inches long on the morning of the 15th. On the morning of the 16th the web was 3 inches long and the basal two-thirds had a coating of sand derived from widening and deepening the hole. The web was lengthened to 3¾ inches by the 17th. There was little further evidence of activity until June 19th when the web measured 4 inches in length. A small pile of sand at the base of the tube indicated that the hole had again been deepened and that the sand had been carried up within the tube and dropped from the opening at the top (fig. 1). There was no evidence that the sand had been formed into pellets as reported for *A. bicolor.* Little additional work was done on the web but on July 20th the male, now mature, was found on the surface of the sand and his cast skin on the side of the tube.

Another juvenile male, confined on June 14th, emerged from his web during the night of July 3d, left his shed skin on the web and wandered aimlessly on the surface of the sand. A third specimen started the construction of a web but abandoned the effort after a day or two. The fourth specimen, quite possible injured during capture, failed to survive.

In the field two webs judged to belong to males, because of their slender form and small size, were found to be abandoned. This circumstance and the fact that males in captivity abandoned their tubes upon attaining maturity suggests that the females are sought in their webs for mating.



Web of *Atypus abbotii* and exuviae of a male

The males in life are strikingly colored. The abdomen is irridescent blue, the remaining parts of the body deep black except for the tips of the tarsi which are light brown. The legs in both sexes are very flexible and appear somewhat inadequate to support the body away from the web.

McCook mistakenly identified *Atypus niger* Hentz [= *A. milberti* (Walckenaer)] as identical with *A. abbotii* and apparently did not know *A. bicolor* which had been described by Lucas (Ann. Ent. Soc. France, 5: 213, 1836). A paper describing the habits of *A. niger* Hentz has been generally overlooked by students of the Atypidae and is not included in the bibliographies of Roewer (Katalog der Araneae, 1942), in Bonnet (Bibliographia Araneorum, 1945) or in W. J. Gertsch's revision of "The Nearctic Atypidae" (Amer. Mus. Novitates, No. 895, 1936). This paper is by W. L. Poteat and was published in the Journal of the Elisha Mitchell Scientific Society (6(2): 134–147, 1 pl., 1 fig., 1890). It is an excellent account of what is now known as *A. milberti*, since no mention is made of the bright red legs which are characteristic of *A. bicolor*, and since the specimens came from Wake Forest, North Carolina, a locality too far north for *A. abbotii*. The drawing of the web and shed skin of the male was made by Jon L. Herring.

Zoraptera from Georgia

In view of the recent article by Valentine and Wilson (Entom. News, 60 (7): 180, 1949) giving records of the order Zoraptera from Alabama, a small number of these insects in the collection at Eastern Illinois State College seems worthy of note.

In March, 1915, Dr. Charles S. Spooner collected seven specimens of *Zorotypus hubbardi* Caudell at Thomasville, Georgia Two of the seven are apterous males, three are apterous females, and two are dealate females. Apparently this is the first record of the order from Georgia.

Garland T. Riegel,
Department of Zoology,
Eastern Illinois State College,
Charleston

A New Genus and Species of Dacnusini (Hym.: Braconidae) [1]

By GARLAND T. RIEGEL, Eastern Illinois State College, Charleston

In order to make the names available for use elsewhere, the following descriptions are offered at this time.

There are three genera of the tribe Dacnusini Nixon that have hairy eyes. This hair may be short, sparse, and visible only at high magnification in strong light. The three genera may be separated by the following key:

1. Cell *2Cu* open below (outline of vein gone, though its former position may be indicated by fold in wing membrane and/or some dark pigment) 2

1- Cell *2Cu* closed below by a definite vein (not just a fold and/or dark pigment); stigma short, wide; labial palps with 4 segments; females occasionally with abdomen greatly compressed and attenuated .... *Chaenusa* Haliday.

2. Wing with vein $R_s + M$&M gone (not just obsolescent), stigma short, wide; labial palps with 3 segments; female abdomen short; gonoforceps of male genitalia not stocking-shaped in lateral view; second valvifer of female genitalia with large phragma above insertion of ovipositor sheath, and dorsal plate of proctiger firmly fused to ninth tergum...... .... *Chorebidella* gen. nov.

2- Wing with vein $R_s + M$&M present or obsolescent (seldom completely gone), stigma long; labial palps with 3 segments; females of some species with abdomen greatly compressed and attenuated; gonoforceps of male genitalia stocking-shaped in lateral view; second valvifer of female genitalia with small or no phragma above insertion of ovipositor sheath, and dorsal plate of proctiger attached to ninth tergum by narrow rod............................ *Chorebidea* Viereck.

CHOREBIDELLA gen. nov.

Head slightly transverse, somewhat concave behind when viewed from above; temples broad; eyes hairy, short oval;

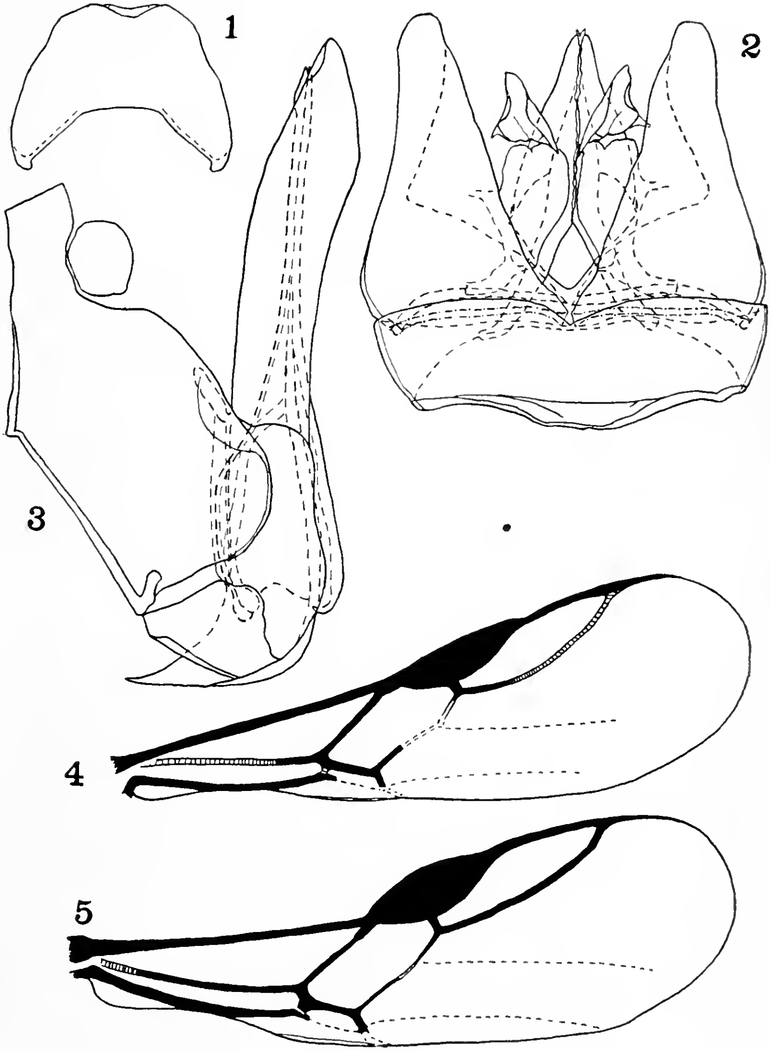
[1] Contribution from the Entomological Laboratories of the University of Illinois. Published by permission of the Graduate College. Extracted from a doctor's thesis submitted in 1947.

clypeus prominent, long, with apical rim; maxillary palps 5-segmented; labial palps 3-segmented; frons with median elevation, not a definite carina; segments of flagellum of antennae with parallel longitudinal ridges; thorax shagreened and therefore with a soft surface appearance; notaulices not distinct; propodeum with median carina on dorsal face, posterior face areolated with fine ridges; anterior wing with vein $R_s + M\&M$ completely effaced; cell *2Cu* open below; stigma prominent, ovate-lanceolate; vein R_s more or less evenly curved, apex remote from tip of wing; cell $2R_1$ longer than stigma; petiole with longitudinal ridges, rather triangular, twice as wide at apex as at base; abdomen spatulate, depressed; fused second and third tergites longer than petiole; setation of tergites sparse, in a single row across each segment; tibiae incrassate; last segment of tarsi dilated; ovipositor slightly exserted; ninth tergum of female broadly joined to dorsal plate of proctiger; gonoforceps of male without dorsal elongations at tips.

Genotype.—Chorebidella bergi sp. nov.

This genus is related to both *Chorebidea* Vier. and *Chaenusa* Hal. It exhibits characters of both genera, and thus seems in some ways to bridge the short gap between them. However, considering the present state of our knowledge of this complex, it seems best to retain the three genera for the time being. Differences and similarities can be appreciated by studying the above key.

As for other characters, the shape of the petiole is nearer to *Chorebidea* than to *Chaenusa*, but the rest of the abdomen and the general habitus favors *Chaenusa*. The male genitalia of *Chorebidella* resemble those of neither genus very closely, though they tend to be more like *Chaenusa*. The latter differs in having accessory lobes on the gonolaciniae and differently shaped gonoforceps. *Chorebidea* differs in having extremely elongated gonolaciniae (when viewed ventrally), and peculiar stocking-shaped gonoforceps. The female subgenital plate of *Chorebidella* resembles that of most species of *Chaenusa*, and the female genitalia in general are definitely closer to *Chaenusa* than to *Chorebidea*.



EXPLANATION OF PLATE

FIGS. 1–5, *Chorebidella bergi* sp. nov. (All figs. not enlarged to same scale.)

FIG. 1. Apical sternite of female, ventral aspect.
FIG. 2. Male genitalia, ventral aspect.
FIG. 3. Female genitalia, left lateral aspect.
FIG. 4. Right fore wing of female.
FIG. 5. Right fore wing of male.

Chorebidella bergi sp. nov.

Color brownish-black; legs, especially trochanters (including distal end of coxae and proximal end of femora), slightly lighter in color; palps light brown; wings with stigma and veins brown, membrane with brownish cast; disc of mandibles and antennae, brown.

Male.—Length, exclusive of antennae, about 2 mm. Head, as seen from above, transverse, being 1.4 times as wide as long; more or less impunctate and shining above, with a few scattered silvery hairs; eyes ovate, with sparse, fairly long setae; maxillary palps 5-segmented; labial palps 3-segmented; frons with a slightly shagreened appearance, a slight elevation longitudinally on upper half, not a definite carina; clypeus slightly projecting in lateral view, with a definite rim ventrally; antennae 19- to 22-segmented.

Mesonotum shagreened, with scattered fine silvery hairs; notaulices more or less lacking except for a median impression on the posterior third; mesopleuron and mesosternum shagreened, the latter with evenly spaced silvery hairs; propodeum rather evenly rugulose, but with several definite cells formed by raised lines; spiracles rather projecting, hidden under long silvery hairs; wing (fig. 5) with vein $R_s + M\&M$ missing, cell *2Cu* open below, stigma short, heavy, lanceolate, more prominent than in female.

Petiole 1.8 times as long as wide at apex, with several longitudinal uneven ridges; abdomen spatulate, about as long as head plus thorax; genitalia as in fig. 2.

Female.—About the same as the male, except for less prominent stigma (fig. 4); antennae with 16 to 17 segments; genitalia as in fig. 3, and apical sternite (subgenital plate) as in fig. 1.

Holotype, male.—Third Sister Lake, Washtenaw County, MICHIGAN, emerged May 14, 1942, from puparium of *Hydrellia cruralis* Cresson collected May 3 on *Potamogeton amplifolius* Tuckerm. by C. O. Berg. Deposited in the U. S. National Museum (Type No. 59894).

Allotype, female.—Nichols' Bog, Cheboygan County, MICHIGAN, emerged July 30, 1941, from puparium of *Hydrellia* sp. collected July 5 on *Potamogeton oakesianus* Robbins by C. O. Berg. Deposited in U. S. N. M. (59894).

Paratypes.—CONNECTICUT: Mill River, Mount Carmel, Aug. 2, 1947, on floating leaves of *Nymphaea*, Kathryn M. Sommerman, 4 ♂♂, 1 ♀; same data except G. T. Riegel, 7 ♂♂, 2 ♀♀; same data except Aug. 4, 1947, on leaves of *Nymphaea* and stems of Cyperaceae, G. T. Riegel, 50 ♂♂, 3 ♀♀. MICHIGAN: Nigger Creek, Cheboygan Co., emerged Sept. 3, 1941, from puparium of *Hydrellia* sp. collected Aug. 21 on *Potamogeton alpinus* Balb. by C. O. Berg, 1 ♀. NEW YORK: Canadarago Lake, July 15, 1935, H. K. Townes, 1 ♂; Goodyear Lake, Milford Center, Aug. 20, 1935, on lily pads, H. K. Townes, 1 ♂.

Paratypes to be deposited in the collections of the U. S. N. M., the Illinois Natural History Survey, the Connecticut Agricultural Experiment Station, the British Museum, the Canadian Dept. of Agriculture, the University of Michigan Museum of Zoology, the Museum of Comparative Zoology, the Philadelphia Academy of Natural Sciences, and the personal collections of A. W. Stelfox (Dublin), Ch. Ferriere (Geneva), H. K. Townes (Raleigh) and the writer.

Hosts.—*Hydrellia cruralis* Cresson and *H. ascita* Cresson (Diptera: Ephydridae).

This species is named in honor of Dr. C. O. Berg, Ohio Wesleyan University. Dr. Berg through his studies of the insect fauna of *Potamogeton* has greatly increased our knowledge of the semiaquatic Hymenoptera. Dr. Berg has informed me in correspondence that the only *Hydrellia* reared from the Aug. 21, 1941, collection from *Pot. alpinus* was *H. ascita*. Therefore, we can assume that *ascita* was the host of the female paratype from Michigan.

The series of specimens which I collected in Connecticut were taken with an aspirator from the floating leaves of a water lily (*Nymphaea*) and the stems of a sedge. The insects were very active in the bright sunlight of late afternoon, flying around the lily leaves which were heavily mined by fly larvae. None were taken on unmined leaves in shady places. Many other dacnusines and many *Hydrellia* adults were present. At dusk the parasites left the lily pads for the sedge stems, where they congregated in numbers, all resting head upwards about three inches above the water line.

Fertility in Species Crosses in Mosquitoes

By James B. Kitzmiller, University of Illinois, Urbana, Illinois

The problem of speciation is one that is receiving much attention at the present time from systematists and geneticists. One of the points at issue is the interfertility or intersterility of populations which are considered to be species. This note does not presume to take sides on the correctness of the concept of interspecific sterility as a criterion for specific differentiation, but merely reports some experiments which confirm the fact that fertility may exist between populations which are usually regarded by taxonomists as species.

Farid (1949) and Sundararaman (1949) have recently reported crosses between two common mosquitoes, *Culex pipiens* and *Culex quinquefasciatus*. Weyer (1936) also reports hybridization in European forms. These investigators have reported fertility in F_1, F_2, and back cross generations in crosses between these two species. Experiments conducted in this laboratory support these results and suggest that fertility between these species is not an isolated phenomenon but is perhaps of widespread occurrence.

Experiments on the hybridization of these two forms were begun by the author at Fort Knox, Kentucky in 1944. Larvae of *Culex pipiens* and of *Culex quinquefasciatus* from Hardin County Kentucky were isolated and hatched. *Pipiens* × *quinquefasciatus* and *quinquefasciatus* × *pipiens* crosses were made, using virgin females for both crosses. Three generations of hybrids were raised (F_3), with no noticeable loss of fertility of viability. These experiments, interrupted by overseas duty, were resumed in February 1948, at the University of Illinois. Stocks of *Culex pipiens* were collected in Champaign, Illinois and stocks of *Culex quinquefasciatus* were received from Galveston, Texas.

The experiments in this laboratory are designed to test the genetic basis for taxonomic differences in mosquito populations. These results will be reported separately, but in the progress of these experiments, crosses between *Culex pipiens* and *Culex* *quinquefasciatus* have been made as a matter of routine, and nothing has been noted to indicate any degree of sterility between the two stocks in this laboratory. The procedure has been to mate several virgin females of one species to males of the other, obtain F_1 egg rafts, raise these larvae separately, and cross F_1 females by F_1 males. All F_1 individuals are from the same egg rafts. No difficulty has been experienced in obtaining F_1 and F_2 generations.

Our results confirm those of Farid and Sundararaman. In view of these facts, it seems that the barrier of interspecific sterility does not exist, at least in our laboratory stocks, between these species.

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WEYER, F. 1936. Kreuzungsversuche bei Stechmücken. Arb. phys. ange. ent. Berlin-Dahlem., 3: 202–208.

A New Philippine Rhyacophila of Unusual Interest (Trichoptera, Rhyacophilidae)

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

In caddisfly material collected in the Philippine Islands by Mr. Harry Hoogstraal in 1946 were two collections of a species of *Rhyacophila*, a genus not hitherto reported from the Islands. It proved to be quite different from described species from Formosa and other parts of the Oriental region, but to have striking affinities with the Nearctic fauna.

The genus *Rhyacophila* is composed almost entirely of small complexes of one to a few species, the various complexes extremely distinct from each other and frequently difficult to relate to each other. In North America one such distinctive unit is the *carolina* complex, apparently restricted to eastern North

America and Puerto Rico, and characterized by the curious shovel-shaped lower portion of the aedeagus. Its closest known relative has been the *hyalinata* complex, restricted to the western montane region of North America, and possessing sufficient distinctive characters to indicate a fairly remote relationship between the two.

Dissection of the Philippine species revealed that it is a much closer relative of the *carolina* complex than is the *hyalinata* complex, as evidenced by the scoop-shaped aedeagus and double anal plates; yet at the same time the lateral processes of the scoop in the Philippine species are quite unlike species of the *carolina* complex and instead are suggestive of similarly situated processes found in the *hyalinata* complex. The most logical inference seems to be that all three groups arose from a common and widely distributed ancestor, whose population became fractured into at least three elements, one in the Appalachians, one in the Rockies, and one in the Philippines, each segregate remaining isolated and localized for a great length of time and developing into a distinctive complex.

Rhyacophila davao new species

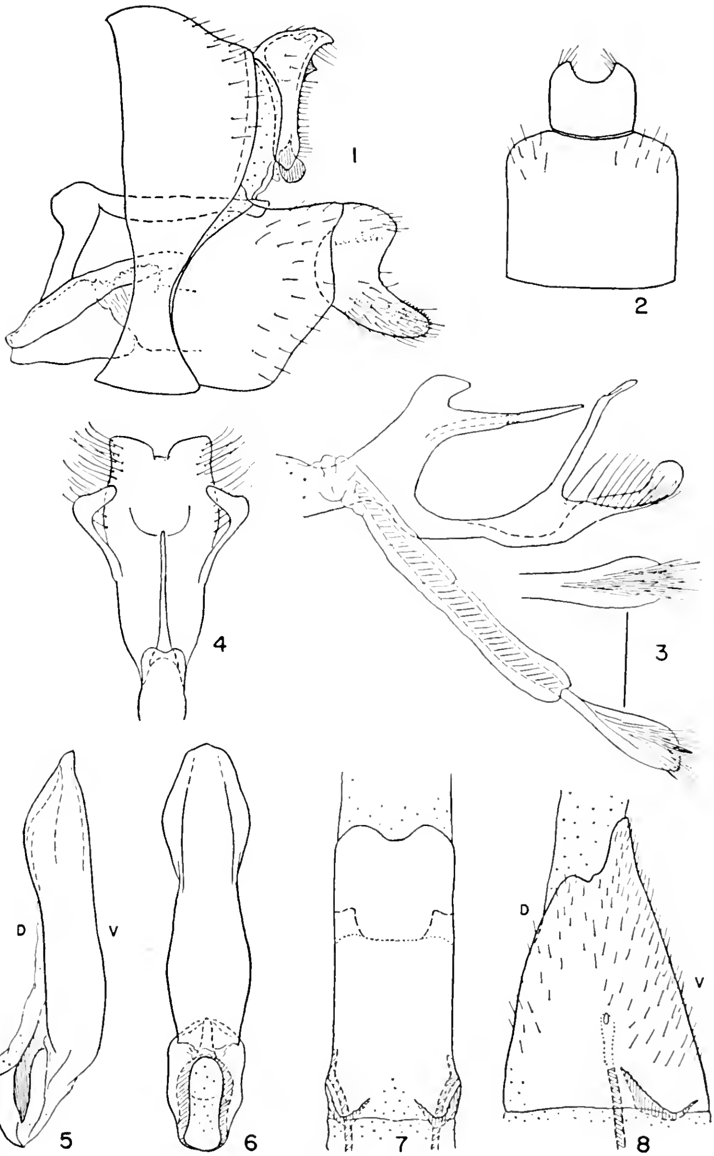
Male.—Length 7.5 mm. Color of body and appendages light yellowish brown except for the dorsum, which is a darker and richer brown, and the wings, which have the stigmal area slightly darker. General structure typical for genus. Genitalia as in figs. 1–4. Ninth segment long dorsad, narrowed to a thin strap near ventral margin, the base of the dorsal margin elevated into a hump. Clasper short and deep, basal segment much deeper than long and with a nearly angulate posterio-ventral corner; apical segment also short and deep, with a rounded dorsal heel and a produced, rounded ventral toe. The inner

---

Figs. 1–8

Explanation of Plate

Rhyacophila davao new species. Fig. 1. Male genitalia, lateral aspect. Fig. 2. Same, dorsal aspect of tergites. Fig. 3. Aedeagus, lateral aspect. Fig. 4. Mesal portion of aedeagus, dorsal aspect. Fig. 5. Spermatheca, lateral aspect. Fig. 6. Same, ventral aspect. Fig. 7. Eighth segment, ventral aspect. Fig. 8. Same, lateral aspect. *D*, dorsal side; *V*, ventral side.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face of the clasper bears a dorsal strap running from the base to the dorsal fulcrum of the aedeagus and two patches of dark peglike spines on the apical segment, their position shown by stippling in fig. 1. Tenth segment short but deep, its dorsal margin projecting forward, its dorsal aspect excavated, fig. 2, its ventral extremity ending in a pair of separate, ovate anal plates. Aedeagus with a complex internal basal structure composed of a dorsal fulcrum articulating with the claspers and tenth tergite, and an irregular vasiform base from which arises the body of the aedeagus. Body of aedeagus, fig. 3, composed of a pair of long, lateral arms, each ending in a spatulate lobe bearing a mesal brush of stiff hair, and having a sclerotized base extending down the full length of the arm; and a mesal portion formed of (1) a dorsal portion, subdivided into a short, slightly bifid, dorsal process, and a longer, slender, single portion bearing the penis opening, and (2) a ventral, scoop-shaped portion which is divided at extreme apex into two oblique short lobes, and bears laterally a pair of long slender arms projecting almost directly dorsad. Between these lateral arms and the apex, the scoop bears an irregular series of long bristles.

Female.—Length 8 mm. Color and general structure as for male. Eighth segment moderately long; lateral aspect, fig. 8, widest at base, tapering gradually to apex, ventral side much longer than dorsal, with a crescentic invagination near base, and with tendon not reaching the small apodemal opening; ventral aspect nearly parallel sided as seen in a cleared specimen, fig. 7, the apical margin gently incised, the apex of the dorsal margin ending in sharp lateral corners joined by a membranous intervening area. Spermatheca, figs. 5, 6, heavily sclerotized, robust and pointed, the ventral aspect with an expanded portion just beyond middle.

Holotype, male.—East slope of Mt. McKinley, elev. above 3000 feet, Davao province, Mindanao, PHILIPPINE ISLANDS, Aug. 22, 1946, H. Hoogstraal (Chicago Natural History Museum). *Allotype, female*.—Same data, but Aug. 21. *Paratypes*.—Same data as for holotype, 2 ♂, 1 ♀; same data as for allotype, 1 ♂; in the collections of the Chicago Natural History Museum and the Illinois Natural History Survey.

Biological Notes on Corythucha morrilli O. & D. (Hemiptera: Tingidae)

By J. W. Tilden, San Jose, California

This was the only tingid found in association with *Baccharis pilularis* D. C. It is abundant where found but appears to be local in distribution. No reference was found to indicate that any species of *Corythucha* has been recorded from this plant, but the literature on Tingidae is so extensive that such a reference may have been overlooked. In the original description [1] the authors say that this "is a very common species in the southwestern portion of the United States. We have numerous specimens from Colorado and Arizona." No definite type locality nor host plant is given. Since *Baccharis pilularis* is absent from much of this region, it seems evident that this plant is only one of the plants used as a host by this insect, and that it therefore is not host specific on *Baccharis*.

Adults confined in the laboratory Feb. 23, 1947, began at once to feed. Excrement is voided as dark droplets that adhere to the leaves. Feeding punctures cause yellow spots due to the removal of the mesophyll of the leaf, and together with the excrement give a characteristic appearance to infested leaves. Feeding is in every respect similar to that of other phytophagous Heteroptera. The rostrum is lowered to the leaf surface, the labium bending to allow the stylets to enter the tissue. The stylets are inserted with a sawing motion. Both sexes vibrate from side to side during feeding, and also bob up and down both when feeding and resting. These movements are conspicuous when many individuals are present on a leaf, but are performed as individual acts, not in unison.

Oviposition was noted first on Feb. 26. The ovipositor is dropped downward and forward, being hinged anteriorly and free posteriorly. The leaf is punctured with a rocking motion until the ovipositor is nearly buried in the leaf tissue. The egg is then deposited with considerable effort. Withdrawal of the ovipositor appears to require all of the female's strength, and

[1] Osborn, H., and C. J. Drake, Ohio Journ. Sci., 17, page 298, 1917.

is accompanied by repeated tuggings and rocking motions. The blades come free with a sudden jerk and the female braces herself strongly to maintain balance.

After the ovipositor is free the female exserts a tubule and deposits a droplet of dark fluid onto the egg puncture, sealing it. This fluid appears to aid in prevention of desiccation. The fluid seems to be of low specific gravity, and flattens out at once, covering an area larger than the puncture. The fluid does not dry completely during the development of the egg, but remains viscous until the egg hatches. This was tested repeatedly by touching the droplets with a fine needle.

The egg is flask-shaped, with the micropylar end nearest the puncture. The egg swells considerably, by imbibition of liquids from the plant tissue. The chorion is fragile and the egg soft and easily distorted upon removal from the leaf tissues. It seems likely that this lack of rigidity allows for necessary distortion that accompanies the accommodation of the egg to the dimensions of the puncture.

Egg laying proceeds rapidly. One female laid fifty-six eggs in four days. Both the upper and lower surfaces of the leaves are used, apparently without preference. Of the fifty-six eggs mentioned above, twenty-seven were on the upper surface and twenty-nine on the lower surface. The lower surface is, however, much more favored by the nymphs.

After an egg is laid, the female moves forward a few millimeters and begins almost at once to feed. This habit of ovipositing and then feeding causes the eggs to be placed in irregular lines, indicating that the female has oviposited, then fed, then oviposited again, repeatedly.

Eggs laid Feb. 26 hatched March 14, after 16 days. Ecdysis was noted on March 17, March 20, and March 28, disclosing the fourth instar. An oversight in feeding caused the death of these nymphs on April 1. Eggs laid March 24 hatched on April 3, ten days later. The shorter hatching time is attributed to the general rise in temperature due to the advance in season. These nymphs molted on April 8, 11, 14 and 16, with adults appearing April 18. This group thus showed stadial times of 5, 3, 3, 2 and 2 days, with 5 instars and a nymphal period of

15 days. This together with the hatching period of 10 days gives a life history of 25 days from egg to adult for this reared brood.

Eggs obtained from this laboratory-reared generation were reared without any significant variation in life history. It would appear that a species with such a short period of development must produce several generations a year. Plants examined in the field as checks showed that *Corythucha morrilli* has a long reproductive season and that the species builds up large populations. Adults remained alive in the laboratory for as long as twenty-nine days, continuing to lay eggs throughout this time.

Determination is through the kindness of Dr. R. L. Usinger.

An Easy Way to Make Entomological Drawings

By George C. Steyskal, Grosse Ile, Michigan

Many a worker has shied away from illustrating a part, complex genitalia, wing venation, etc., because of lack of artistic skill or a fancied difficulty of drawing objects under the binocular microscope. At its best the camera lucida is cumbersome, especially when used with the binocular. The lighting is critical, the drawing plane must be carefully adjusted and firmly fixed in one position, the size of the drawing is difficult to control, and the instrument is costly.

Many workers use another method which obviates all these disadvantages and is possibly even more accurate. This method may be called the ocular grid method since it involves the use of a cross-ruled reticle inserted in one eyepiece of the microscope. Such a reticle costs less than ten dollars and a good substitute may even be made at practically no cost by ruling a piece of cellulose acetate or plexiglas or other plastic with very fine lines scratched into the material with a sharp pointed metal tool held in a toolmaker's height gage or laid on a planer gage or gage blocks. The scribing tool is brought alongside the plastic held firmly on a square object so that it may be turned 90°. The scriber and the measuring tool on which it is held are slid across a smooth surface and very light pressure applied to the scriber against the plastic. A convenient distance to space the lines is 0.025 inch. A bacteria counting reticle is also serviceable.

The reticle is placed face down inside the eyepiece on a ledge that is provided for the purpose. It provides a screen of fine lines in the field. If the ledge is properly located, the lines should be sharply in focus. If not, try interchanging the top and bottom lenses of the eyepiece—they may have been wrongly assembled after cleaning—or move the ledge to its correct position. If the latter is not feasible the reticle may be blocked up with bits of plastic cemented around the edge of the reticle. The reticle does not interfere with examination of specimens and may even be left in the ocular if its presence is not found too annoying since it is also convenient for making comparative measurements.

The drawing is made on graph paper with an ordinary soft pencil. I use an easily obtainable paper ruled five squares to the inch with pale green lines. The outlines of the object are easy to duplicate by following them through the squares and drawing lines in corresponding squares on the paper.

By ruling off sets of two, three or more squares on the paper drawings may be made to various scales. For example, if the object is ten squares long the drawing may be made two inches long (two times five squares) by letting one square of the paper equal one square of the grid, or it may be made four inches long by making four squares of the paper equal one square of the grid and ruling the paper accordingly.

To transfer the drawing to the paper on which the final ink drawing is to be made (I use three-ply Strathmoor bristol board), I blacken the back of the graph paper with a very soft lead pencil, such as Eberhard Faber's No. 6325 Ebony, and trace the drawing with the carbon paper thus made onto the bristol board with a mimeograph stylus or a plain nail with the point buffed smooth. If it is desired to reverse a drawing it may be laid face down on the ink board and traced or rubbed from the back. The use of a soft pencil in drawing assists at this point.

The drawing may be sketched directly on the bristol board by lightly ruling the board with suitable squares, but I consider the use of graph paper more advisable for a number of reasons. Firstly, when the transfer method is used very little erasing is necessary on the ink drawing while unlimited erasing may be done on the graph paper. Secondly, notes may be made on the sketch without worrying about having to remove them. Thirdly, should something happen to the ink drawing another can be made from the sketch on the graph paper.

I have made full plate drawings by the method outlined above in three hours. I hope that its use may result in lightening entomological labors and provide more illustrations.

Aural Myiasis by Musca vicina (Dipt.)

By John W. H. Rehn, Academy of Natural Sciences of Philadelphia

Many cases of accidental myiasis, including infestations of the ear, due to *Musca vicina* or *M. domestica* have been recorded. However, in most recorded instances it appears that the larvae have attacked only diseased tissues [1] while in the case here considered no diseased or traumatic condition was observed.

At Gaya, Eritrea in September 1942 a single mature larva of *Musca vicina* was removed from the external meatus of a Sudanese laborer. The ear was not injured in any way but did contain a considerable quantity of wax. The laborer when he reported at a dispensary stated that he had been having an ear ache for four days. The larva was removed and the laborer returned to work. Some hours later he was questioned regarding the ear ache and stated that it had disappeared shortly after the removal of the larva.

It would seem probable that the larva had entered the external meatus when the laborer was either asleep or lying on the ground. In the general area fly breeding was abundant at this time. Whether the larva had actually undergone any development in the ear is not known.

[1] James, M. T., The Flies That Cause Myiasis in Man, U. S. Dept. Agr. Misc. Pub. No. 631, p. 141 (1947).

A Preoccupied Subgeneric Name in Andrena (Hymenoptera: Apoidea)

By U. N. Lanham, Department of Zoology, University of Michigan

The subgeneric name *Cryptandrena* was proposed by me in September, 1949 (University of California Publications in Entomology, vol. 8, p. 222) for a group of species related to *Andrena carlini* Cockerell, with that species as the genotype. Professor C. D. Michener has called my attention to a paper by Pittioni (1948, Boll. Istituto Ent. Univ. Bologna, vol. 17, pp. 46–61) in which the name *Cryptandrena* was proposed as a subgenus of *Andrena.*

I propose the name *Bythandrena* to replace *Cryptandrena* Lanham 1949, not Pittioni 1948.

IXth International Congress of Entomology

The ninth International Congress will be held at Amsterdam, the Netherlands, from the 17th to the 24th of August. The general sessions and most of the sectional meetings will be held in the "Indish Institute."

The Congress will include meetings of the following sections:

(1) Systematics and morphology, (2) Nomenclature, (3) Genetics and ontogeny, (4) Physiology, (5) Ethology (analytical behavior studies), (6) Ecology and biology, (7) Zoogeography, (8) Agricultural entomology and beekeeping, (9) Forest entomology, (10) Tropical agricultural entomology, (11) Stored-products entomology, (12) Medical and veterinary entomology, (13) Insecticides and insecticidal technique, (14) Arachnoidea.

A number of symposia will be organized, excursions will be planned and, after the Congress, the proceedings will be published.

Those planning to attend the Congress should write at once to The Secretariat of the IXth International Congress of Entomology, 136 Rapenburgerstraat, Amsterdam, The Netherlands, announcing their intention and mentioning the section or sections in which they are primarily interested, in order to be placed on the mailing list to receive further particulars. One may even receive a personal invitation, if required, by writing to the Hon. Gen. Secretary, J. de Wilde.

Current Entomological Literature

COMPILED BY R. G. SCHMIEDER

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1950 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Baumgartner, F. M.—A preliminary study of the effects of certain insecticides upon the wildlife of north central Oklahoma. [Proc. Okla. Acad. Sci.] 29: 6–10. **Blackwelder, R. E.**—Alan Sloan Nicolay, 1893–1950. (Obituary with portrait and bibliography.) [Col. Bull.] 4: 33–37. **Bourgogne, J.**—Léon Lhomme, 1867–1949. [110] 6: 61–62. **Bullough, W. S.**—Practical invertebrate anatomy. xi–463 pp. MacMillan, London. 1950. **Danser, B. H.**—A theory of systematics. [Bibl. Biotheoretica] 4 (3): 1–180. **Dobzhansky, T.**—Evolution in the tropics. [Amer. Sci.] 38: 209–21. **Franz, H.**—Das Studium geographischer Rassen und seine Bedeutung für die Lösung tiergeographischer und stammesgeschichtlicher Probleme. [Z. Wiener Ent. Ges.] 35: 3–15. **Gregory, W. K.**—Parallel and diverging skeletal evolution in vertebrates and arthropods. [100] 4: 164–71. **Klapperich, H.**—Hans Wagner. Vaclar Machulka. (Obituaries.) [Col. Bull.] 4: 20. **Malies, H. M.**—Hints on photomicrography for the entomologist. [51] 7: 313–22. **Mequignon, A.**—Le peuplement entomologique des Açores. [Mem. Soc. Biogeogr.] 8: 109–34, 1946. **Neave, S. A.**—Nomenclator zoologicus. Vol. 5, 1936–1945. London, Zoological Soc., of London, 1950. Pp. v + 308. **Renkonen, O.**—Discussion on the ways of insect synecology. [Oikos, Copenhagen] 1: 122–26. **Ross, E. S.**—The rôle of the entomological museum. [60] 26: 1–10. **Russo, G.**—Filippo Silvestri. (Obit. and bibliography, with portrait.) [Riv. di Parass.] 11: 1–11. **Shoumatoff, N.**—Andrey Avinoff (1884–1949). [Lep. News] 4: 7–9. **Théodoridès, J.**—Observations écologiques dans l'état de New Jersey. [Rev. Canad. Biol.] 9: 9–27. **Tischler, W.**—Grundzüge der terrestrischen Tierökologie. Fried. Vieweg & Sohn, Braunschweig 1949, 220 pp. **Wade, J. S. and B. B. Pepper**—George Ware Barber. (Obituary.) [45] 58: 55–59. List of publications on entomology and related subjects by George Ware Barber, 1918 *et seq.*, compiled by J. S. Wade. *Ibid.* 61–68. **Weiss, H. B.**—Alan S. Nicolay. (Obituary.) [45] 58: 95–96. Leland Ossian Howard, 1857–1950. (Obituary.) *Ibid.* 87. Preservation of biological specimens in plastic. [45] 58: 60. **Wheatley, G. A. and S. Z. Moczarski**—An insect barrier utilizing high-frequency current. [53] 165: 766–67. **Williams, C. B.**—Doctor Johnson's report on Aphis fabae and insect drift. [Rothamstead Expt. Sta.] Report for 1948: 68–69, 1949. **Wing, M. W.**—Professor Dr. Hermann A. Eidmann, an obituary notice. [45] 58: 130–31. **Zuidema, H. P.**—A new fossil insect and plant locality in Montana. [Papers Mich. Acad. Sci.] 34 (1948): 119–23, 1950.

ANATOMY, PHYSIOLOGY, MEDICAL—Beadle, L. C. and J. Shaw—The retention of salts and the regulation of the non-protein nitrogen fraction in the blood of the aquatic larva, Sialis lutaria (Neuropt.). [40] 27: 96–109. **Bergold, G. und G. Schramm**—Biochemische Charakterisierung von Insektenviren. [Biol. Zentralbl.] 62: 105–18, 1942. **Beutler, R.**—Zeit und Raum im Leben der Sammelbiene. [Die Naturwiss.] 37: 102–05. **Bodine, J. H.**—The effects of sulfanilamide upon the oxygen uptake of mitotically active and blocked grasshopper embryos. [12] 98: 94–97. **Buchli, H.**—La parthénogenèse, les rapports entre sexués et leur influence sur la ponte chez Reticulitermes lucifugus. [C. R. Acad. Sci.] 230: 1697–99. **Cloudsley-Thompson, J. L.**—Epicuticle of Arthropods. [53] 165: 692–93. **Cousin, G.**—Étude expérimentale et quantitative de l'hérédité interspecifique. Transmission de la forme et de ses potentialites évolutives. Croisement Gryllus campestris × G. bimaculatus. [Memoirs Acad. Sci. L'Inst. Franc.] 64: 1–213, 1940. **Dierick, G. F. E. M.**—Breaking of diapause in the winter egg of the European red spider (Acarina). [53] 165: 900. **Dobzhansky, Th.**—Genetics of natural populations. XIX. Origin of heterosis through natural selection in populations of Drosophila pseudoobscura. [Genetics] 35: 288–302. **Donner, K. O. and G. Kriszat**—Die elektrophysiologisch bestimmte Sensitivtätsverteilung des Fliegenauges im sichtbaren Spektrum. [10] 42A (14): 1–7. **Fraenkel, G., with M. Blewett and M. Coles**—The nutrition of the mealworm, Tenebrio molitor L. (Col., Tenebrionid). [Physiol. Zool.] 23: 92–108. **Gahan, J. B. and J. M. Weir**—Houseflies resistant to benzene hexachloride. [80] 111: 651–52. **Gese, P. K.**—The concentration of certain inorganic substances in the blood of the Cynthia pupa, Samia walkeri. [Physiol. Zool.] 23: 109–13. **Goodwin, T. W. and S. Srisukh**—A biochemical description of locust coloration. [Biochem. Jour.] 46 (4): xvii. **Gouin, F.**—La morphologie de l'appareil buccal d'Eulalia sp. (Dipt., Stratiomyidae). [108] 55: 22–26, ill. **Grandjean, F.**—L'origine de la pince mandibulaire chez les Acariens actinochitineux. [Arch. Sci. Phys. et Nat., Geneva] 29: 305–55, ill., 1947. **Gustafsen, J. F.**—The origin and evolution of the genitalia of the insecta. [50] 15: 35–67. **Haget, A.**—Expériences sur l'origine de l'intestin moyen chez l'embryon de Leptinotarsa (Coleop.) et sur les facteurs de sa morphogenèse. [C. R. Acad. Sci.] 230: 1695–97. Mise en évidence d'une induction exercée par l'ectoderme sur le mésoderme dans la morphogenèse embryonnaire de Leptinotarsa (Coleop.). *Ibid.* 1788–90. **Hamilton, A. G.**—Further studies on the relation of humidity and temperature to the development of two species of African locusts—Locusta migratoria migratorioides, and Schistocerca gregaria. [88] 101: 1–58. **Heubner, W.**—Über Wanderung der D D T in Insektennerven. [Sitzb. Deut. Akad. Wiss., Berlin, Math.-Wiss. Kl.] 1948 (8): 3–8, 1949. **Hirata, Y., K. Nakanishi and H. Kikkawa**—Xanthopterin obtained from the skins of the yellow mutant of Bombyx mori (silkworm). [80] 111: 608–09. **Hirschler, J.**—Über perinukleäre Membranen in den männlichen Geschlechtszellen einiger Lepidopteren-Arten. [Biol. Zentralbl.] 62: 14–28, 1942. Organization und Genese des Ei-Nährzellen-Verbandes im Ovarium von Macrothylacia rubi L. (Lep.). Ein methodischer Versuch. *Ibid.* 554–77. **Hughes, T. E.**—The physiology of the alimentary canal of Tyroglyphus farinae (Acarina). [74] 91: 45–61, ill. **Hum-**

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The Status of Two Common North American Carpenter Ants

By WILLIAM L. BROWN, JR., Biological Laboratories, Harvard University

In his recent book, "Ants of North America," Dr. W. S. Creighton has made a very important advance in the taxonomy of the familiar carpenter ants belonging to the *Camponotus* (s. str.) *herculeanus* group. Among the chief points of interest in this treatment is the recognition of the synonymy of *herculeanus* var. *whymperi* with the "typical" *herculeanus*. This synonymy will no doubt be applauded by sensible myrmecologists, for no one has ever been able to show any morphological differences between the Eurasian and North American populations.

Dr. Creighton has also raised the common eastern *pennsylvanicus* to separate specific status, and I think his evidence for this move is strong enough to deserve the support of all workers. Furthermore, a number of variants that have managed to persist in the literature are exposed as synonyms, mostly based on insufficient or poorly preserved material. In this one publication, Dr. Creighton has presented ant taxonomy, in *Camponotus* and other groups, with the most prodigious act of unscrambling that has yet been performed on this or any other continent. His work will undoubtedly form the bedrock systematics for all future work on Nearctic ants, and changes to be made during the "morphological" period of our labors will be largely in the nature of retouches of this single contribution.

To the present author, two of the most important, yet still relatively minor, corrections that should be made lie with the forms Creighton has called *Camponotus pennsylvanicus modoc*

Wheeler and *C. pennsylvanicus ferrugineus* (Fabricius). I am convinced that neither form can be placed as a subspecies of *pennsylvanicus.*

Camponotus herculeanus modoc Wheeler

In my opinion, *modoc* is much more logically treated as a southern race of *herculeanus* than as a western race of *pennsylvanicus. Modoc* ranges widely in the mountains of the western United States and in subboreal regions of the Pacific Northwest, and its northern limits roughly meet the southern low altitude limits of *herculeanus herculeanus* in a broad belt near the Canadian Border. Specimens stemming from this broad region seem to intergrade between the two subspecies, although the material I have seen could certainly stand supplementation through further collections. *Modoc* can be distinguished from the northern and alpine form in that the reddish color of the propodeum and petiole has been replaced by black, so that *modoc* is concolorous black except for the legs. Also, the gastric pubescence of *modoc* tends to be a little longer, often surpassing the posterior borders of the gastric segments in the middle. These relatively pubescent specimens were thought by Wheeler to represent intergrades between *modoc* and *pennsylvanicus*, and it is possible that Dr. Creighton is following this line of thought. A reexamination of *modoc, pennsylvanicus,* and *h. herculeanus* specimens, common in most collections in this country, should convince most workers that the interpretation given here has the better chance of being correct.

Camponotus ferrugineus (Fabricius)

This form is completely blanketed distributionally by the range of *pennsylvanicus.* Morphologically, it differs from *pennsylvanicus* (so far as anyone has been able to tell) only in color. This color difference, however, is quite striking, and there are no recorded instances of difficulty in distinguishing *ferrugineus* in the field. Dr. Creighton's treatment of this ant is extraordinary in that he has allowed it to remain as a subspecies of *pennsylvanicus* in spite of the complete and exceedingly detailed sympatry shown by the two forms. His aberrant procedure has, I believe, been forced by the conflict of his belief in sympatry and lack of intergrades as reliable specific criteria on the one hand, and his profound distrust of color as the same sort of criterion on the other.

By his own taxonomic principles, Dr. Creighton will eventually have to resolve this dilemma for himself. Meanwhile, I feel confident in proposing that *ferrugineus* be raised to separate specific rank. The prospect of considering the striking color difference as the sole morphological point of differentiation so far discovered does not disturb me in the least, even though I realize that other species of the same group (in Europe and Asia) are extremely variable in coloration. The major taxonomic fact supporting this view, and one recognized by Dr. Creighton, is the lack of known intergradient color forms connecting the two species. This fact has been noted by several authors, and it appears to hold true even in areas where nests of the two forms may be only a few feet apart. The flight time of the sexual phases frequently coincides to the day, at least in Pennsylvania and eastern Massachusetts, so that ample opportunity is probably presented for interbreeding.

To allow, therefore, for the possibility of the cospecificity of the two forms, one would have to postulate that the genetic factor or factors controlling color would operate on an "all-or-none" basis in this case. Furthermore, the random association of queens of mixed origins should certainly result in mixed pleometrotic nests if such an "all-or-none" theory is to be accepted. No mixed nests are known in nature.

There is a biological difference that will aid in separating the two as species. In areas where they occur together, *pennsylvanicus* is usually the more common species. While it will accept a rather wide range of nest sites, *pennsylvanicus* (in the area of sympatry) as found in relatively undisturbed forest areas nearly always nests in standing timber. This standing timber may be partially rotten or largely sound. Dr. Creighton's belief that the tunnels of this ant are driven only into decaying parts of the sound timbers or standing trees is certainly incorrect, as has been shown abundantly in the literature both for *pennsylvanicus* (cf. Townsend, 1945, for bibliography) and for *herculeanus herculeanus* (cf. Eidmann, 1928). Dr. R. B. Friend, Connecticut State Entomologist and one who has extensively investigated ant damage to telephone poles in his state, assures me that *pennsylvanicus* can and will tunnel extensively in sound poles there. I myself have watched for long periods at a living sycamore tree housing a colony of *pennsylvanicus* at Philadelphia. The sawdust brought out and dropped to the base of the tree by the ants was large in amount, and in periods of great tunnelling activity was creamy white in color, the shade of new sawdust fresh from the saw. It seems probable that the original entrance to the interior of the tree is often or always forced through a decayed or otherwise damaged place, however, and it is true that *pennsylvanicus* will also nest in wholly or partially decayed wood. Nests of *pennsylvanicus* (in the sympatric zone) are rarely made in "red-rotten" logs or stumps, and the soil itself is rarely penetrated by the galleries.

In these respects, *ferrugineus* differs sharply, for its nests are almost invariably in or beneath rotten logs at the punky "red" stage. The galleries, in all of the many nests I have seen, penetrate the soil beneath the log or stump to considerable depths. Often the major population of the nest will be found in the subterranean chambers, and if the log be removed, the colony will often stay on living underground at the same spot. Anyone who cares to survey the biological statements concerning *ferrugineus* in the various state lists and similar sources will find that this ant behaves in an essentially similar fashion throughout its range. Perhaps the coloration is an adaptation to nesting in this reddish environment, and the same is possibly true of *C. noveboracensis* (Fitch), a more boreal species also commonly found in red-rotten logs and stumps.

The combined color differences and ethological peculiarities, and also the distributional considerations, leave little alternative to considering *ferrugineus* as a good and separate species.

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Orasema in Nests of Pheidole dentata Mayr (Hymenoptera: Formicidae)

By Arnold F. Van Pelt,[1] University of Florida, Conservation Reserve, Welaka, Florida

Within the past few years, two instances of parasitism were found within the nests of *Pheidole dentata* Mayr. In one case the parasites were determined by Mr. A. B. Gahan of the United States National Museum as the chalcid *Orasema robertsoni* Gahan, and in the other case Mr. Gahan determined the parasites as *Orasema* sp., possibly *robertsoni* Gahan. In the latter case insufficient material was available for specific determination.

The first parasitized colony was collected in the Welaka Reserve of northeastern peninsular Florida on September 19, 1949. This nest was in a hardwood stump in mesic hammock (*Magnolia grandiflora—Ilex opaca* association). The number of ants within the nest was 174, including 12 soldiers. Unparasitized pupae and larvae were present, along with an almost equal number of parasitized immatures.

Many different sizes of *Orasema* larvae were found, ranging from small insignificant points on the ant pupae or larvae, through a characteristic striped stage, to the late stage larvae with vesiculate knobs on its lateral borders. All were attached to the anterior portion of a *Pheidole* larva or pupa (fig. 1, A).

[1] Contribution of the Department of Biology, University of Florida, Gainesville.

Different size *Orasema* pupae were also discovered (fig. 1, B). These pupae, when they first drop from the ant host, are enclosed in a vesiculate skin, and only later do they become fully formed. There were four fully formed pupae counted within the present nest, and three of these were pigmented. Similar stages of *O. viridis* are well illustrated by Wheeler (1910: 415).

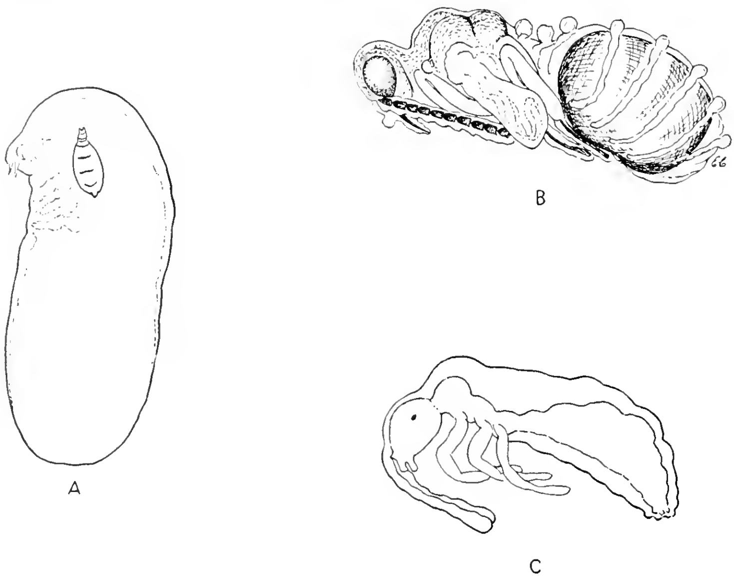

Fig. 1. A, *Pheidole* larva with an *Orasema* larva attached anteriorly; B, fully formed and pigmented *Orasema* pupa; C, phthisergate of *Pheidole* worker.

The other case of parasitism was observed in a nest of *Pheidole dentata* Mayr taken about six miles north of Gainesville, Florida. The colony, collected on October 12, 1946 from a longleaf pine (*Pinus palustris*) log in the late stages of decay, occurred in a longleaf pine flatwoods (*Pinus palustris-Aristida stricta* association). It is noteworthy that both parasitized nests were taken in the fall.

Many deformed phthisergates, or worker pupae which have, through *Orasema* parasitism, lost the necessary body fluids to develop correctly, were present in both nests (fig. 1, C). No phthisogynes, or similarly affected female pupae, were observed, but several parasitized female larvae were found. According to Wheeler (1910: 418) the ant larvae parasitized by *Orasema* are in many cases able to pupate, but the affected pupae are unable to emerge.

The writer wishes to express his appreciation to Mr. A. B. Gahan for his determinations of *Orasema* and to Miss Esther Coogle for the drawings which appear in this paper.

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

By Charles P. Alexander, Amherst, Massachusetts

The preceding part under this title was published in Entomological News, 57: 245–252, 1946. The species discussed herewith are chiefly from materials in the Zoological Museum of the University of Michigan, having been sent to me for examination by the Director, Dr. James Speed Rogers. Additional species from other sources are acknowledged in the text.

Tipula (Lunatipula) polingi n. sp.

♂. Length about 15 mm.; wing 16 mm.; antenna about 5 mm. Closely allied and generally similar to *Tipula* (*Lunatipula*) *flavocauda* Doane, differing in details of coloration of the wings and structure of the male hypopygium.

Wings with a faint brownish tinge, cells *C* and *Sc*, stigma and the prearcular field darker yellowish brown; vein *Cu* and adjoining part of cell *M* not or scarcely darker. In *flavocauda*, the stigma is darker and there is a darkened seam in cell *M* adjoining vein *Cu*.

Male hypopygium with the outer tergal lobes obliquely truncated, the outer apical angle obtusely rounded, the sclerotized margin microscopically roughened, the inner angle not or scarcely produced into a spine. Outer basal lobe of the inner dististyle produced into two powerful spines from a common base, the spines slightly unequal, the outermost a little longer and slightly less acute at apex. Gonapophysis virtually as in *flavocauda*. Eighth sternite with the outer lateral blade elongate, obtuse at apex.

Habitat.—TEXAS. *Holotype:* ♂. Brewster County, June 1926 (O. C. Poling); University of Michigan.

The fly is named for the well-known collector of insects, the late Mr. O. C. Poling. The typical form of *flavocauda* Doane is found in southern Arizona and adjacent areas, in the vicinity of Tucson being the commonest representative of the genus during the spring months. In New Mexico, an evidently allied species, *Tipula* (*Lunatipula*) *stalagmites* Alexander, is found. The fly described herewith is the most easterly member of the group. It is possible that all three flies may be considered as subspecies in a relatively restricted chorocline, with *flavocauda* being the typical form and oldest name.

Limonia (Dicranomyia) immanis n. sp.

Allied to *cramptoniana*, differing especially in the structure of the male hypopygium; ninth tergite large, the posterior border shallowly emarginate, lateral lobes conspicuous, with long yellow setae; basistyle and ventral dististyle very complicated by outgrowths; gonapophyses not setuliferous; aedeagus without spines.

♂. Length about 7.5–8 mm.; wing 7–8 mm.

♀. Length about 8 mm.; wing 8 mm.

Described from the type specimen that is mounted on a microscope slide. Rostrum and palpi brown. Antennae brown, the scape darker; flagellar segments oval, the terminal one pointed, more than one-half longer than the penultimate. Head dark brown; anterior vertex relatively broad, exceeding three times the diameter of the scape.

Thorax almost uniformly dark brown, variegated with paler on the dorsopleural and meral regions. Halteres with stem pale, knob weakly darkened. Legs with the coxae brownish yellow; trochanters yellow; remainder of legs brown, the femoral bases more brightened. Wings whitish subhyaline; stigma oval, brown, relatively conspicuous; veins brown. Venation: Sc_1 ending opposite origin of *Rs*, Sc_2 some distance from its tip, Sc_1 nearly three-fourths as long as *Rs*; inner end of cell R_3 lying basad of that of cell *1st* M_2; *m* relatively short, less than *r–m*; *m–cu* a short distance before the fork of *M*.

Abdomen more or less bicolored; tergites brown, sternites brownish yellow, their bases more infuscated; outer segments, including the hypopygium, more uniformly darkened. Male hypopygium with the tergite large, transversely rectangular, the posterior border with a broad and shallow emargination; lateral lobes conspicuous, tipped with long yellow setae; median tergal area slightly produced into an oval knob provided with about 15–16 long setae. Proctiger apparently divided into two roughly oval plates or blades, the apex more produced, microscopically spiculose, the roughenings continuing around the margin but more reduced. Basistyle with the ventromesal lobe very complex, comprised chiefly of a large flattened blade that is generally oval or triangular in outline, with ridges or crests, the surface with abundant setae; near base of blade with a cylindrical darkened lobe that bears a group of strong setae at apex. Dorsal dististyle a sinuous slender rod, the apex an acute spine. Ventral dististyle in total area subequal to the basistyle and its lobe, very complex in structure; on face of style near base with an oval tubercle and a much longer stout lobe, its tip obtuse; on lower margin of style, just cephalad of the rostral prolongation, with a flattened lobe that is fringed with long yellow setae; rostral prolongation with two straight black spines, arising close together at the narrowed part of a triangularly dilated outer rostral portion; just basad of the spines with a long slender tail-like lobe, both ends of which are hairy, the lower end and nearest the spines obtuse, with a conspicuous brush of setae; outer portion of this lobe narrowed to the subacute tip, the outer third with abundant long erect pale setae. Aedeagus relatively slender, the outer third with erect short setae, the dorsal surface with two ridges that bear conspicuous spinous points for most of the length of the organ. Gonapophysis with the mesal-apical lobe stout, the surface with abundant microscopic setulae.

Habitat.—Michigan. *Holotype:* ♂, mounted on microscope slide, Lake County, October 7, 1947 (J. Speed Rogers); Rogers Number 3583.

In addition to the holotype, the University of Michigan Collection includes the following specimens, which may be considered as being homotypical or paratypical: 2 ♂♂, 2 ♀♀, with the type and bearing the same field number; 2 ♂♂, on slides, Schoolcraft County, September 22, 1940; 2 ♂♂, 6 ♀♀, Iosco County, October 18 and 19, 1947, Nos. 18, 19 and 22; 3 ♂♂, 2 ♀♀, Ontario, York County, October 8, 1940, No. 8 (all J. Speed Rogers).

The most similar described species is *Limonia* (*Dicranomyia*) *cramptoniana* (Alexander), which has all details of the male hypopygium quite distinct, particularly the tergite, lobes of the ventral dististyle, gonapophysis and aedeagus. The male hypopygium of *cramptoniana* has been figured by the writer (Alexander, Diptera of Connecticut, fig. 35, B, 1942).

Limonia (Dicranomyia) michigana n. sp.

Allied to *magnicauda broweriana*, differing especially in the structure of the male hypopygium; ninth tergite large, the caudal margin very slightly emarginate; ventromesal lobe of the basistyle unusually large and complex; ventral dististyle of about the same size as the basistyle, unusually complicated by outgrowths, particularly the rostral prolongation.

♂. Length about 8–10 mm.; wing 7–8.5 mm.
♀. Length about 9–10 mm.; wing 7.5–8.5 mm.

Described from the type specimens, mounted on a microscope slide.

Rostrum, palpi and antennae dark brown; flagellar segments oval; terminal segment about one-third longer than the penultimate. Head dark brown.

Thorax almost uniformly dark brown (on slide). Halteres pale, knob weakly more darkened. Legs with coxae and trochanters pale; remainder of legs dark brown, the femoral bases more brightened; claws (male) unusually simple, with one distinct but small basal tooth and an even less evident more basal spur. Wings subhyaline; stigma oval, pale brown, very poorly indicated; veins brown. Venation: *Sc* short, Sc_1 ending opposite to some distance before the origin of *Rs*, in extreme cases the distance between the two veins approximately one-fourth the length of *Rs;* Sc_1 alone from one-third to one-fourth *Rs; m–cu* at or close to fork of *M*.

Abdomen dark brown, the incisures narrowly pale; hypopygium chiefly darkened, the ventral dististyle paler. Male hypopygium unusually large and complicated in structure. Ninth tergite large, only slightly transverse, the caudal margin very shallowly emarginate; lateral lobes low, with unusually long and abundant setae, at the summit of the lobe forming a loose brush; median region of tergite with a central furrow, near the posterior end of which is a small oval pocket bearing about six long setae. Proctiger large and well-developed, the lateral borders blackened and sclerotized, the apex paling into thin membrane. Basistyle of moderate size, the ventromesal lobe unusually large and complex, including a major blackened clavate structure, the margin of which is weakly notched and bearing a strong outer point, basad of which are a double series of spines, the outer ones directed slightly distad, the more basal series with the comb of teeth directed more cephalad; near base of lobe with a further stout clavate structure that bears numerous long setae. Dorsal dististyle a slender and relatively weak rod, nearly straight, narrowed to an acute point. Ventral dististyle about equal in size and complexity to the basistyle, on outer margin near base produced into a long sinuous rod that gradually widens to the subtruncate hairy tip; on inner face of style and possibly to be construed as being an apical lobe of the basistyle is a smaller lobe that is more expanded outwardly so as to appear more or less palmate, the margin with numerous strong spinous setae. Rostral prolongation unusually complex, comprised of two main branches, the more basal one more or less split or divided at apex into two arms, one nearly glabrous, the other bearing several setae and bristles at apex; upper branch of the prolongation with the usual two spines placed at and before mid-length, beyond the outer spine very gradually narrowed to the subobtuse tip; spines oblique in position, directed outwardly, subequal in size; at base of prolongation on the disk of the style with a conical darkened lobe that bears several very long setae. Gonapophysis with the mesal-apical lobe slender, relatively small and weak, the tip curved, the margin irregularly crenulate. Aedeagus slender, straight, the tip weakly bilobed.

Habitat.—MICHIGAN. *Holotype:* ♂, mounted on microscope slide, Livingston County, Edwin S. George Reserve, November 1, 1948. (J. Speed Rogers). *Paratopotype:* ♂, mounted on slide with the type.

In addition to the types above mentioned, the University of Michigan Collection includes the following specimens, which may be considered as being homotypical or paratypical: More than 60 ♂♂, 40 ♀♀, from the type locality, between June 18 and November 1, especially on the latter date but with records for July, August and October. Further material from Livingston, Washtenaw, and Iosco Counties, the last taken October 18 from a low wet grassy alder thicket. This is *Limonia* (*Dicranomyia*) species 37-A as recorded by Rogers in his fine report on the crane-flies of the George Reserve (Univ. Michigan, Mus. of Zoology, Misc. Publ. 53: 1–128, 8 pls., map, 1942; reference on page 85); here the species is recorded as being apparently very local but numerous in two areas of wet grass-sedge-fern and shrub-sedge marsh in the big swamp of the George Reserve.

The fly is closest to *Limonia* (*Dicranomyia*) *magnicauda browerina* Alexander, differing conspicuously in the structure of the male hypopygium. I wish to express my great indebtedness to Professor Rogers for the privilege of describing the present species and many others that he has collected in the past.

Atarba (Atarba) bellamyi n. sp.

Thorax almost uniformly brownish yellow, unpatterned, the pleura very vaguely more pruinose; antennae with the flagellar segments bicolored, chiefly black, the proximal fourth or less of the segments yellow, the amount of pale color decreasing on the outer segments; abdomen obscure yellow, weakly to scarcely darkened before the hypopygium; male hypopygium with the outer dististyle on margin with only three major spines, the apical point long and slender; aedeagus unusually small and slender.

♂. Length about 4.5–5 mm.; wing 4.8–5.5 mm.; antenna about 2.5–4 mm.

Rostrum chestnut brown; palpi black. Antennae (male) unusually variable in length, as shown by the measurements; scape and pedicel yellow, flagellar segments bicolored, chiefly black, with the proximal fourth or less yellow, the amount of this latter color decreasing in amount on the outer segments, the outermost being uniformly blackened; flagellar segments long-cylindrical; verticils unilaterally distributed, much longer than the erect pale shorter setae. Head brownish yellow.

Thorax almost uniformly brownish yellow, unpatterned, the pleura very vaguely more pruinose. Halteres with stem pale, knob infuscated. Legs with the coxae and trochanters yellow; femora yellow, the extreme tips blackened; tibiae and tarsi yellow, the outer segments of the latter brownish black; tibial spurs small pale. Wings with the ground brownish yellow, the prearcular and costal fields clearer yellow; veins brownish yellow. Venation: Sc_1 ending opposite or just beyond the origin of *Rs*, this vein about as long as *Rs* or the basal section of R_5; anterior branch of *Rs* gently sinuous; cell R_4 about two and one-half times as wide at margin as cell R_2; *m–cu* about one-third to one-half its length beyond the fork of *M*.

Abdomen obscure yellow, weakly to scarcely darkened before the reddish yellow hypopygium. Male hypopygium with the appendage of the ninth sternite very short and broad, the outer apical angles extended laterad into acute spines. Outer dististyle on outer margin with only three major spines, the outermost largest, placed at near three-fifths the length of the style; the other spines are widely separated, with a few accessory microscopic denticles; apical point long and slender, with a further spine on lower margin just back of the apex. Gonapophysis pale, without spinous points. Aedeagus unusually small and slender.

Habitat.—Florida, Georgia. *Holotype:* ♂, Welaka, Putnam County, Florida, on U. S. Fisheries Tract, at light-trap No. 3, July 1–2, 1946 (R. E. Bellamy); Collector's No. 1525; returned to Bellamy. *Paratopotypes:* 3 ♂♂, with the type; 1 ♂, July 26, 1946; Bellamy No. 1605. *Paratype:* ♂, Neel Gap, Union County, Georgia, July 5, 1947 (P. W. Fattig).

I am most pleased to name this very distinct fly for the collector, Dr. R. Edward Bellamy, who has done important work on the crane-flies of Florida. The species is entirely distinct from the only other eastern species, the genotype *Atarba* (*Atarba*) *picticornis* Osten Sacken, and also from the species in Cuba and the southwestern states. The most evident distinctions are found in the coloration of the antennae and abdomen, and in the structure of the male hypopygium, particularly the outer dististyle and aedeagus. The occurrence of the species in the mountains of northern Georgia was quite unexpected and indicates a much wider range for the fly than is known at this date.

Erioptera (Mesocyphona) femora-atra n. sp.

Allied to *caloptera;* size relatively small (wing, female, under 4 mm.); mesonotal praescutum buffy, with two broad black longitudinal stripes; femora black, the bases and a narrow ring at near three-fifths the length yellow, remainder of legs yellow; wings brown, spotted and dotted with white, the dark color much exceeding the pale in extent.

♂. Length about 3.4–3.5 mm.; wing 3.6–3.7 mm.

Rostrum and palpi black. Antennae with scape and pedicel black, more or less variegated with paler; basal segments of flagellum pale yellow, the outer ones passing into brown. Head buffy, the center of vertex dark brown.

Pronotum brownish black medially, the scutal lobes pale. Mesonotal praescutum buffy with two broad black intermediate stripes that are much broader than the median interspace, the latter slightly wider behind; lateral praescutal borders narrowly dark brown, crossing the suture behind onto the scutal lobes; intermediate praescutal stripes continued caudad, including the mesal portions of the scutal lobes; scutellum buffy;

postnotum darkened. Pleura dark brown, with a broad longitudinal silvery stripe. Halteres with stem whitened, knob dark brown. Legs with the coxae and trochanters obscure yellow; femora brownish black to black, with a narrow yellow ring at near three-fifths the length, the bases restrictedly obscure yellow; remainder of legs light yellow. Wings with the ground color brown, more saturated along the costal border, variegated by numerous white spots and dots, including a series of about seven along the anterior border, the second not reaching costa; fourth pale area continued across wing as a narrow, only slightly broken band that extends to vein *Cu;* all longitudinal veins behind and excepting R_5 with a white marginal spot; remaining cells of wings with scattered white spots; in brief, the pattern is dark with a much more restricted pale pattern; veins pale brown, pale in the white areas. Venation: Cell M_2 open by the atrophy of the basal section of M_3.

Abdomen chiefly dark brown.

Habitat.—Georgia. *Holotype:* ♀, Valdosta, Lowndes County, May 28, 1946 (P. W. Fattig). *Paratopotypes:* 2 ♀♀.

Although the present fly is generally similar to *Erioptera* (*Mesocyphona*) *caloptera* Say, it seems certainly to be distinct in the pattern of the legs and wings, as described. All three type specimens are virtually identical in the points indicated.

Notes on Some Aquatic Insects of the Brandywine Creek Drainage, Chester County, Pennsylvania

By John W. H. Rehn, Research Associate, Academy of Natural Sciences of Philadelphia

During 1948 a biological survey of the Conestoga Basin, Lancaster County, Pennsylvania, was carried on by the Academy of Natural Sciences of Philadelphia for the Sanitary Water Board of the Commonwealth of Pennsylvania. At this time a limited number of similar collections was made in the Brandywine Creek Drainage. As a result of the interest shown in stream pollution in the state, particularly in the Brandywine Drainage, it has been thought advisable to present the small amount of information assembled during that season's work. In addition it is believed that some of the distributional records may be of interest to those working on the various groups of aquatic insects.

A basic report has recently been published on the survey of the Conestoga Basin,[1] but due to the limited character of that undertaken in the Brandywine Drainage none has been presented. The method of survey on this drainage was essentially the same as that utilized on the major survey, with the same technics, methods of sampling and recording.

It is desired to thank all of those that participated in the survey for their help in the accumulation of the material here presented.

All of the material listed represents immature individuals except in the Hemiptera and Coleoptera where the material is adult unless otherwise noted. Incomplete identifications are listed only as a help in establishing the various ecological associations present.

A listing of the various localities examined and the conditions encountered is given below. The densities at the stations are listed, as in the other stream survey report: (1) rare, (2) few, (3) frequent, (4) common, (5) very abundant.

Station A. Brandywine Creek, 2½ miles north of Coatesville. Average width 5 feet. Average depth 15 inches. Shores wooded lowland. Bed of stream some boulders, mainly gravel or sand and a little mud.

This station was first examined 23 July 1948 (A1) and a second time 13 August 1948 (A2). This is station 129 of the State Stream Survey.

Superficially this appeared to be a healthy station.

Station B. Brandywine Creek south of bridge at Coatesville. Average depth 19 inches. Shores weeds and industrial wastes. Bed of stream mainly rubble, some clay.

This station was first examined 21 July 1948 (B1) and a second time 11 August 1948 (B2). This is station 126 of the State Stream Survey.

[1] Patrick, Ruth, A proposed biological measure of stream conditions, based on a survey of the Conestoga Basin, Lancaster County, Pennsylvania. Proceedings Academy of Natural Sciences of Philadelphia, CI, pp. 277–341, map, (1949).

This station was heavily contaminated with oil and at the time of the first examination no insects could be found.

Station C. Brandywine Creek at Modena. Average width 50 feet. Average depth 12 inches. Shores low vegetation. Bed of stream mainly gravel, with mud near the shores.

This station was first examined 21 July 1948 (C1) and a second time 13 August 1948 (C2). This is station 127 of the State Stream Survey.

This station was heavily contaminated with oil, but not as much so as B. In addition garbage and other wastes were also present.

Station D. Brandywine Creek at Embreeville State Hospital. Average depth 20 inches. Shores pasture, with cut banks. Bed of stream about one-half rubble and sand, remainder rock with a fine mud covering.

This station was first examined 21 July 1948 (D1) and a second time 16 August 1948 (D2). This is station 128 of the State Stream Survey.

Superficially this appeared to be a healthy station.

Station E. Brandywine Creek above Lenape. Average depth 13 inches. Shores mixed second growth. Bed of stream mainly rocks and rubble, a little mud near the banks.

This station was examined 13 August 1948 and is station 141 of the State Stream Survey.

This appeared to be a healthy station.

Station F. Brandywine Creek near Lenape. Average depth 19 inches. Shores mixed vegetation, banks cut. Bed of stream rubble to rocks except for mud near the shores.

This station was examined 13 August 1948 and is station 142 of the State Stream Survey.

At this station there was some traces of oil contamination.

Odonata

Agrionidae

Agrion sp. A2 3, D2 2.
Hetacrina sp. D1 2, D2 2, E 1.5, F 2.

Coenagrionidae

Argia moesta (Hagen) A2 2.
Argia sedula (Hagen) A2 2.
Argia violacea (Hagen) A2 4, E 3.
Argia maculata? A1 2.5.
Enallagma sp. C1 2, C2 3.
Enallagma civile (Hagen) C1 3, D2 4.

Aeshnidae

Cordulegaster diastatops (Selys) D2 1.5.
Gomphinae E 1.5.
Hagenius brevistylus Selys A1 1.5, A2 1.5.
Gomphus descriptus Banks A2 3.5, F 2.5.
Gomphus exilis Selys A2 2.
Gomphus spiniceps (Walsh) or possibly *G. villosipes* Selys A1 2, D1 2, F 2.
Gomphus villosipes Selys D2 1.5.
Boyeria vinosa (Say) A1 2.5, A2 4, D1 2, D2 2.5, E 3, F 2.
Aeshninae E 2.
Aeshna umbrosa Walker C1 2, D2 2.

Libellulidae

Macromia sp. A1 3.
Macromia illinoiensis Walsh A2 1.5, D1 2, D2 2, F 2.
Macromia probably *illinoiensis* B2 3.
Somatochlora sp. C1 2, C2 3.
Plathemis lydia (Drury) C1 2.

Ephemeroptera

Ephemeridae

Ephoron sp. A1 1.
Ephoron leukon Williamson A2 2.
Hexagenia atrocaudata McDunnough A1 4, A2 3.5.

Heptageniidae

Stenonema annexum Traver A1 4, F 3.2.
Stenonema candidum Traver A1 3.
Stenonema gildersleevei Traver A2 1.
Stenonema ithaca (Clemens & Leonard) A2 4.
Stenonema probably *ithaca* E 3.
Stenonema ohioense Traver A1 2, D1 2.
Stenonema pudicum (Hagen) A1 2.5, A2 2, D1 2.
Heptagenia sp. A1 1.5.
Heptagenia marginalis Banks A1 2, A2 2.
Iron humeralis (Morgan) A1 3, A2 4.

Baetidae

Baetidae A1 1.5.
Isonychia albomanicata (Needham) A1 4, A2 4.
Isonychia matilda Traver A1 3.
Ephemerella lata Morgan A1 2.5, A2 2, F 2.
Baetis sp. A1 2.
Baetis pygmaeus (Hagen) A2 2.
Pseudocloeon cingulatum McDunnough A1 3, A2 3.

PLECOPTERA

Perlidae

Perlesta placida (Hagen) A1 2.
Acroneuria arida (Hagen) A1 3.5, A2 3.
Acroneura internata (Walker) A2 2, F 2.
Acroneura ruralis (Hagen) A1 3.
Togoperla sp. A1 1.5, A2 3.5.

HEMIPTERA

Veliidae

Veliidae (sight records) A2 5, F 4.

Nepidae

Ranatra sp. A2 3.

Corixidae

Corixidae (sight records) A2 2.

NEUROPTERA

Corydalidae

Corydalus cornutus Linnaeus A1 3, A2 4, C1 2, D1 3, D2 2, E 4, F 2.
Nigronia sp. A2 2, D1 2.

COLEOPTERA

Haliplidae

Haliplidae (sight records) A2 2.

Dytiscidae

Dytiscidae (sight records) A2 2.5.

Gyrinidae

Gyrinidae (sight records) A2 3.

Parnidae s.l.

Larval water pennies A1 2, A2 2.5, D1 1.5.

TRICHOPTERA

Rhyacophilidae

Rhyacophila fuscula (Walker) A1 2.

Philopotamidae

Chimarra aterrima Hagen A2 1.

Psychomyiidae

Neuroclipsis sp. A1 2, A2 1.
Psychomyia sp. A1 1.5.

Hydropsychidae

Hydropsyche sp. A2 1.5.
Hydropsyche bifida complex A1 3, A2 4.
Hydropsyche simulans Ross A2 2, F 2.5.
Hydropsyche betteni Ross A2 1.5.
Cheumatopsyche sp. A1 3, A2 1.5, F 2.5.
Macronemum sp. A1 1.5.

Limnephilidae

Neophylax sp. A1 2.5.

Leptoceridae

Athripsodes sp. A of Ross A1 1.5.

DIPTERA

Tipulidae

Tipula sp. D1 2.

Simuliidae

Black flies F 2.

Chironomidae

Chironomidae—A1 1.5, A2 3.5, B2 3.5, C1 1.7, C2 2.5, D1 2.8, D2 3.2, E 2.5, F 2.5.

Tabanidae

Tabanidae D2 1.5.

Empididae

Roederiodes Coquillett? E 1, F 1.5.

Lepidoptera

Pyralididae

Elophila sp. A1 1.5, D1 1.

The diversity of forms at the various stations appears to be of some interest. It should be noted that Chironomids are treated as a single entity. At station A, 58 different forms were found, 40 on the first and 41 on the second examinations. At station B, only two forms were found, both on the second examination, there being no insect life present at the time of the first examination. At station C, seven different forms were found, seven at the time of the first examination and only three at the second sampling. At station D, 18 different forms were found, with 13 types present at each sampling. At station E, 10 forms were found and at station F, 17.

When one examines the information for the various major groups as distributed from the headwaters, through pollution and downstream, the following conclusions can be made. The Odonata were well represented at A, practically absent from B, and then show a gradual increase in diversity and numbers downstream. The Ephemeroptera showed a good mixed fauna at A, and were absent from B. Downstream the families other than the Ephemeridae reappeared but in reduced variety and number. In the Plecoptera only the Perlidae were found at A, and members of this family were again encountered at F. Of the Neuroptera, *Corydalus* was the only common form and this soon returned following the heavy pollution. Of the Trichoptera five families, represented by six species, were found only at A, while the Hydropsychidae, which were moderately well developed at A, reappeared at station F. Neither the Hemiptera nor Coleoptera were sufficiently collected to warrant the drawing of any conclusions. Of the Diptera either insufficient material, as in most families, or incomplete determinations do not allow the forming of conclusions. It is interesting to note that the single aquatic lepidopteron, *Elophila*, was present in both stations A and D.

Taxonomic Notes on Two South American Psyllids (Homoptera)

By Leonard D. Tuthill, Department of Zoology and Entomology, University of Hawaii

As a result of study of several species of South American Psyllidae, mostly received from Senor Carlos A. Lizer y Trelles of Argentina, I am able to dissolve to some extent the confusion which has surrounded the nomenclatorial and taxonomic status of two of the species.

Genus **Gyropsylla** Brethes

1921 *Gyropsylla* Brethes, Revista de la Facultad Agronomia Universidad National de la Plata, Argentina 14: 87.
1925 *Metaphalara* Crawford, Broteria Ser. Zool. 22: 60.

Several specimens from the Territory of Missiones, Argentina determined as *Metaphalara spegazziniana* by Lizer, furnish confirmation of the close relationship of this species with *Psylla ilicis* Ashmead of North America as indicated by Lizer and Crawford. The latter erred however in erecting the genus *Metaphalara* for these two species and the related *cannela*. *Gyropsylla* is the valid name of the genus. The synonymy of the type species, *Gyropsylla spegazziniana* (Lizer), is as follows:

1919 *Paurocephala spegazziniana* Lizer, Marcellia, 16: 103.
1921 *Gyropsylla ilicicola* Brethes, Revista de la Facultad Agronomia Universidad National de la Plata, Argentina, 14: 88.
1925 *Metaphalara spegazziniana* Crawford, Broteria Ser. Zool., 22: 72.

Genus **Holotrioza** Brethes

1920 *Holotrioza Brethes*, Aspiraciones, 2: 132.

The psyllid described by Scott in 1882 (Trans. Ent. Soc. London, 1882: 443) as *Psylla duvanae* was properly assigned to a genus other than *Psylla* by Brethes. In 1920 he erected a new genus, *Holotrioza*, for this species. This was done in a discussion of galls formed on the host plant, *Schinus polygamus* (Cav.) Cabr. His choice of a name was unfortunate however, as the insect belongs to the subfamily Pauropsyllinae rather than to the Triozinae. As the genera of this subfamily are at present quite incompletely known and mostly poorly defined the exact relationship of this form within the subfamily is doubtful but it appears to be most closely related to *Pauropsylla*.

Several specimens collected at Buenos Aires by Lizer have been examined.

Current Entomological Literature

COMPILED BY R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1950 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Bishopp, F. C.—Percy N. Annand, 1898–1950 (Obit.). [52] 10: 93. Leland Ossian Howard, 1857–1950 (Obit.). *Ibid.* 94. **Brues, C. T.**—The Salagubong gong, a Filipino insect toy. [73] 57: 26–28. **Chiang, H. C. and A. C. Hodson**—An analytical study of population growth in Drosophila melanogaster. [25] 20: 173–206. (See also under Anatomy.) **Freeborn, S. B., H. F. Gray, R. T. Legge and R. L. Usinger**—In memoriam William Brodbeck Herms, 1876–1949. [52] 10: 92–93 (portrait, in color). **Goux, L.**—Hivernation et diapause hivernale chez les coccides de la fauna française (Hom. Coccoidea), et remarques sur le déterminisme de la diapause. [Bull. Mus. d'Hist. Nat. Marseille] 3: 126–45, 1943. **Heikertinger, F.**—Über Fütterungsversuche mit Tagfaltern und Vögeln in der Mimikryforschung. [Verh. Zool.-Bot. Ges., Wien.] 90, 91: 5–25, 1944. **Johnson, C. G.**—The comparison of suction trap, sticky trap and tow-net for the quantitative sampling of small airborne insects. [Ann. Appl. Biol.] 37: 268–85. **Just, G.**—Zur Phylogenese von Anpassungs Charakteren. [Zool. Anz.] Suppl. 7: 126–33, 1934. **LeMoult, E.**—Limitation et subdivision de l'espèce et proposition de termes nouveaux. [Misc. Ent.] 43: 45–58, 1946. **Lindroth, C. H.**—August West, 11.8.1874–5.4.1949 (Obit.). [Ent. Tidskr.] 71: 79. **Thienemann, A.**—Die Binnengewässer. Bd. 18. Verbreitungsgeschichte der Süsswassertierwelt Europas. Pp. xvi, 1–809, 249 figs. E. Schweitzerbart, Stuttgart, 1950. **Tullgren, A.**—John Adam Peyron, 1870–1949 (Obit.). [Ent. Tidskr.] 71: 15–16 (portr.). **Tulloch, G. S.**—Alan Sloan Nicolay. (Obit.). [18] 45: 82. **Urquhart, F. A.**—The Kitto insect collection. [23] 82: 83. **Utida, S.**—On the equilibrium state in the interacting population of an insect and its parasite. (Curculionid and Pteromalid.) [26] 31: 165–75. **Vappula, N. A.**—Finnish entomological literature published in 1947, including economic entomology and control of insect pests. [Ann. Ent. Fennici] 15: 1–16, 1949. **Walker, E. M.**—Francis J. A. Morris (Obit.). [23] 82: 90–92.

ANATOMY, PHYSIOLOGY, MEDICAL—Abul-Nasr, S. E.—Structure and development of the reproductive system of some species of Nematocera (Diptera). [Phil. Trans. Roy. Soc., ser. B] 234: 339–96, ill. **Arnal, A.**—El aparato digestivo y la digestion en los culicidos hematofagos. [Trab. Inst. Cien. Nat. José de Costa., Ser. Biol.] 2: 307–64, ill. **Bair, T. D.**—Experimental determination of the autoselected temperature in the chicken louse, Cuclutogaster heterographus (Nitsch). [26] 31: 474–77. **Bourgogne, J.**—Un type nouveau d'appareil génital femelle chez les Lépidoptères. [107] 115 (1946): 69–80, ill., 1949. **Burla, H., A. Brito da Cunha, A. G. L. Calvacanti, Th. Dobzhansky and C. Pavan**—Population density and dispersal rates in Brazilian Drosophila willistoni. [26] 31: 393–404. **Chiang, H. C. and A. C. Hodson**—The relation of copulation to fecundity and population growth in Drosophila melanogaster. [26] 31: 255–59. (See also under General.) **Day, M. F.**—The occurrence of mucoid substances in insects. [Austral. Jour. Sci. Res.] Ser. B, 2: 421–27. **Dobzhansky, Th.**—Genetics of natural populations. XIX. Origin of hetereosis through natural selection in populations of Drosophila pseudoobscura. [Genetics] 35: 288–302. **Durand, M.-C.**—Contributions à l'étude de la gamétogenèse des Gryllidae. [C. R. Acad. Sci.] 230: 2335–36, ill. **Flanders, S. E.**—Regulation of ovulation and egg disposal in the parasitic Hymenoptera. [23] 82: 134–40. **Gorirossi, F. E.**—The mouth parts of the adult female tropical rat mite, Bdellonyssus bacoti (Hirst, 1913) Fonseca, 1941 [= Liponissus bacoti (Hirst)], with observations on the feeding mechanism. [46] 36: 301–18. **Grandori, L. e G. Reali**—Uso dei narcotici nello studio del meccanismo di azione del D.D.T. sugli insetti. [Boll. Zool. Agr. e Bachicolt., Torino] 16: 3–14. **Hadorn, E.**—Physiogenetische Ergebnisse der Untersuchungen an Drosophila-Blastemen aus letalen Genotypen. [Rev. 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J.**—Sex-determination in the honey bee. VII. [51] 8: 7. **Newton, J.**—Prolonged duration of the pupal stage in certain moths (Eriogaster). [29] 62: 49–50. **Oertel, E.**—Relative humidity and temperature within the beehive. [37] 42: 528–31. **Pavan, M.**—Studi sugli antibiotici di origine animale. IX. Sui rapporto fra estratti di Formicidae, acido formico e alcuni formiati. [Atti Soc. Ital. Sci. Nat. Mus. Civ., Milano] 88: 136–41, 1949. **Pradhan, K. S.**—On the physiology of digestion in the larva of the woolly bear, Anthrenus fasciatus Herbst (Dermest.). [Jour. Zool. Soc. India] 1: 107–19, 1949. **Qadri, M. A. H.**—External and internal anatomy of the buffalo louse, Hematopinus tuberculatus. Aligarh Muslim University Publications, Zoological Series, 1948. 21 pages, ill., Price Rs 3. On the morphology and post-embryonic development of the male genitalia and their ducts in Hemiptera. [Jour. Zool. Soc. 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M.**—Some physiological relationships of the female European corn borer moth in controlled experiments. [37] 42: 474–84. **Waterhouse, D. F.**—The hydrogen ion concentration in the alimentary canal of larval and adult Lepidoptera. [Austral. Jour. Sci. Res.] 2: 428–37. **Wenig, K.**—Mechanismus Tkáňového dýchání u hmyzu. [Časopis Čs. Spol. Ent.] 46: 85–98, 1949.

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SMALLER ORDERS—Bair, T. D.—Anoplura. (See under Anatomy). **Carriker, M. A., Jr.**—Studies in neotropical Mallophaga. VIII. "Ischnocera" of the American "Psittacidae," Part 2. Genus Paragoniocotes Cummings. [111] 10: 1–21. **Chopard, L.**—Dermaptera. (See under Anatomy.) **Eichler, W.**—Über die endoparasitische Lebensweise der Kormoran-Federlinge (Mallophaga). [Riv. di Parass.] 11: 103–08. **Emerson, K. C.**—The genus Lagopoecus (Philopteridae: Mallophaga) in North America. [43] 23: 97–101, ill. **Guppy, R.**—Biology of Anisolabis maritima (Gene) the seaside earwig, on Vancouver Island (Dermaptera). [Proc. Ent. Soc. Brit. Col.] 46: 14–18. **Hack, W. H.**—Nota sobre un Colémbolo de la Antártida Argentina (Achorutes viaticuss). [Notas del Mus. de la Platte] 14 (Zool. No. 126): 211–12, ill., 1949. **Holland, G. P.**—Notes on some British Columbian fleas, with remarks on their relationship and distribution. [Proc. Ent. Soc. Brit. Col.] 46: 5–13. Notes on Megabothris asio (Baker) and M. calcarifer (Wagner) with the description of a new subspecies (Siphonapt., Ceratophyllidae). [23] 82: 126–33, ill. **Jameson, E. W., Jr.**—Catallagia mathesoni, a new Hystrichopsyllid flea (Siphonaptera) from California. [43] 23: 94–96, ill. **Judd, W. W.**—Aggregations of the snow-flea, Achorutes socialis Uzel (Collembola) recurring over three years. [23] 82: 84–85. **Knowlton, G. F., S. C. Ma and D. L. Wray**—Collembola in northern Utah celery fields. [18] 45: 96. **Lindemann, W.**—Collembola. (See under Anatomy.) **Miller, E. M.**—A handbook on Florida termites. [Univ. of Miami Press, Tech. Ser.] 1–30, ill., 1949. **Needham, J. G.**—Three new species of North American dragonflies, with notes on related species (Odonata). [83] 76: 1–12. **Qadri, M. A. H.**—Anoplura. (See under Anatomy.) **Ross, H. H. and D. R. Merkley**—The genus Tinodes in North America (Trichoptera). [43] 23: 64–67 (k), ill. **Strickland, M.**—Isoptera. (See under Anatomy.) **Tjeder, B.**—Neuroptera from the Azoren and Madeira. [Soc. Sci. Fenn., Comm. Biol.] 8 (13): 1–12. **Nybom, O.**—The Trichoptera from the Atlantic Islands. [Soc. Sci. Fenn., Comm. Biol.] 8 (14): 1–19. **Valle, K. J.**—Odonaten von den Azoren. [Soc. Sci. Fenn., Comm. Biol.] 8 (5): 1–7. **Wray, D. L.**—Some new Collembola from Utah and Idaho. [18] 45: 91–95, ill.

ORTHOPTERA—Chopard, L.—Insectes Orthoptéroides (Blattidae, Mantidae, Gryllidae, Phasmidae, Dermaptera) récoltés dans les iles atlantiques. [Soc. Sci. Fenn., Comm.

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Review

Mathematical Biophysics. Revised edition. By N. Rashevsky. Chicago: University of Chicago Press. 1948. 669 pp., illus. Price $7.50.

The entomologist who is dealing with fundamental problems is first of all a biologist. He is investigating a special group that is so rich in species as to outnumber all other groups of organisms, with the possible exception of the Protozoa and Bacteria. The entomologist is indeed fortunate to have such a rich variety of working material, for he can not only test established biological principles, but can also formulate new relationships on the basis of his own work.

Since much biological work is dependent on chemistry-physics and mathematics (*sensu lato*, i.e., both quantitative and qualitative), many biologists will be interested in the young science of mathematical biophysics. Unfortunately this science is only in its infancy at present. It will probably be many years before it has developed to a very satisfactory state. The chief reason why a theoretical biology is expected to grow slowly is the large and heterogeneous mass of largely undigested data that have been accumulated. Portions of these data have been worked out, in many cases quite satisfactorily from the standpoint of theory. However, there is no satisfactory general theory of biology as there is in the case of physics. The section of biology that has the most satisfactory unifying theory is genetics, and it is interesting to note that this science was founded on a partially axiomatic (*sensu* Woodger et al.) basis. The biologist can hardly hope to attain easily a position comparable to that of the present-day physicist because of the vastly more complex situation with which he has to deal. The situation that has been attained in theoretical and experimental physics may be envied by scientists whose houses are not in such fine order, but it must be remembered that it took a number of brilliant minds over a hundred years to arrive at this point. And also the data of physics during this period of development were less numerous and less complex than the mountain of facts and alleged facts which the present-day biologist must begin to organize.

Two main attempts have been made to place biology on a general theoretical basis. The first, the work of J. H. Woodger, is probably more powerful than the present work of Rashevsky. Woodger's book, *The Axiomatic Method in Biology*, Cambridge University Press, 1937, has, however, elicited little or no response. It contains a new and strange tool, and it is, perhaps, because of the natural disinclination of most of us to take the time to master a new and complex method that the book has been so little read. The present work of Rashevsky utilizes a largely quantitative approach to biology. It is hoped that this initial and circumscribed attempt to rationalize biology will ultimately develop to the point of furnishing a fairly satisfactory unifying theory. Such a development is presumably years away because of the complexity and magnitude of the task. Professor Rashevsky and his students are to be congratulated on making a start in this worthwhile endeavor.

To attain the desired goal, *viz.*, a theoretical biology, deductions from which will indicate new and fruitful lines of investigation, a symbolic language must be used. Furthermore any symbolism in order to be useful, must present more than a mere translation from verbal description to symbolic description, some of which is evident in the present work. Symbolic statements of relationships from which significant consequences can be deduced, and later tested by experimentation or observation have the advantage of being relatively free from the semantic difficulties inherent in natural quasi-logical languages. The long history of human thought has adequately demonstrated this point.

The chief basis for Rashevsky's theoretical biology seems to rest on the kinetic theory and not on thermodynamics, which the author has called "thermostatics." He expressed the opinion that at present, at least, he does not intend to use thermodynamics in his work because he considers this tool to be inadequate for open systems. Be that as it may, I seem to recall that J. Willard Gibbs (ca. 1876) wrote a famous paper on the equilibrium of heterogeneous systems. Certainly a phase of a heterogeneous system may be considered as open rather than closed. A recent writer has claimed much to be new, true and interesting about open systems in biology. It is to be hoped that some mathematician will write a critique of his paper, showing how neatly certain unwanted constants and variables were made to do a disappearing act!

The book under consideration contains 54 chapters, which are distributed among four major sections. The titles of the sections are: I. Mathematical Biophysics of Vegetative cells; II. Mathematical Biophysics of Excitation and Conduction in Peripheral Nerves; III. Mathematical Biophysics of the Central Nervous System; IV. The Organism as a Whole and the Organic World as a Whole. Those familiar with the earlier works of the Rashevsky school will immediately see upon examining the present revised edition that it is a composite of the first edition (1938), *Advances and Applications of Mathematical Biology* (1940), and various journal articles, many of which are taken from *The Bulletin of Mathematical Biophysics.* This journal, a quarterly founded in 1939, is under the editorship of N. Rashevsky.

No doubt a mathematician who picks up this book will think that it has too much obvious detail, and that it is, perhaps, not too rigorous in spots. Many biologists will in all probability maintain that the contrary is true. Any author has a problem in attempting to satisfy readers of various tastes and backgrounds. Professor Rashevsky has apparently attempted a compromise, intended to partially satisfy a variety of readers. It would seem that a biologist whose training has included the calculus and differential equations should not experience too much difficulty in reading this book. In this connection it is unfortunate that in one's mathematical schooling in this country it takes so long to wade through so many totally unedifying topics only to stop just short of the really valuable calculus. This is particularly lamentable in that a reasonably good knowledge of at least the main ideas of the calculus could easily be the end product of a non-engineering curriculum. My own meager knowledge of mathematics was acquired largely outside of school, and then put to good use during two of the war years when I taught in the Mathematics Department (State College, Raleigh, North Carolina. Such a method of outside study in mathematics has certain points in its favor, for one can go as slowly or as rapidly as one's natural laziness and wits dictate! And slow or fast, the game of mathematics is far more entertaining than bridge and good relaxation from real chess.

In summary, I wish to point out that Professor Rashevsky is keenly aware of a number of the limitations of his book. In fact, he goes into a very detailed analysis of a number of them in the preface. The reader will want to examine this part of the book, not only because of Professor Rashevsky's critique of his own work, but because of certain interesting historical details.

This book is recommended to any biologist who is looking for a book about biology that is different.—MERLE W. WING.

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ENTOMOLOGICAL NEWS

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ENTOMOLOGICAL NEWS

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On Four New Polydesmoid Millipeds

By Nell B. Causey, Fayetteville, Arkansas

Type specimens of the new millipeds described in this paper will be deposited in the collection of the Academy of Natural Sciences of Philadelphia.

Xystodesmidae

Brachoria benderi, n. sp. figs. 1 and 2

Nearest *Brachoria separanda* Chamberlin 1947 in size, but differing from that and other species of the genus in the details of the male gonopods and in the color.

Male holotype.—Metatergites brown-black; a thin bright pink line on lateral margins of collum and keels and on the caudal segment; a small pink dot on each pore-bearing keel anterior to and slightly medial to the pore; protergites cream, partially exposed in middle and posterior body regions, giving the body a moniliform appearance; legs, venter, pleurites light cream color: distal two segments of antennae brown, remainder tan.

Coxae and prefemorae spined. Sternum between each two pairs of legs of a segment slightly depressed, the caudal margin sharply raised and convex; no indication of sternal spines or processes. Beginning with the fourth segment, the caudal margins of the keels are produced caudad, becoming acute posteriorly. The lateral margins of the keels are raised, with the pores on the dorsal surface of the margins.

In situ the distal one-third of the main blades of the gonopods are superimposed, the two forming with their bases a rough circle; the ends of the accessory pieces are almost in contact in the medial line. The base is thickly setose, and the main blade is sparsely so as far as the transverse ridge. Beyond the ridge the blade is flattened, attenuated, and turns sharply dorsad. Views of the left gonopod are shown in figs. 1 and 2.

Length 30 mm., width 7 mm. B-C-H of segment 14 .21–1–.57.

Locality.—Mississippi, Rankin County, Piney Woods. One specimen was collected by Mr. Singleton Bender April 22, 1950.

Nannaria davidcauseyi n. sp. figs. 3 and 4

The male gonopods of this species are of the *castanea* (McNeill 1887) type; they are distinct in the configuration of the thin keel at the distal end of the main blade.

Male holotype.—Color unknown. Body with shape typical of the genus. Sternites of the second pair of legs of each segment from the sixth through the eighteenth produced adjacent to the legs into a blunt spine as typical of the genus; a few setae on the sternites.

In situ the gonopods cross medially about one-third of their length from the distal end, with the medial process and the spur at its base visible. Details of the left gonopod are shown in figs. 3 and 4.

Length 21.8 mm., width 4 mm.

Locality.—Arkansas, Newton County, about three miles northwest of Jasper. Two recently molted males and two larvae of the last larval stadium were collected by Dr. David Causey Aug. 25, 1950, from an oak-hickory woodland on an east hillside.

In the male paratype the spur at the base of the medial spine of the gonopod was much less distinct than that of the type specimen, and the keel at the end of the main blade showed a slight variation in shape.

EXPLANATION OF FIGURES

FIG. 1. *Brachoria benderi* n. sp. Left gonopod of male holotype, submedial view.
FIG. 2. Same, caudo-lateral view.
FIG. 3. *Nannaria davidcauseyi* n. sp. Left gonopod of male holotype, submedial view.
FIG. 4. Same, distal end of main blade, caudo-lateral view.
FIG. 5. *Eurymerodesmus planus* n. sp. Left lateral view of male holotype showing modification of pleurite and telopodites of gonopods.
FIG. 6. *Polydesmus wheeleri* n. sp. Left gonopod of male holotype, medial view.
FIG. 7. Same, lateral view.

Eurymerodesmidae

Eurymerodesmus planus n. sp. fig. 5

A species near *hispidipes* (Wood) but easily separated from it by the absence of lobes on or near the margin of the gonopodal opening.

Male holotype.—Margins of keels and collum orange; some metatergites have a medial orange spot, roughly triangular, and others have several small confluent orange spots; intermittent mid-dorsal black line; remainder of tergites dark, but whether the dark olive so often seen in this genus is their final color is uncertain; antennae light brown; pleurites and legs gray-brown; venter cream.

Mandibular process 0.5 mm. long, without ridges or dark pigment. Coxal joint of second legs with the two tubercles shaped as in *hispidipes;* the longer is darkly pigmented distally. Sternites between legs 3 through 28 with a pair of rounded setose areas, the setae less abundant than in *hispidipes*. Between the ninth legs (i.e., the legs immediately behind the gonopods corresponding to the ninth pair of legs in the female) the sternal lobes are separated by a U-shaped excavation about the width and shape of each lobe. No spines on coxae and prefemorae. Lateral margins of keels slightly convex; posterior angles of keels 16 through 19 acute.

Gonopodal opening emarginate anteriorly as usual in the genus; caudal margin roundly merges into sternite between ninth legs; no setae across anterior margin; numerous setae on lateral margins, where they form a triangle on each side. Posterio-lateral margins of gonopodal opening not raised as is usual in the family; however, in lateral view (fig. 5), indications of the usual marginal development are seen in the pleurites adjoining the opening, which are roughly wrinkled and setose in a triangular area; the lateral margins are pigmented along a thin line, which is best seen from a ventral view.

Gonopods typical, each consisting of a large basal division and a simple, smoothly curved and attenuated telopodite. The three rows of setae on the telopodite are arranged as in *hispidipes;* two extend almost the full length of the telopodite and the third is subterminal, consisting of only 8 or 10 setae. *In situ* the telopodites are crossed both at the base and near the end, with the ends reaching into the excavation between the ninth legs; in lateral view the *hufthornchen* is visible anterior to the telopodite.

Length 30 mm., width 4.3 mm. B–C–H of segment 14 .27–1–.67.

Locality.—Mississippi, Rankin County, Piney Woods. Two males, three females, and a male of 19 segments were collected by Mr. Singleton Bender April 13, 1950.

A *male paratype* agrees in general with the holotype except that the anterior margin of the gonopodal opening has four long setae and the telopodites are not crossed. *Females* in the collection believed to be of this species have an irregular orange line around the keels and across the caudal margin of the metatergites and from two to six orange dots on the metatergites; length 25 to 29 mm., width 4.1 to 4.4 mm.

Polydesmidae

Chaetaspis ohionis new name

Chaetaspis albus Williams and Hefner, Bull. Ohio Biol. Survey, No. 18, pp. 110–111, fig. 12a, 1928.

The gonopod figured by Williams and Hefner does not conform to the description of *C. albus* Bollman 1887 from Bloomington, Indiana. This is an unnamed form which may have to be moved into another genus; it is distinctive in its greater size and the simpler lateral pieces of the gonopods.

Polydesmus wheeleri n. sp. figs. 6 and 7

In the form of the gonopods this species is near *pronomeutes* Chamberlin 1942, but it can be distinguished by the details shown in figs. 6 and 7.

Male holotype.—Medium brown above, lighter below. Tubercles on collum in three transverse rows of 12, 6, and 8, each with a single seta on its summit. The keels of the other tergites, except the last, have either 3 or 4 serrations, the first without a seta, and the others and the posterior angle of the keel each with one seta. Protergites well exposed and finely granular. Most of the metatergites with three transverse rows of 4, 4, and

6 setose tubercles. On most of the keels there are two wide medial and one narrow lateral tubercles, each with a seta. Sternite between each pair of legs finely hirsute, with the exception of that between the seventh, which has the usual excavation; no tufts of setae on the sternites.

Length 11.7 mm., width 1.3 mm.

Locality.—North Dakota, Grand Forks. The male holotype, a gravid female, and several larvae were collected by Dr. George C. Wheeler Sept. 20, 1949. The female was 11.5 mm. long.

On the Correct Name of the Family Phaloniidae. (Lepidoptera)

By Nicholas Obraztsov, Zoological Collection of the Bavarian State, Munich 38, Germany

The chronological view on the nomenclature of the family Phaloniidae is as follows:

1. Agapetae Hübner, Verz. bek. Schm., 1825.—Typus: *Agapeta* Hb. 1822 (Genotypus: *Phalaena Tortrix zoegana* L. 1767).
2. Cochylidi Guenée, Ann. Soc. Ent. France, (2) III, 1845.—Typus: *Cochylis* Tr. 1829 (Genotypus: *Tortrix roseana* Hw. 1811).
3. Lozoperidae Wilkinson, Brit. Tortr., 1859.—Typus: *Lozopera* Stph. 1829 (Genotypus: *Pyralis francillana* F. 1794).
4. Conchylidae Meyrick, Proc. Linn. Soc. N.S. Wales, VI, 1882.—Typus: *Conchylis* Ld. 1859 (nom. emend. pro *Cochylis* Tr.).
5. Phaloniadae Meyrick, Handb. Brit. Lep., 1895.—Typus: *Phalonia* Hb. 1825 (Genotypus: *Phalaena Tortrix tesserana Schiff.* 1776).
6. Commophilidae Durrant, Nov. Zool., XXV, 1918.—Typus: *Commophila* Hb. 1825 (Genotypus: *Agapeta aeneana* Hb. 1822).
7. Aetheinae Obraztsov, Zschr. Wien. Ent. Ges., XXX, (1945) 1946.—Typus: Aethes Billb. 1820 (Genotypus: Pyralis smeathmanniana F. 1781).

The oldest familiotypus is accordingly *Agapeta* Hb. 1822. The correct name of the family usually named as Phaloniidae is therefore **Agapetidae** (Hb.) nom. nov.

On a Collection of Centipedes from Western South Carolina

By Ralph E. Crabill, Jr., Cornell University, Ithaca, New York

The following locality data have been drawn from the study of a collection of centipedes which were captured mainly at Clemson, South Carolina during the spring and summer of 1949 and 1950. Although the collectors were not looking for centipedes exclusively, they were able, none the less, to unearth representatives of seven families, sixteen genera, and nineteen species within a relatively small area, a record which attests to the richness and diversity of the south eastern chilopod fauna.

I should like to express my gratitude to the following biologists, through whose efforts this report has been made possible: Drs. David Dunavan and R. E. Ware of the Department of Entomology and Zoology of Clemson College; Mr. E. C. Turner of the Department of Entomology of Cornell University, and Mr. W. R. M. Mason, now of the Division of Entomology, Science Service, Ottawa, Canada.

Unless otherwise specified, the following records refer to specimens taken at Clemson, South Carolina.

GEOPHILOMORPHA

Sogonidae

Sogona minima Chamberlin. Many specimens from Clemson and Issaguena Lake (Pickins County). Males typically with fifty-one, females with fifty-one to fifty-three pairs of legs. At the present writing this minute species is known only from this state, Tennessee, and Georgia, but it should be expected generally in those southern states adjacent to the Great Smokies.

Linotaeniidae

Linotaenia branneri Bollman. A female with forty-one pairs of legs. This species, which occurs throughout the southern states, is known from as far west as Arkansas and Missouri. Closely allied to the Transitional-Boreal *chionophila*, it may prove to be subspecifically distinct from that form when the eastern states have been more thoroughly collected.

Geophilidae

Geophilus mordax Meinert. Many specimens from Clemson and Issaguena Lake. Known from scattered localities in many mid-western states, this species is typically Austral in distribution and is perhaps one of the most commonly encountered geophilids in its range. Presumably a key-character for the recognition of this species is the visible prebasal plate; however, a sizable proportion of the population throughout its range is characterized by a covered prebasal plate, so that this criterion is not always trustworthy. More reliable criteria are: the crimson color in life and in relatively fresh alcoholic material; the well-defined carpophagous structures on the anterior sternites; the posteriorly isolated coxopleural pore; the sculpturing of the basal plate.

Watophilus alabamae Chamberlin. The single Clemson female with fifty-one pairs of legs extends the range of this species, hitherto known only from Alabama and Georgia, into South Carolina. This specimen agrees in all particulars with the published description of the type.

Arenophilus bipuncticeps (Wood). Two females with sixty-one and sixty-three pairs of legs. This is one of the most widespread of our autochthonous geophilids, ranging from as far as South Dakota in the west to Florida in the east. To date, however, there is only one reliable record of its presence in the northeast. Within the genus, *bipuncticeps* is easily distinguished by the characteristic sternal pore pattern and by the heavy pilosity on the ventral surfaces of legs one to seven (or eight).

Arenophilus watsingus Chamberlin. Many specimens. The males have sixty-one, the females sixty-one to sixty-three pairs of legs. At present this species is known from the southern Atlantic coastal states, the Gulf coastal states, Kentucky and Arkansas.

Although *bipuncticeps* seems to have a much more extensive distribution than does *watsingus,* both species may occupy the same locality in the southeast, as they do at Clemson. In such areas there appears to be a tendency for one or the other to dominate in number of individuals.

SCOLOPENDROMORPHA

Scolopendridae

Cormocephalus (Hemiscolopendra) punctiventris (Newport). A male.

Cryptopidae

Theatops posticus (Say). One female. A common species in the eastern and midwestern Austral regions of the United States.

Theatops spinicaudus (Wood). Five specimens. Less commonly encountered than the preceding species, *spinicaudus* is known from the southeastern and the southern mid-western states, as well as from Mexico and Hawaii.

Cryptops hyalinus Say. Many specimens. One of the commonest of our endemic cryptopids, this species has been reported from many scattered localities east of the Rocky Mountains. Virginia and New York specimens are generally smaller in size than those collected farther south and may prove to be a distinct subspecies eventually.

Otocryptops sexspinosus (Say). Many specimens. This species shows considerable intraspecific variation in color and overall size within a single restricted area. The specimens collected at Clemson are larger than those taken farther north but do not appear to be subspecifically distinct.

Otocryptops nigridius (McNeill). Two specimens. Unlike *sexspinosus,* this species is apparently not widespread in the United States: it is known only from a few southwestern and mid-western localities. Its smaller size, greater compactness, the bluish spots that fleck the white undersurface of its more posterior legs, and the sparse pilosity covering the distal segments of its more posterior legs distinguish it readily from *sexspinosus.*

LITHOBIOMORPHA

Ethopolidae

Bothropolys multidentatus (Newport). The single male differs in no important respect from New York specimens. Dendrophilous in habitat and thriving at higher altitudes, this species is very common in the Appalachians and in adjacent areas.

Lithobiidae

Lithobius atkinsoni Bollman. Many specimens. A common southern species.

Neolithobius underwoodi (Bollman). Many specimens. The Clemson specimens' twelfth and thirteenth leg spinulation ventrally is 0, 1, 3, 3, 2, instead of the usual 0, 1, 3, 3, 3. However, since other significant morphological characters are not apparent, I view these forms as intraspecific variations.

Paitobius atlantae Chamberlin. One female.

Sozibius providens (Bollman). Five specimens. Commonly encountered in the Appalachians and in adjacent areas, *Sozibius* reaches the northernmost known limit of its range in southern New York state.

Garibius monticolens Chamberlin. Four specimens.

Helembius sp. A male and female, both damaged. I refer these specimens to *Helembius* with some hesitancy, although they agree with that genus in most particulars. According to Chamberlin's description, the genotypic species, *nannus,* has a V-shaped prosternal diastema, whereas that of my specimens is distinctly U-shaped.

Personal

Joseph S. Wade, Entomologist in the U. S. Department of Agriculture, retired on July 31st, at the age of 70, after over 37 years of Government service, all of it in the division of Cereal and Forage Insect Investigations. He will continue to reside in Washington, at 1629 Columbia Road, N.W.

Supplement to Notes on Some Aquatic Insects of the Brandywine Creek Drainage, Chester County, Pennsylvania.

By John W. H. Rehn, Research Associate, Academy of Natural Sciences of Philadelphia.

In the basic paper [1] only the immature stages of the Chironomidae were reported and no attempts were made to identify them. However, with most of the collections an attempt was made to rear some individuals. In many cases this was successful and the adults thus obtained were determined by Dr. H. K. Townes, then of the Bureau of Entomology and Plant Quarantine. The following recorded material represents that obtained by these means and determined by Dr. Townes. The locality information is cited as in the basic report and, as these represent selected samples, no attempt has been made to estimate density.

Cricotopus bicinctus A1, B2, D1, F.
Polypedilum illinoiense E.
Polypedilum fallax D1.
Wiedmannia hamifera A1, A2.

Thus two species were reared from larvae collected at stations A1 and D. No adults were obtained from larvae collected at stations C1, C2, D2 and E.

New Records of the Mayfly Genus Baetodes, with Notes on the Genus

By George F. Edmunds, Jr., Department of Invertebrate Zoology and Entomology, University of Utah, Salt Lake City, Utah

The mayfly genus *Baetodes* was described by Needham and Murphy with its genotype as *Baetodes serratus* Needham and Murphy (1924; Bull. Lloyd Libr., 24, Ent. Series, 4: 55, Pl. 13).

[1] Entomological News, vol. 61, pp. 171–177.

a Brazilian species described from nymphal specimens only. Adults have never been reared from *Baetodes* nymphs, but Traver (1934; Bol. Ent. Venez., 2: 94, fig. 8) has placed adults of a new species which she described from Venezuela in the genus (*viz.*, *Baetodes spiniferum*) on morphological evidence. In this paper she also reported the occurrence of nymphs of this genus collected by Berner in northeastern Mexico, and speculated that the genus was probably widespread in the Neotropical region.

Dr. Traver has kindly permitted me to examine and report at this time on a nymph which represents the first record of this genus for North America north of Mexico. The specimen was collected by Dr. J. G. Needham from the Rio Frio, Garner State Park, Texas on March 6, 1936. I should also like to report on a second Mexican record which is represented in my collection by a series of *Baetodes* nymphs collected by S. Mulaik at Culinevara, south of Mexico City, January 1, 1948.

Nymphs of this genus can be readily distinguished from all other North American Baetinae by the following characters: ventrally-directed gills on segments 1–5 only; middle tail reduced to a stub, lateral tails bare or at the most with only a few inconspicuous setae; usually with a row of median raised projections on the middle abdominal tergites (lacking in *Baetodes* nymph number 1 of Needham and Murphy). The nymphs will not run to Baetinae in Traver's key to the subfamilies of nymphal Baetidae (1935; Biology of Mayflies: 428); because of the nearly bare tails, one comes to an impasse at couplet 2. It should be noted that it is difficult to place several genera properly in couplet 7 of this key. The footnotes aid in correctly placing *Ameletus* and *Parameletus*, but some species of *Callibaetis* may run to Siphlonurinae. Some of the difficulties of this couplet may be obviated by using the form of the distal margin of the labrum as a key character. All Baetinae seem to be characterized by a distinct notch in this margin while the same margin in the Siphlonurinae is straight, rounded, or shallowly emarginate.

Adult males of *Baetodes* will run to *Pseudocloeon* in Traver's key to the North American genera of the Baetinae (*op. cit.*: 655), but apparently can be separated by adding the following couplet:

5a—Fore tibia $1\frac{1}{2}$ to $1\frac{5}{7}$ times as long as femur. . *Pseudocloeon*
—Fore tibia more than 2 times as long as femur. . *Baetodes*

The adult of *B. spiniferum* is also characterized by having mid-dorsal abdominal spines on tergites 2–5, a feature of the nymphal genotype.

It is probable that both the new records presented above are representatives of undescribed species the naming of which should await the discovery of adult specimens.

Further Records of the Occurrence of the European Praying Mantis (Mantis religiosa L.) in Southern Ontario. (Orthoptera)

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

In an earlier paper (1947) the writer recorded the occurrence of the Praying Mantis in the vicinity of Hamilton, Ontario, during the summer of 1946, and Smith (1949) discussed the distribution of this insect in southern Ontario, basing his account on records of collections up to the year 1948. Since the publication of these two papers the writer has had an opportunity of examining specimens, in collections at McMaster University, Hamilton, Ontario, which show that the mantis was present at Hamilton as early as 1941 and which represent collections at other localities in southern Ontario. These collections are as follows: Green female, Ancaster, Sept. 1, 1948; brown female, Brantford, Sept. 6, 1947; green male, Burlington, Sept. 12, 1947; brown female, Cayuga, Aug. 18, 1948; green male, Dundas, Sept., 1943; green female, Hamilton, June, 1942; brown male, Hamilton, Sept., 1945; green female, Hamilton, July, 1941; brown male, Hamilton, Oct., 1941; brown male, St. George, Aug. 26, 1948; brown male, South Cayuga, Aug. 31, 1948; green male, Toronto, Sept. 3, 1947; green male, Troy, Aug. 29, 1948; brown female, Turkey Point, Sept., 1943; brown female, West Flamboro, Oct. 16, 1949.

During the years 1941–1949 a total of 82 adult mantids was collected in the vicinity of Hamilton and at other localities, the collections in 1946 being reported by Judd (1947). The distribution of these 82 specimens, with regard to color and sex, is presented in the following table:

	Green		Brown	
	Male	Female	Male	Female
1941		1	1	
1942		1		
1943	1			1
1945			1	
1946	13	5		2
1947	3	8	3	2
1948	12	10	3	6
1949		4	3	2
Totals	29	29	11	13
	58		24	

These figures indicate that the number of green individuals is approximately twice the number of brown, and that the color is independent of sex.

As recorded by Judd (1947) adults were placed in battery jars with twigs on which to lay their egg masses. A sudden movement outside the jar would occasionally cause a mantis to assume a "scaring attitude." On Oct. 6, 1947, a green female, on being startled, instantly turned to face the source of the disturbance. The wings were held vertically and fully outspread above the back and the tip of the abdomen was bent upward and forward between the wings. The insect reared upward with its fore-legs rampant, and the coxae were held close together and turned so that their inner surfaces faced forward, and the two white spots outlined in black, on the coxae, looked like a pair of large, close-set eyes. The mantids were also capable of stridulating. On Sept. 10, 1947, a brown female assumed the "scaring attitude" with the wings outspread and held vertically above the back. The abdomen was flipped rapidly backward and forward, its sides rubbing on the veins of the dorsal surface of the hind wings, causing a rasping sound.

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SMITH, C. W. 1949. The distribution in Ontario of the European Mantis, *Mantis religiosa* L. Seventy-ninth Ann. Rep. Entomol. Soc. Ontario, 1948: 41–44.

Contribution to the Knowledge of Chinese Coccinellidae. X. Occurrence of Perilitus coccinellae (Schrank), a Parasite of Adult Coccinellidae, in North China (Hymenoptera, Braconidae)

By C. L. LIU, Tsing Hua University

Since reporting the occurrence in Yunnan of the Euphorine Braconid, *Perilitus coccinellae* (Schrank), a parasite of adult Coccinellid hosts, in this journal,[1] search has been continued for this remarkable species after our return to the north. Five specimens have so far been encountered during the months of April through June. Two of these were collected from the vicinity of Tsing Hua Yuan where the University is located, and the remaining three from the District of Funing, in eastern Hopei Province. For Tsing Hua Yuan the latitude is 40°00′ N and for Funing, 39°53′30″ N, with a difference of 6½ minutes. Tsing Hua Yuan is situated on longitude 116°17′ E, and Funing, 119°12′ E, the latter being approximately 250 kilometers (air distance) due east from Tsing Hua Yuan. The elevation for

[1] LIU, C. L. 1944. Contributions to the knowledge of Chinese Coccinellidae. VI. Occurrence of *Perilitus coccinellae* (Schrank), a parasite of adult Coccinellidae, in Yunnan (Hymenoptera, Braconidae). Ent. News, 55: 235–7.

Tsing Hua Yuan is exactly 50 meters and that for Funing is approximately 30 meters, the latter being not far from the coast of the Gulf of Liaoning. Geographical relationship places these two localities in the same category and their climate is similarly north temperate.

These preliminary findings extend the geographical distribution of *Perilitus coccinellae* by nearly 15 degrees to the north of Yunnan on mainland China. As the recorded hosts of this parasite are well represented in the intervening areas between Hopei and Yunnan, there seems every probability that the present parasite will sooner or later be discovered in this region. Similarly one may confidently expect its occurrence in the Northeastern Provinces.

Sonan (1939)[2] reported collecting *Perilitus coccinellae* from Taipei (Taihoku), Formosa. This locality has a latitude of 25° 2′ N and longitude of 121°30′30″ E and an elevation of below 50 meters.

As compared with Kunming, Tsing Hua Yuan is 15° north and very much lower in elevation. Taipei is almost on the same latitude as Kunming but with an elevation equaling that of Tsing Hua Yuan. The climate in Taipei is considerably warmer than in Kunming but since it is still some 2° above the Tropic of Cancer, it is still within the temperate zone.

It may now be said that so far as China is concerned the probable distribution of *Perilitus coccinellae* lies within an area roughly bounded on the north by 40° and south by 25° latitude and on the east by 121° and on the west by 102° longitude. The climate of this area is temperate.

The five cases reported herein involve three different host species: *Coccinella axiridis* Pallas, *Coccinella septempunctata* L. and *Adonia variegata* Goeze. As may be noted, all these are aphid feeders. Although the host list for North China may be extended with further investigation, it must be mentioned that of the hundreds of specimens of the two local species of *Epilachna*, no case of parasitism by *Perilitus* was ever observed. Sonan (1939)[2] reported the same thing from Formosa.

[2] SONAN, JINHAKU. 1939. On the lady-birds parasite, *Perilitus coccinellae* (Schrank) (Hym. Braconidae). (In Japanese.) Trans. Nat. Hist. Soc. Formosa, 29: 225–9.

Current Entomological Literature

COMPILED BY R. G. SCHMIEDER

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1950 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

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

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

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Begg, M. and J. H. Sang—A method for collecting and sterilizing large numbers of Drosophila eggs. [80] 112: 11–12. **Dobzhansky, T. and C. Pavan**—Local and seasonal variations in relative frequencies of species of Drosophila in Brazil. [36] 19: 1–14. **Paulian, R.**—La vie larvaire des insectes. Librairie R. Thomas, Paris, 1950, pp. 1–206, ill. **Rosin, S. und R. Pfister**—Zur Technik der Fixierung von Insektenlarven. [Rev. Suisse Zool.] 57: 569–70. **[Steering Committee, Nomenclature Discussion Group]**—Zoological nomenclature: a reply. [80] 112: 27–30. **Stenzel, H. B.**—Proposed uniform names of higher categories in zoological systematics. [80] 112: 94. **Wright, S.**—Genetical structure of populations. [53]: 166: 247–49.

ANATOMY, PHYSIOLOGY, MEDICAL—Anderson, J. M.—A cytological and cytochemical study of the male accessory reproductive glands in the Japanese beetle, Popillia japonica Newman. [12] 99: 49–64. **Beadle, L. C. and J. Shaw**—The retention of salts and the regulation of the non-protein nitrogen fraction in the blood of the aquatic larva, Sialis lutaria (Neuroptera). [40] 27: 96–109. **Carter, H. F.**—The genus Taeniorhynchus Lynch Arribalzaga (Dipt., Culiciae) with special reference to the bionomics and relation to disease of the species occurring in Ceylon. [Ceylon Jour. Sci.] 24: 1–26. **Cei, J. M.**—Facteurs genetico-raciales que diferencian la regulacion hormonal del ciclo sexual en Leptodactylus ocellatus (L.) de la Argentina. Razas de remperatura y sus relaciones con algunas caracteristicas climatica regionales. [Acta Zool. Lilloana] 7: 113–34, ill., 1949. **Day, M. F.**—The histology of a very large insect, Macropanesthia rhinocerus Sauss. (Blattidae). [Austral.

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Zool.] 57: 511–17, ill. **Ogloblin, A. y K. Gavrilov**—El "schock" prococado en la langosta Schistocerca cancellata (Serf.) por aplicacion de altas dosis de los liquidos inyectados. [Acta Zool. Lilloana] 7: 161–76. **Pacaud, A.**—Fonction glycogénique et différentiation morphologique du mésentéron chez la larve de Simulium costatum Fried. (Diptère). [Ann. Sci. Nat., Zool.] 12: 1–14. **Pagan, C. and R. H. Hageman**—Determination of DDT by bioassay. [80] 112: 222. **Paulian, R.**—(See under General.) **Piepho, H.**—Über die Hemmung der Falterhäutung durch Corpora allata. Untersuchungen an der Wachsmotte Galleria mellonella L. [Biol. Zentralbl.] 69: 261–71. **Pradhan, K. S.**—On the head capsule, mouth parts and related muscles of the larva of the wooley bear, Anthrenus fasciatus Herbst (Col., Dermestidae). [Rec. Indian Mus.] 46: 73–86, ill., 1948. **Pratt, J. J. and F. H. Babers**—Cross tolerances in resistant houseflies. [80] 112: 141. **Richard, G.**—L'innervation et les organes sensoriels de la patte du termite a cou jaune (Calotermes flavicollis F.). [Ann. Sci. Nat., Zool.] 12: 65–83, ill. **Roeder, K. D. and E. A. Weiant**—The electrical and mechanical events of neuromuscular transmission in the cockroach Periplaneta americana. [40] 27: 1–13, ill. **Salt, R. W.**—Some effects of temperature on the production and elimination of diapause in the wheat stem sawfly (Hymenop.). Canad. Jour. Res. 25: 66–86. **Slifer, E. H.**—Vulnerable areas on the surface of the tarsus and pretarsus of the grasshopper (Acrididae, Orthoptera); with special reference to the arolium. [5] 43: 173–88, ill. **Soumalainen, E.**—Parthenogenesis in animals, pp. 193–253 of: Advances in genetics, edited by M. Demerec. Vol. II. pp. 1–265. Academic Press, N. Y. **Thomas, M.**—Les principaux facteurs de la psychologie animale. [Scientia] 135: 105–13. **Thomas, I. M.**—The reactions of mosquito larvae to regular repetitions of shadows as stimuli. [Austral. Jour. Sci. Res. ser B.] 3: 81–123. **Tschumi, P.**—Über den Werbetanz der Bienen bei nahen Trachtquellen und seine richtungsweisende Bedeutung. [Rev. Suisse. Zool.] 57: 584–90. **Vachon, M.**—Remarques préliminaries sur l'alimentation les organes chélicériens le biberon et la tétine de l'embryon du scorpion Ischnurus ochropus (Scorpionidae). [Arch. Zool. Exp. Gen.] 86 (Notes et Rev.): 137–56. **Voy, A.**—Le pouvoir régénérateur au cours de l'intermue pré-imaginale chez le Phasme (Carausius morosus Br.) [C. R. Acad. Sci.] 231: 246–47. **Walshe, B. M.**—The function of haemoglobin in Chironomus plumosus under natural conditions. [40] 27: 73–95. **Water-**

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EXCHANGES

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

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

Butterflies of New England, principally from New Haven, Conn., for exchange. Louis Clarke, 28 W. Elm St., New Haven 15, Conn.

Wanted—Proc. Ent. Soc. Phila., vols. 1–6; Proc. Cal. Acad. (Nat.) Sci., 1–7; Proc. Acad. Nat. Sci. Phila., 1–8; Trans. Amer. Ent. Soc., 1–5; Bull. Buff. Soc. Nat. Sci., 2–3; Psyche, **11**, **13**, **15**. C. F. dos Passos, Mendham, N. J.

Miridae (Capsidae)—American species wanted, with locality labels, in exchange for British species. D. Leston, F.R.E.S., 6 Frognal Rise, London N. W. 3, England.

Wanted—Entomological microscope in good condition; Spencer, Bausch & Lomb, or other standard make. David G. Shappirio, 4811 17th St., N.W., Washington 11, D. C.

Coleoptera—Large quantities of Cicindelidae, Buprestidae, Lucanidae, Cerambycidae wanted in exchange for all families of Coleoptera from Ill., Ind. and Mo. Joseph B. Hayes, 1905 N. Pulaski Rd., Chicago 39, Ill.

American Sarcophagidae—wanted for identification. H. R. Dodge, 291 Peachtree Street, Atlanta 3, Georgia.

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

For exchange—The periodic Cicada, T. septendecim. Desire Lepid. espec. Papil., Sphing. & Speyeria. Also Col., espec. Ceramb. & Lucan. John W. Morris, 2704 Genesee St., Syracuse 9, N. Y.

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

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