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AMERICAN TRICHOPTERA—NOTES AND DESCRIPTIONS.

BY NATHAN BANKS, EAST FALLS CHURCH, VA.

(Continued from p. 258.)

LEPTOCERIDÆ.

Molanna flavicornis, n. sp. (Fig. 46).

Body black, including thorax above, head and thorax clothed with whitish gray hair, basal joint of antennæ dark, beyond wholly pale yellowish (in both sexes); palpi pale, legs pale yellowish, more or less infuscated on femora. Wings yellowish gray. Venation similar to *M. uniophila*, alike in both sexes, venation pale; in fore-wing the cubitus united to the median at a rather obtuse angle, but separates at a very acute angle, as in other species; in the hind wings fork 2 has diverging sides.

Expanse 27 mm.

From Husavick, Man., July, and Winnipeg, Man., May, (Wallis).

Triænodes dentata, n. sp. (Fig 45).

Yellowish gray, head and basal joint of antennæ densely clothed with long yellowish hair; antennæ pale, joints narrowly dark at tips, legs pale. Wings gray, with much gray and yellowish hair, near outer margin there is much black hair, the outer fringe mostly black, deep black at outer angle, posterior fringe gray, a black spot at the arculus, and another about half way from it to base; hind wings yellowish gray, with gray fringe, venation in both pairs pale; costa of fore wings (in ♂) densely hairy. Venation as in *T. ignita*, but the fork 1 is still shorter.

Expanse 18 mm.

From Johnstown, N. Y., June (Alexander), and Hampton, N. H., July (Shaw).

Leptocella stigmatica, n. sp. (Fig. 48).

Face pale, vertex dark with yellowish or gray hair; basal joint of antennæ brown, rest with pale on basal part of the joints, gradually darker beyond; palpi pale; thorax brown, with short yellowish white hair; the abdomen and legs yellowish. Wings gray, in male a large dark brown spot on the stigmal region back to the radial sector, the anastomosis dark-margined, and veins elsewhere faintly dark-margined, fringe black on outer margin; hind wings gray, with gray fringe, black at upper tip. Fore wings very slender, the apical cells short, fork 1 longer than pedicel, fork 3 reaches nearly to the anastomosis, discal cell longer than second apical, not much swollen above; hind wings very broad, basal venation can be traced in a strong light, similar to that of *L. exquisita*. Lower male appendage with blunt tip.

Expanse 27 mm.

From Jemez Mts., New Mexico, June and July (Woodgate).

Leptocella intervena, n. sp. (Figs. 15, 50).

Pale yellowish, with white hair; antennæ rather broadly annulate with dark brown. Fore wings white, in the apical part there are short dark streaks in the cells not touching the veins, these streaks form incomplete bands across the wing, other dark marks along the anal margin; a few black streaks in the middle of wing, but not so distinct as in apical part of wing.

Expanse 21 mm.

From Zavalla Co., Nueces River, Texas, 26 and 27 April (Hunter and Pratt) at light. Type in National Museum.

Œcetina interjecta, n. sp. (Figs. 2, 5).

Face yellow, vertex dark, palpi and antennæ pale, latter with tips of joints narrowly black; thorax brown; abdomen pale brown, yellowish near tip; legs pale yellow. Wings gray, veins darker, a long dark cloud near the stigma; hind wings gray, with darker gray fringe. Fore wings with costal margin much curved near tip, fork 1 reaching to discal cell, veinlets of anastomosis much disjointed; hind wings with fork 1 very short, fork 3 twice as long, and fork 5 reaching nearly one-half way to base.

Expanse 14 mm.

From Go Home Bay, Georgian Bay, Ont., 23 Aug. (Walker).

Leptocerus angustus, n. sp. (Fig. 40).

Body dark, head with gray hair; palpi black, with gray hair. Basal joint of antennæ yellowish brown, rest dark, extreme bases of joints whitish; legs pale. Wings gray, with many black hairs near tip, a white point each side of dark stigma, and another white spot at arculus, outer fringe interruptedly dark and white, a long black streak on margin beyond arculus; hind wings gray. Fore wings with fork 3 reaching before fork 1, anastomosis with upper vein disjointed from others, which are nearly interstitial, discal cell reaching fully twice its width before thyridial cell.

Expanse 20 mm.

From Go Home Bay, Georgian Bay, Ont., 1 Aug. (Walker).

Leptocerus retactus, n. sp. (Fig. 41).

Gray; face yellowish, with white hair; palpi dark gray; vertex dark brown; abdomen pale yellowish, darker at tip; legs pale, but tibiæ rather gray. Wings gray, with yellowish brown hairs, hyaline dots near base of discal cell, and middle part of costal area hyaline, the median and anal veins for some distance narrowly lined with hyaline. Wings not very long; fore wings with discal cell very long, narrowed near tip, the veins of anastomosis much disjointed and oblique; fork 1 twice as long as pedicel, the double fork (of female) barely longer than fork 1. In hind wings the first and third forks about equal.

Expanse 16 mm.

From Muskoka River, Ont., 30 June, and Go Home Bay, Ont., 8 Aug. (Walker).

Leptocerus inornatus, n. sp. (Fig. 42).

Yellowish brown, white hair on face; palpi gray; antennæ yellowish, narrowly annulate with brown; mesonotum dark brown; abdomen yellowish, brown at tip; legs yellowish, fore tarsi white, plainly annulate with brown, mid-tarsi less distinctly marked, hind tarsi all pale. Wings brownish, with brown veins, no marks, clothed with fine white and gray hair. In fore wings fork 1 has a pedicel about as long as fork, fork 3 plainly longer than its pedicel, end of discal cell much beyond the median cross-veins.

Expanse 23 mm.

From Victoria, Texas, 23 March (Mitchell). Type in National Museum.

Leptocerus futilis, n. sp. (Figs. 44, 49).

Body black, head with white hair; palpi dark, with white hair, basal joint of antennæ dark, rest whitish with dark tips to joints; thorax with white stripes in front, and tufts over base of wings; legs pale. Wings dark gray, veins dark, surface clothed with very short yellowish hair, a pale spot at arculus; fork 3 extends more basad than fork 1; the three cross-veins of anastomosis widely disjointed; discal cell extends hardly its width before thyridial cell.

Expanse 21 mm.

From Go Home Bay, Ont., 11 July (Walker).

CALAMOCERATIDÆ.

Psiloneura, n. gen.

In both wings forks 1, 2, 3, 5, the discal cell is closed, in fore wings a cross-vein from base of fork 1 (or before) to the radius; discal cell moderately short; spurs 1, 2, 4 all very short; antennæ wide apart at base; maxillary palpi with joint 2 much longer than any others.

Type.—*P. mœsta*, n. sp.

Philoneura mœsta, n. sp. (Fig. 12).

Brown; palpi brown, face with few yellow hairs; antennæ dark brown; vertex with golden and black hair; thorax blackish near base of wings; abdomen black; legs yellowish; wings grayish brown, with very short yellowish hair; face broad, antennæ wide apart, about two-thirds as long as the fore wings, venation as figured, the corneous dot in fork 2 is one-fourth the way from base, instead of near base as in most species. In fore wings fork 1 extends two-thirds of way back on discal cell, the cross-veins before base of fork up to radius.

Expanse 22 mm.

From Cambridge, Mass., Sept.

Astoplectron, n. gen.

Type.—*Heteroplectron boreale* Prov. Similar to *Heteroplectron*, but no fork 4 in fore wings of either sex, and in ♂ no fork 3, and in hind wings the discal cell is closed. In hind wings forks 1, 2,

3, 5. In fore wings fork 1 reaches far back on cell, fork 3 hardly as long as fork 2; there is no cross-vein from radial sector to radius, spurs 2, 4, 4; basal joint of the antennæ about as long as the vertex.

Astoplectron connexa, n. sp. (Figs. 24, 55).

Similar in appearance to *A. boreale* Prov.; body and wings brown, without markings, legs paler; basal joint of antennæ dark. Differs from *A. boreale* in that the vein at upper side of fork 1 is angularly bent up toward radius, and connected to radius by a cross-vein, this just alike in both fore wings; in three males of *A. boreale* there this vein is straight; besides the proportions of the cells are slightly different. The male appendages are a little shorter than in *A. boreale.*

Expanse 18 mm.

From Great Falls, Va., 12 June.

SERICOSTOMATIDÆ.

Olemira costalis, n. sp. (Fig. 34).

Brown; palpi covered with long, dense, black hair; antennæ brown, basal joint black beneath; vertex pale in middle, vertex and thorax with some yellow hair; legs yellowish; wings gray, nearly uniformly coloured, fringes darker. In male the costal area is swollen and reflexed over the wing, just as in *O. americana,* except that this reflexed part is only about one-half as wide as in *O. americana;* venation as in that species, but in the hind wings the discal cell is a little longer; genitalia similar to that of *O. americana.*

Expanse 15 mm.

From Woodworth's Lake, Fulton Co., N. Y., 19 August (Alexander). *O. americana,* besides the type locality, I have seen it from Riverside, Mass., and Falls Church, Va.

Micrasema falcata, n. sp. (Fig. 52).

Brown; palpi yellowish; antennæ dark at base; head and thorax with gray hair; abdomen black, with white hair; legs pale, with white hair. Wings brown, with scattered yellowish and black hairs; venation similar to that of *M. charonis;* discal and median cross-veins interstitial, fork 1 reaching back on discal cell further

than in *M. charonis*, and fork 2 has a very much longer pedicel, longer than the discal cell.

Expanse 10 mm.

From Great Falls, Va., 12 May.

Micrasema charonis, n. sp. (Figs. 3, 47, 51).

Jet black; head and thorax with black hair; legs rather brown; abdomen with rather long, erect hairs above; spurs very short, not as long as width of the joint. Venation as figured; maxillary palpi long, slender, upcurved, reaching to tip of basal joint of antennæ, sparsely hairy.

Expanse 10 mm.

From Black Mts., North Fork Swannanoa River, N. Car., May. The first record of this genus from the United States.

Mormomyia vernalis Bks. (Figs. 1, 4, 28).

I have this species from Tryon, N. Car. Among the original series are two specimens with slightly longer wings, and both have fork 4 well developed in each fore wing; both are males, and their genitalia do not appear to differ from typical specimens.

Schizopelex hesperus, n. sp. (Fig. 10).

♀.—Brown; vertex and thorax with white hair above; antennæ brown; wings brown, densely and evenly clothed with short golden hair, no markings: hind wings gray, with sparse golden hair, abdomen brown; front and mid legs brownish, hind legs yellowish. Venation similar to *S. lobata*, but fork 2 is acute at tip.

Expanse 28 mm.

From Vinyard, Utah, 10 July. Differs from *S. lobata* in the white hair of head and thorax.

EXPLANATION OF PLATES.

Fig. 1.—*Mormomyia vernalis*, hind wing.
Fig. 2.—*Œcetina interjecta*, fore wing.
Fig. 3.—*Micrasema charonis*, wings.
Fig. 4.—*Mormomyia vernalis*, head.
Fig 5.—*Œcetina interjecta*, genitalia.
Fig. 6.—*Stenophylax hesperus*, genitalia above.
Fig. 7.—*Anisogamus infernàlis*, genitalia.

Fig. 8.—*Limnephilus spinatus*, genitalia.
Fig. 9.—*Limnephilus spinatus*, genitalia above.
Fig. 10.—*Schizopelex hesperus*, wings.
Fig. 11.—*Neuronia smithi*, genitalia.
Fig. 12.—*Psiloneura moesta*, wings, palpi.
Fig. 13.—*Limnephilus argenteus*, genitalia.
Fig. 14.—*Limnephilus æqualis*, genitalia.
Fig. 15.—*Leptocella intervena*, fore wing.
Fig. 16.—*Glossosoma penitus*, genitalia.
Fig. 17.—*Limnephilus secludens*, genitalia.
Fig. 18.—*Paragapetus moestus*, fore wing.
Fig. 19.—*Glossosoma penitus*, genitalia, beneath.
Fig. 20.—*Paragapetus moestus*, genitalia.
Fig. 21.—*Stenophylax hesperus*, genitalia.
Fig. 22.—*Anisogamus disjunctus*, genitalia.
Fig. 23.—*Paragapetus moestus*, hind wing.
Fig. 24.—*Astoplectron connexa*, wings.
Fig. 25.—*Plectrocnemia cinerea*, genitalia, above.
Fig. 26.—*Plectrocnemia cinerea*, genitalia.
Fig. 27.—*Limnephilus secludens*, genitalia, behind.
Fig. 28.—*Mormomyia vernalis*, genitalia.
Fig. 29.—*Limnephilus productus*, genitalia, above.
Fig. 30.—*Philopotamus distinctus*, genitalia.
Fig. 31.—*Limnephilus æqualis*, genitalia, above.
Fig. 32.—*Stenophylax flavata*, genitalia, above.
Fig. 33.—*Stenophylax flavata*, genitalia, behind.
Fig. 34.—*Olemira costalis*, genitalia.
Fig. 35.—*Phylocentropus vestitus*, genitalia.
Fig. 36.—*Limnephilus productus*, genitalia.
Fig. 37.—*Plectrocnemia canadensis*, genitalia.
Fig. 38.—*Philopotamus americanus*, genitalia.
Fig. 39.—*Rhyacophila acropedes*, genitalia.
Fig. 40.—*Leptocerus angustus*, genitalia.
Fig. 41.—*Leptocerus retactus*, genitália.
Fig. 42.—*Leptocerus inornatus*, genitalia.
Fig. 43.—*Rhyacophila bipartita*, ♀ plate below.
Fig. 44.—*Leptocerus futilis*, genitalia.

Fig. 45.—*Triænodes dentata*, genitalia.
Fig. 46.—*Molanna flavicornis*, genitalia.
Fig. 47.—*Micrasema charonis*, head.
Fig. 48.—*Leptocella stigmatica*, genitalia.
Fig. 49.—*Leptocerus futilis*, genitalia, above.
Fig. 50.—*Leptocella intervena*, genitalia.
Fig. 51.—*Micrasema charonis*, genitalia.
Fig. 52.—*Micrasema falcata*, genitalia.
Fig. 53.—*Rhyacophila bifila*, genitalia, ♀.
Fig. 54.—*Rhyacophila bipartita*, genitalia.
Fig. 55.—*Astoplectron connexa*, genitalia, palpus.
Fig. 56.—*Rhyacophila bifila*, ♀, beneath.
Fig. 57.—*Agapetus malleatus*, genitalia.
Fig. 58.—*Hydropsyche partita*, penis.
Fig. 59.—*Hydropsyche partita*, genitalia.
Fig. 60.—*Plectrocnemia adirondica*, genitalia.
Fig. 61.—*Dolophilus breviatus*, genitalia.
Fig. 62.—*Hydropsyche venularis*, genitalia.
Fig. 63.—*Diplectrona californica*, genitalia.
Fig. 64.—*Psychomyia diversa*, genitalia.
Fig. 65.—*Holocentropus longus*, genitalia, above.
Fig. 66.—*Dolophilus major*, genitalia.
Fig. 67.—*Polycentropus centralis*, genitalia.
Fig. 68.—*Holocentropus longus*, genitalia.
Fig. 69.—*Holocentropus orotus*, genitalia.
Fig. 70 —*Polycentropus confusus*, genitalia.
Fig. 71.—*Holocentropus interruptus*, genitalia.
Fig. 72.—*Neureclipsis signatus*, genitalia.
Fig. 73.—*Hydropsyche recurvata*, genitalia.

OBITUARY.

Mr. Frank E. Moeser, a collector of Lepidoptera and a keen observer of their life histories, died at his home, 239 Guilford St., Buffalo, N.Y., on May 15th, being forty-five years of age. His work among the local Noctuidæ especially, proved of interest, in that material brought to notice by Grote, when the latter was with the Buffalo Society of Natural Sciences, was again collected by him. He is survived by a wife, daughter and son. H. Bird.

INSECTS AND PAIN.

BY HARRY B. WEISS, NEW BRUNSWICK, N.J.

In various books on entomology one often comes across the statement that insects do not suffer acute sensations of pain as do the higher animals. Different facts are cited to prove this, the most familiar being the case of a butterfly that was pinned alive, escaped and returned to its feeding among flowers with apparently no inconvenience. Kirby and Spence quote the action of a bee eating honey though deprived of its abdomen. Dr. John B. Smith found that if he cut off the abdomen of a fly it would live for twenty-four hours after, with practically no digestive system, very little nervous system and most of its heart gone and when the head was removed it lived for the same length of time. The interesting feature was that no apparent symptom of pain was developed.

It is also said that if a dragonfly be captured, held loosely by the wing and the tip of its abdomen presented to its mouth, it will proceed to eat at once as far as it can reach.

Referring to the human system many experiences commonly called painful are only unpleasant or disagreeable. This confusion is due to the fact that painful things are always unpleasant. Painfulness however is quite distinct from unpleasantness. The same stimuli which result in sensations of pressure, warmth and cold may also bring about painfulness if they are long continued or repeated often enough.

There are various theories accounting for pain sensations, the oldest one teaching that there were no specific pain organs, but that sensations of pain were brought about by continued or excessive reactions of other end-organs especially those of pressure. This theory was disproved by the discovery that certain anaesthetics destroyed pain sensations independently of pressure sensations. For instance if one's tooth is treated with cocaine, no pain is felt upon its removal but one is conscious of the pressure of the dentist's instrument.

Another theory is that pain is produced only by the excitation of distinct end-organs of pain. This theory is based on the discovery of pain spots on the skin. However the spots which are sensitive to pain and not to pressure have been found to occur

only on the elbow joints and membranous coverings of the eye. This lack of spots is explained by assuming that more stimulation is required to excite pain end-organs than pressure end-organs.

A third theory is that pain end-organs are not distinct from pressure end-organs but are exposed pressure organs situated under unusually thin parts of the epidermis and that pain is not due to any activity of these end-organs but to "a transformation in the gray matter of the spinal cord of nerve excitations conveyed from these exposed pressure end-organs."

Returning to insects we find that they have well developed nervous systems and that their organs are well supplied with nerve endings. Moreover many insects give signs of discomfort when handled or mutilated. There is no doubt but that they are highly susceptible to pressure stimuli. In fact end-organs of touch such as hairs and bristles are distributed over the entire integument.

Pain sensations however are hard to distinguish in insects from those of touch. One argues that the mutilated insects heretofore referred to experienced no pain simply because they exhibited no signs of suffering. What then constitutes a symptom of pain in insects? Who is qualified to judge? Many pain racked persons go about their duties without exhibiting any signs of pain other than changes in facial expression. Of course extreme mutilation of the human body results in almost immediate death while in the case of insects death is not immediate. All pain however is an exhausting experience and injurious to the organism. With insects final exhaustion is simply deferred.

In the case of the dragonfly eating its own body, it is hard to find a human parallel unless we cite mentally unbalanced persons who inflict serious injuries upon their person. One might argue that they would not do this if it were painful and yet we are positive such actions are painful.

The character of the insect nervous system is unlike our own and the surface of their bodies is usually rigid and hard and probably not sensitive to pressure and pain in the same way as our own bodies so that we have no reliable guides as to their sensations of pain. Man judges most things by himself and when this guide fails he is at a loss to explain certain happenings in a

satisfactory way. It seems therefore that the evidence for assuming that insects do not suffer acute sensations of pain is not by any means complete. We simply do not know and have no reliable means at present of finding out.

A NEW FOSSORIAL WASP FROM QUEENSLAND.

BY T. D. A. COCKERELL, BOULDER, COL.

Zoyphium crassicorne n. sp.

Male: Length about 5mm.; black, with the legs entirely orange; clypeus, labium and mandibles pale ferruginous, the clypeus with an inconspicuous dusky median patch; antennæ pale ferruginous, the flagellum with a dusky shade above; wings hyaline, stigma and outer nervures dark rufous, inner nervures pale ferruginous; front, vertex and mesothorax dullish, with extremely close, minute (microscopical) regular punctures; ocelli in a triangle, lateral ocelli not quite as far from eye as diameter of one; antennæ placed low down on face, distance from antenna to lower margin of clypeus rather less than distance of antennæ apart; antennæ clavate, 12-jointed, the scape short and thick, the club very large, compressed apically; face and lower half of front with short glittering hair, silvery on front, very pale golden on face; eyes slightly converging above; lower margin of clypeus with a pair of low rounded tubercles, far apart; mandibles with a large rounded tooth on lower margin; tegulæ short, pale rufo-testaceous; metathorax with short silvery hair at sides, its basal area with a fine median raised line, the apical half of which runs through a broad shining depressed or excavated area; tibiæ with apical part spinose; tibial spurs stout, finely ciliate-denticulate; basal nervure going basad of transversomedial; marginal cell long, pointed on costa; three submarginal cells, the first receiving first recurrent nervure some distance from its end, the second triangular; abdomen shining, very minutely punctured, the apex presenting a broad slightly rounded truncation, with obtuse but salient angles.

Hab.—Brisbane (*H. Hacker*). Collected May 13, 1912. Queensland Museum 63. The type of *Zoyphium* is *Z. sericeum* Kohl, 1893. In Kohl's species the venation differs from that of *Zcrassi corne.* in some rather striking details; the second recurrent nerveur joins the second submarginal cell about the middle (far

beyond the middle in *crassicorne*), the third submarginal cell is as broad above as the length of the second transversocubital nervure (hardly more than half as broad in *crassicorne*), the median cell of the hind wings is obtusely pointed (very broadly truncate in *crassicorne*). Turner remarks: "None of the species of *Zoyphium* described by me have the tooth on each side of the second (first) dorsal segment mentioned by Kohl in his description of the genus"; *Z. crassicorne* is also without such a tooth.

From the other species of *Zoyphium*, *Z. crassicorne* is distinguished as follows:

(1) From *Z. erythrosoma* Turn. by the small size and quite different colour.

(2) From *Z. rufonigrum* Turn. by the black thorax. The male antennæ are very much thicker apically, with a very much larger club, than in *rufonigrum*; the penultimate joints in *crassicorne* are much broader than long. The tooth on the lower side of the mandibles is more broadly rounded than in *rufonigrum*.

(3) From *Z. kohlii* Turn. by the smaller size and red clypeus. The venation is also different; in *kohlii* the basal nervure goes more basad of the transversomedial, the marginal cell is shorter, and the second recurrent nervure joins the second submarginal cell about the middle.

(4) From *Z. frontale* Turn. by the three submarginal cells and the entirely black scutella.

(5) From *Z. doddi* Turn. by the larger size; first recurrent nervure joining first submarginal cell considerably more than three-quarters from base*; antennæ further from each other than from the eyes; hypopygium not produced into a spine at apex; eyes distinctly converging above. This is no doubt the nearest relative.

(6) From *Z. dipteroides* (Turn.) by the smaller size and black color,

(7) From *Z. funebre* (Turn.) by the orange legs, wholly black pronotum, &c.

(8) From *Z. rufipes* Rohwer by the smaller size, black thorax, &c.

In one view, the antennæ of *Z. crassicorne* appear broadly truncate at end.

*It joins the cell 608 microns from base and 128 from apex.

ON SOME CENTRAL AMERICAN DERMAPTERA IN THE UNITED STATES NATIONAL MUSEUM.

BY MALCOLM BURR, D. SC., LONDON, ENGLAND.

The following notes form a list of a number of Central American Dermaptera submitted to me for study. Although there are no species new to science among them, some of the records of scarce and little known species are of considerable interest.

Diplatys jansoni, Kirby.

Panama—Canal Zone, Paraiso, 5. ii. and 7-10. v., 1911, 2 ♂; 8-9. ii. and 22. iv., 1911, 4 ♀ ♀; 5. ii. and 1. v., 1911, 2 larvæ (Schwarz).

It was formerly suggested that *D. severa* Borm. was a mere melanic form of this species, but the two are undoubtedly distinct. It is desirable that the genital armature of the American Diplatyinæ be examined, for which purpose material in alcohol is urgently needed. New genera will probably be required for this and the following species.

Diplatys jansoni superficially resembles a staphylinid beetle.

Diplatys gracilis Stål.

Panama—Canal Zone, Porto Bello, 20. ii., 1913. ♂. (Schwarz.)

This species has not hitherto been recorded from Central America, but only from Peru and Brazil. It is a rare insect in collections. I consider *D. sahlbergi* a mere variant.

Pyragra fuscata Serv.

Mexico—Omealca, V. C. 16. iv., 1908. ♀ and larva. (Knab.)

Guatemala—Dept. Solola, Olas de Moka, 3000 feet., ix., 1908. 2 larvæ. (Engelhardt.)

Echinopsalis guttata Borm.

Panama—Porto Bello, 25. ii., 1911, and Paraiso, 17. i., 1911, both larvæ. (Schwarz.)

Recorded from Nicaragua, Costa Rica and Colombia. It is a rare species.

August, 1914.

Eulabis saramaccensis Zach.

Panama—Canal Zone. Frijoles, 1 ♂; Paraiso, 19. i., 1911, 1 larva; 5. ii., 1911, 1 ♂, "in fruit trap"; 21. iii., 1911, 1 ♂; 3. v., 1911, ♂ ♀. (Schwarz.)

This species has but recently been described by Zacher from Surinam. In nature specimens have probably often been mistaken for *Anisolabis annulipes*.

Psalis americana Beauv.

Panama—Porto Bello, 27, iii., 1912, 2 larvæ. (Busck.)

Labidura riparia Pall.

Mexico—Tampico, vii., 1912, 1 ♀. (Schwarz.)

Spongophora croceipennis Serv.

Guatemala—Dept. Solola, Olas de Moka, 3000 feet, ix., 1908, ♂. (Engelhardt.)

Costa Rica—Tuis. 2400 feet, ♀. (Lankester.)

Purex frontalis Dohrn.

Costa Rica—La Florida, 500 feet. 2 ♀. (Lankester.)

Recorded from Peru and Ecuador.

Purex parvicollis Stål.

Panama—Porto Bello. 25. ii., 1912, ♀. (Schwarz.)

A very scarce species, only known Rio de Janeiro (Stål), and a contemporary specimen in my own collection.

Vostox similis Borm.

Mexico—Orizaba. 13. iii., 1908. ♀. (Knab.) Vera Cruz, Cordoba. 24. ii., 1908. ♀. (Knab.)

Panama—Canal Zone, Tabernilla. 9. v., 1907. ♀. (Busck.)

This species has remained unrecognized since its description by Bormans from specimens from Colombia. I only know of his original specimens in the Vienna Museum and in my collection.

Vostox insignis Stål.

Panama—Canal Zone, Tabernilla. ♂. (Busck.) Lion Hill. ♂. (Busck.) Paraiso. 20. ii., 1911. ♀. (Schwarz.)

Spongovostox ghilianii Dohrn.?

Panama—Canal Zone, Paraiso. 5. iv., 1911. ♀. (Schwarz.)
Mexico—Tampico. vii.; 1912. 1 ♂. 2 ♀. (Schwarz.)

Spongovostox alter Burr.

Panama—Canal Zone, Paraiso. 9. ii. and 2. iv., 1911. ♂♂. (Schwarz.)

Spongovostox apicedentata Caud.

Mexico—Aguas Calientes. ♂. (Schwarz.)

Labia curvicauda Motsch.

Panama—Canal Zone, Paraiso. 1. ii., 1911. 1 ♂, 2 ♀. 25. iv., 1911. 1 ♀. (Schwarz.)
A cosmopolitan species.

Labia equatoria Burr.

Panama—Porto Bello. 20-25-26. ii., 1911. 2 brachypterous and 2 macropterous ♀. (Schwarz.)

Labia bilineata Scudd.

Panama—Canal Zone, Paraiso. 5. iii., 1911. ♀. (Schwarz.)

Prolabia formica Burr.

Panama—Canal Zone, Paraiso. 1 ♂, 14 ♀ and some larvæ. Numerous dates, January-May, 1911. (Schwarz.)

Prolabia annulata Beauv.

Panama—Canal Zone, Paraiso. 2 ♂, 6 ♀. January-May, 1911. (Schwarz.). Frijoles, "on flowers of Lengua de Vacca", ♀. (Schwarz.) Tabernilla. 1. v., 1907. ♂, ♀. (Busck.) Bohio. 7. ii., 1911. ♀. (Schwarz.) Port Limon. ♂. (Knab.)
This species has been discussed in detail by me in Proc. U. S. Nat. Museum, and I have not altered the opinions there expressed.

Prolabia arachidis Yers.

Guatemala—Champerico. 3. viii., 1908. ♂. (Knab.)

Prolabia mexicana Borm.

Mexico—Vera Cruz, Cordoba. 23. iv., 1908. ♀. (Fenyes.)

Sparatta nigrina Stål.

Panama—Porto Bello. 27-28. ii. and 12. iii., 1911. ♂, 2 ♀. (Schwarz.)

Doru lineare Esch.

Panama—Canal Zone, Tabernilla. 14. vi., 1907. ♀. (Busck.)

Mexico—Vera Cruz, Cordoba. 2-11. iii. and 26. iv., 1908. 3 ♂, 3 ♀. (Knab.)

It is interesting to note that by external characters this genus scarcely differs from *Forficula*, except in the slender forceps and spined pygidium. The validity of the genus is confirmed by a study of the genital armature. The metaparameres are regularly convex externally, straight internally and acute at the apex, which is unusual in *Forficula*.

Doru bimaculatum Fabr. will have to be removed to a distinct genus, as the metaparamera are apically rounded, as in *Forficula*, but it differs in several features from that genus.

Ancistrogaster variegata Stål.

Panama—Canal Zone, Paraiso. 10. iv., 1911. ♀. (Schwarz.)

Mexico—Vera Cruz, Cordoba. 10. ii., 1908. ♀. (Knab.)

Ancistrogaster spinax Dohrn.

Guatemala—Dept. Solola, Olas de Moka, 3000 feet. v., 1908. 1 ♂, 2 ♀. (Engelhardt.)

Vlax toltecus Borm., or **intermedius** Burr.

Mexico—Vera Cruz, Orizaba and Cordoba. 13. ii., 1908. 2 ♀. (Knab.)

Dinex americanus Borm.

Panama—Canal Zone, Bohio. 7. i., 1911. 2 ♂. (Schwarz); (one is of the form originally figured by de Bormans, the other has the anal points and armature of the forceps scarcely developed). Paraiso. 26. i., 1911. ♀. (Schwarz.) Frijoles, "on flowers of Lengua de Vacca." ♂. (Schwarz.)

Neolobophora ruficeps Burm.

Panama—Canal Zone, Culebra. ♂. (Rousseau.)

A REVIEW OF THE WORK ON THE POISONED BAIT SPRAY, DRY METHOD AND MIXED TREATMENT OF CONTROLLING FRUIT FLIES (TRYPETIDÆ).

BY HENRY H. P. SEVERIN, PH.D., MILWAUKEE, WIS.

(Continued from p. 246).

Olive Fly (*Dacus oleæ* Rossi.).

After the Italian entomologists, De Cillis and Berlese, had demonstrated the effectiveness of the poisoned bait spray to control the olive fly, Chapelle (2 and 3) and Ruby, of France, carried on a series of similar spraying experiments to combat this same pest, and confirmed the results obtained in Italy. The work of the Italian entomologists with the dry method and mixed treatment of controlling the olive fly was also tested by the French scientists.

In 1907 two of Dr. De Cillis' formulas (Table II) were used by the French scientists. As some of the ingredients of these formulas were rather expensive, Dr. Berlese began to experiment along more economical lines, and in 1908 one of his formulas (Table II) was tested. The following table shows the formulas which were used in France from 1907-1909:

TABLE II.

	1907	1907	1908	1909
Molasses (45 to 50% sugar)	65	40	98	90
Honey	31	40	..	..
Sodium arsenate	2	2	2	2
Glycerine	2	..	..	..
Water	..	18	..	10

In 1907 the formulas were diluted in the proportion of 10 kilogrammes of the solution to 100 liters of water, but in the next two years 20 kilogrammes of the solution to 100 liters of water was used. The 20% concentration gave the diluted solution a syrupy consistency and consequently a better adherence to the leaves.

The number of applications of the spray, dose per tree and cost, including labour, was as follows:

	1907	1908	1909
Number of applications of spray	5-6	3-4	6
Dose per tree	.5-1	.3-.5	.5 liters
Cost of treatment per tree	4-9	1 1/5-1 3/5	4 cents

The first application of the spray was made about fifteen days before the egg-laying period began. The bait was uniformly ap-

plied to the interior and exterior of the tree, so that the droplets adhered to the upper and lower surfaces of the leaves. The time required to spray one tree was estimated at half a minute to a minute.

Non-isolated orchards.—During a number of years spraying experiments were carried on in a number of olive gardens which were adjacent to one or more untreated olive plantations, and consequently more intimately exposed to the invasion of the fly. In 1908 three small orchards encircled by neighbouring olive groves were treated. In 1909 a number of orchards composed of about 2,000 trees, and in contact at numerous places with neighbouring olive gardens, was sprayed. In 1907 two non-isolated orchards were sprayed. The first contained about 2,500 trees, and was encircled by olive groves. The second was composed of about 3,000 trees, grouped in a score of orchards, and was situated at the junction of two rivers and rose in a succession of terraces on the side of a hill to an elevation of 600-800 meters. The results obtained are shown in Table III. The two columns of figures under the heading, "olivés infested in treated orchard," represent different varieties of olives, the same variety being used as a check under the heading, "olives infested in untreated orchard." Compare the first column of figures with the third, and the second with the fourth.

TABLE III.

Number of trees.	Applications of spray.	Olives infested in treated orchard.		Olives infested in untreated orchard.	
		%	%	%	%
145	4	32.5	40	60.25	80.5
150	4	31.75		62.5	
630	4	7.5	15.5	10.	36.25
		Periphery			
2000	6	17	33.8	73.	82.
		Centre			
		4	5.6		
		Periphery			
2500	5	71.2	68	96	97.4
		Centre			
		51.25	47.75	89	87.5
		Along river			
3000	5	54.3	48.4	76.1	76.1
		50-100 meters on hill			
		37.9	29.3	70.1	70.1

From this table it is evident that in the small, non-isolated olive gardens the treatment reduced the infestation between 40 and 50 %. According to the authors, by increasing the number of applications of the spray, the infestation could be reduced still more.

The Italian entomologists obtained excellent results in small, non-isolated olive groves by applying 6-7 sprays. It would be necessary to renew the bait after each heavy rain.

In the large, non-isolated olive groves the central part is protected by the spray, while the fruit along the periphery is generally attacked by the maggot in a proportion which increases according to the nearness of the infested olive plantations not treated.

Isolated orchards.—During a number of seasons Chapelle (2) and Ruby conducted a series of spraying experiments in small, isolated olive gardens. In one experiment 620 trees were sprayed during two successive seasons. This orchard was isolated by about one kilometer (3,280.8 feet) from other olive groves. The results obtained are given in Table VI.

Olive groves containing 10,000 trees were treated with the dry method of control in 1911 (Table VII) and with the poisoned bait spray in 1912. These olive gardens were scattered over a large area, and were owned by a score of proprietors. The vast area of olive trees was well isolated, being situated at a distance of 500-600 meters from the neighbouring olive plantations.

The insecticide was composed of 15 kilogrammes of molasses, 2½% of sodium arsenate in 100 liters of water. One application of the spray was made on July 8, just previous to the emergence of the first brood of olive flies, and another treatment was given on September 6, at the time when the second brood of flies were issuing. The second spray was applied to the more exposed parts of the large area of olive trees, only two-thirds of the orchard being treated. One man was able to spray 700-900 trees in a day. Each tree received about .3-.4 of a liter of the bait. The cost of the treatment, including labour, was estimated at 1 cent per tree. The results of examining the crop on October 5 and November 5 are recorded in Table IV.

TABLE IV

	Olives infested in treated orchard.						Olives infested in untreated orchard.					
	%	%	%	%	%	%	%	%	%	%	%	%
Oct. 5, 1912		4	2		7		63		57	56		
Nov. 5, 1912	10	6.5	5	9	6	14	60.5	66.5	85.33	75	100	81

It is unquestionable that the isolation and perfect homogeneity of the olive groves treated contributed to this remarkable success. The authors emphasize the need of co-operation of olive growers in the same vicinity, so that a large area of olive trees may be treated.

The attack of *Dacus* upon olives results not only in the premature dropping of the fruit, but also causes a very serious diminution in the yield of the oil. Figures are given to show that in order to produce the same quantity of oil, the ratio of olives required from untreated to treated trees is about 5-3.

Dr. Cazeneuve (2) declares that mortal accidents have occured with animals which have eaten sprayed olives or vegetation growing underneath or in the neighbourhood of treated trees. The authors could not confirm any accidents of this kind.

Can arsenic be found in the manufactured oil of olives obtained from treated trees? Chemical tests by Gassend (2) of olive oil obtained from olives taken from trees sprayed 2 or 3 days before the crop was gathered showed traces of arsenic estimated at less than .000001 gr. per liter. Negative results were obtained with the oil when the normal interval elapsed between the last application of the spray and the harvesting of the olives.

The poisoned bait spray has some disadvantages. According to Berlese, the spray stains the olives. The insecticide also stimulates the development of fungi when a low per cent. of sugar is present in the sweet substance, but in order to overcome this difficulty, the bait ought to contain at least 30% sugar (glucose or saccharose). According to the French scientists the fear of propagating fungi with heavy and numerous doses of the spray disappears from the work of 1912. The small quantity of diluted molasses is washed off with the first heavy rains.

Dry Method.

The dry method of controlling fruit flies consists in suspending in the trees, a container holding the poisoned sweets in such a way that the bait is constantly within the reach of the rapidly flying fruit fly. This system would have the advantage of (1)

abolishing spraying and thus warding off the danger from fungi; (2) reducing the cost of labor; (3) overcoming the unfavourable action of rains which wash off the sweet ingredients of the spray and (4) doing away with the inconvenience of lack of water in certain regions. In southern Italy the fruit fly remedy offers a serious difficulty on account of lack of water to dilute the stock solution, but with the dry method of control very little water is used.

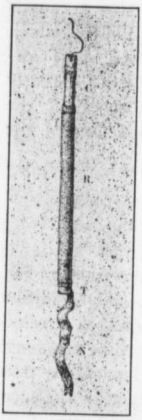

FIG. 23.—Tube containing poisoned molasses; F, suspending wire; C, bamboo; R, roll of blotting paper; T, cork; N, canvas ribbon. (After Berlese).

One system used in France in 1908 and classed under the dry method of controlling the olive fly was to place the poisoned bait in a bottle provided with a cork through which passed a wick. This wick extended into the poisonous mixture and acted like the wick of a lamp. The molasses was slightly diluted with water and mixed with potassium or sodium arsenate (2%).

This dry method of control was used in 232 and 340 trees of two isolated olive orchards. In the olive garden containing 232 bottles, from 5.75 to 6.75% of the olives were maggoty, whereas in an untreated olive grove bearing the same variety of olives, from 6.75 to 22.75% were infested. The results of the second experiment are recorded in table V.

TABLE V.

Method of Treatment.	Number of trees.	Olives infested in treated orchards.		Olives infested in untreated orchards.	
1907 sprayed	340	% 33.25	% 9.9	% 80.75	% 98.75
1908 bottles	340	8.8	12.6	69.4	79.4
1909 sacs	340	11.34	14.0	40.57	58.33

The results of the last experiment appear most encouraging but it must be noted that this olive garden was well isolated and had been sprayed with success during the previous year; it may be possible that there was a reduction of the pest during the year when this dry method of control was used.

Another system classed under the dry method of control was tried on a small scale in France in 1908 and on a large scale in 1909. This method consisted in suspending in the tree a canvas sac (10-14 inches in length and about 2 inches in diameter), which contained about 1½ lbs. of a mixture of poisoned molasses, sawdust and bran (Fig. 24). The insecticide transudes directly through the canvas and when a rain washes off the bait, the poisoned molasses filters through again. The proportion of the ingredients used in the canvas sacs was as follows:

Arsenical molasses.....71%
Sawdust.....21%
Bran.....8%

An excess of bran gives too much porosity to the mixture and favors evaporation. The addition of water to the molasses accelerates dessication, a thing to avoid most. To lessen dessication it is necessary to tightly stuff the sacs. After filling the bags, drops of liquid ooze out and this loss can be avoided by allowing the sacs to drain over a vessel for several hours or even two days.

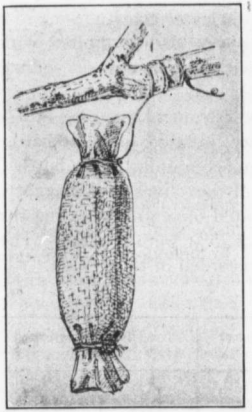

FIG. 24.—Canvas sac stuffed with a mixture of bran and poisoned molasses. (After Berlese).

The sacs thus prepared are placed in the interior of the trees at a region as accessible as possible. Once during the summer, water was added to the bags on account of the sacs becoming dry at their upper end; this was due to the oozing of molasses through the canvas and to evaporation. Later when the first rains and dew of September occur, the atmospheric humidity insures excellent conditions. The cost, including all expenses, amounted to $4.00 per sac. The results obtained in two isolated olive gardens are given in tables V and VI.

TABLE VI.

Method of Treatment.	Number of trees.	Olives infested in treated orchard.		Olives infested in untreated orchard.	
		%	%	%	%
1907 sprayed	620	7.5	17.5	80.75	98.75
1908 sprayed	620	1.8	1.4	69.4	79.4
1909 sacs	620	16.0	14.0	40.57	58.33

It is evident from tables V and VI that the use of these sacs in isolated olive gardens did not give as good results as the use of the poisoned bait spray during the previous years.

In a non-isolated orchard containing 675 olive trees, each tree was provided with a sac. This orchard had never been sprayed. The results showed that 15 to 32.5% of the olives were infested in this olive garden, whereas in a neighbouring olive plantation bearing the same variety of olives 26 to 39.67% were attacked by the pest. It is apparent that little value can be attributed to this dry method of control in a non-isolated olive grove.

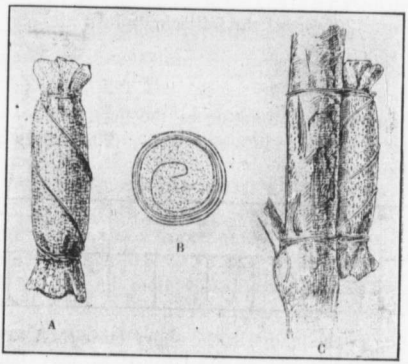

FIG. 25.—A, roll of absorbent paper stuffed with a mixture of bran and poisoned molasses; B, same in section; C, fastened to a branch. (After Berlese).

A third system classed under the dry method of control was to wire to the branches of an olive tree, a sheet-iron or galvanized-

iron pan (about 14-20 inches in diameter; 6-8 inches deep) containing the poisoned molasses. Pieces of rags floating at the surface of the poisonous mixture, enable the insect to come to rest within reach of the bait. Each pan contained about 2 kilogrammes of poisoned molasses (3% arsenate of soda) diluted with a small quantity of water. The evaporation during the dry summer caused the molasses to lose its syrupy state and 2 liters of grape juice were added to each pan. In 1910 this dry method of control was undertaken in two isolated olive gardens. A glance at table VII shows the results obtained,

During this same year, this method was tested on a large scale in Italy under the direction of Dr. Berlese. The results as published by this scientist were most favourable.

In 1911, Chapelle (2) and Ruby repeated the experiment on a large scale. A score of olive groves containing 10,000 trees was selected. This large area of olive trees was isolated by 500-600 meters from the neighbouring olive plantations. The pans were regularly distributed at the rate of 1 for every 40 trees. Each pan contained from 5-6 liters of the following solution:

Molasses.....15 kilogr.
Sodium arsenate..... 3 „
Salt water .....100 liters

From the beginning of summer up to the first rains of autumn, 6 liters of water was poured into each pan. The results are shown in table VII.

TABLE VII.

	Number of pans.	Number of trees.	Olives infested in treated orchard.				Olives infested in untreated orchard.			
			%	%	%	%	%	%	%	%
1910	13	620	25.66				18.40			
1910	80	3,000	1.66	1			8.0	2.8		
1911	250	10,000	14.1	25	44.67	0	7.0	8.0	1.32	2

According to the figures in the above table the treatment with the use of the pans has no practical value.

The three systems classed under the dry method of control as practised by the French entomologists have not given as satisfactory results as the poisoned bait spray.

(To be continued.)

THE THIRD GENUS OF THE FAMILY ELASMIDÆ (HYMENOPTERA).

BY A. A. GIRAULT, NELSON, N. Q., AUSTRALIA.

The following genus and species was found just too late to be included within the supplement to the Elasmidæ (memoirs Queensland Museum, II., 1913). It was first mistaken for *Euryischia* Howard, the species being characteristic for that genus because of its slenderness and pale legs. The genus differs from *Euryischia* in bearing complete parapsidal furrows, a slender, conical abdomen, and in lacking the prominent projection caudad of the submarginal vein near its apex, moreover the coxæ are not compressed but cylindrical. Otherwise, it is very similar to Howard's genus *in all details* and in general appearance.

Family Elasmidæ.

Euryischomyia, new genus.

Type—The following species:

Euryischomyia washingtoni, new species.

Female—Length, 1.00 mm. Slender, the abdomen conic-ovate. Jet black and like the species of *Euryischia*, but the legs, except hind coxæ and femora, lemon yellow, also the tegulæ and the fore wings bear a clearly delimited, broad, jet black band across them under the marginal and most of postmarginal veins, the distal margin just reaching apex of stigmal vein, the proximal margin nearly straight; wings otherwise hyaline. Scutum with hardly more setæ than the scutellum which is nearly naked, the few sparse setæ whitish. Thorax finely scaly. Mandibles bidentate, the second tooth broadly truncate. Two ring-joints, the three funicle joints subquadrate, the third wider than long. Bristles under submarginal veins short, not more than two. Submarginal vein entire and continuous. Hind coxæ greatly enlarged, cylindrical, ovate; the hind femora compressed. Tarsi 5-jointed.

Male—The same but the abdomen shorter, more obtuse at apex.

Described from one male, two female specimens captured August, 1914.

January 8, 1913, by sweeping in forest along the banks of Cape River.

Habitat—Capeville (Pentland), Queensland.

Types—In the Queensland Museum, Brisbane, one male, one female on a slide.

The species is respectfully dedicated to Booker T. Washington.

HORMOMYIA BULLA, N. SP.

BY E. P. FELT, ALBANY, N. Y.

1867. Walsh, B. D., Ent. Soc. Phil. Proc., 6, p. 226.
1894. Brodie, Wm., Biol. Rev. of Ont., 1, p. 74.
1909. Jarvis, T. D., Ent. Soc. Ont. 39th Rep't, p. 83.
1912. Cosens, A., Can. Inst. Trans., 9, p. 317.

The midge, previously unknown, produces a subgobular, yellowish gall, about the size of a large pea, on Helianthus leaves. The deformities are about equally prominent on both sides of the leaf and located irregularly, though usually near the mid rib. This species has been recorded from the Province of Ontario by the late Dr. Brodie, and has been reported as common at Evanston, Ill., by Mr. L. H. Weld, who reared the adults described below, July 23, 1907, and who states that the gall occurred commonly at North Evanston, Ill., on plants growing in a deep, black, rich soil along with compas plants. The gall of *H. helianthi* Brodie Mr. Weld reports as very local at Evanston, Ill., it being found by him in September, whereas the gall of *H. bulla* occurs in July. Unfortunately, the account by Walsh gives only an incidental mention of the gall of *H. bulla*, and we are therefore unable to credit him with having characterized the species. The midge is closely allied to *H. helianthi* Brodie, from which it may be readily separated by its smaller size, longer stems of the antennal segments in the male, and the distinctly longer palpi of the female.

Male.—Length 1.5 mm. Antennæ extending to the third abdominal segment, sparsely haired, pale yellowish; 14 segments, the fifth with stems 1¼ and 1½ times their diameters, respectively;

the basal enlargement subglobose, the distal broadly oval, with a length ¼ greater than its diameter; the basal circumfili extending to the distal third of the basal portion of the stem, the distal circumfili nearly to the apex of the segment; terminal segment slightly reduced, the stem with a distinct swelling near the middle, the distal enlargement broadly fusiform, with a length about twice its diameter, the apex obtuse. Palpi; first segment short, subquadrate, the second greatly produced, angularly curved, slender, with a length fully seven times its diameter (another male has three papal segments, the second and third subequal). Mesonotum reddish brown. Scutellum and postscutellum fuscous yellowish. Abdomen rather thickly haired, dark reddish brown; genitalia fuscous yellowish. Wings hyaline, costa dark straw. Halteres yellowish. Coxæ and femora basally pale yellowish, the distal portion of femora and the basal portion of tibiæ dark straw, the distal part of tibiæ and the tarsi yellowish. Claws slender, evenly curved, simple, the pulvilli as long as the claws. Genitalia; basal clasp segment short, broad, the terminal clasp segment long, tapering to a subacute toothed apex; dorsal plate broad, broadly and triangularly emarginate, the lobes divergent and broadly rounded; ventral plate short, tapering to a broadly rounded apex.

Female.—Length 3 mm. Antennæ extending to the base of the abdomen, rather thickly haired, brownish yellow; 14 segments, the fifth with the stem about ¼ the length of the cylindric basal enlargement, which latter has a length about twice its diameter, the distal third with coarsely reticulate circumfili; terminal segment cylindric, with a length over twice its diameter, broadly rounded apically. Palpi; first segment subquadrate, the second twice the length of the first, rather stout, the third ½ longer than the second, fusiform. Mesonotum shining dark brown. Scutellum and postscutellum fuscous yellowish. Abdomen thickly haired, brownish yellow, the ovipositor somewhat fuscous. Wings hyaline, costa dark brown. Halteres yellowish basally, fuscous apically. Coxæ and legs mostly a fuscous straw. Ovipositor when extended about ½ the length of the abdomen, moderately stout; terminal lobes with a length ½ greater than the width, the apex broadly rounded and sparsely setose. Type Cecid No. 1267.

A NEW SPECIES OF MYMARIDÆ FROM AUSTRALIA.

BY A. A. GIRAULT, NELSON, N. Q., AUSTRALIA.

Genus *Stethynium* Enock.

1. **Stethynium cinctiventris,** new species.

Female.—Length 0.80 mm. Habitus of *Anaphes*.

Black, the abdomen with a broad band of silvery-white around its base, occupying nearly a third of the surface; scutum more or less pallid, especially at caudal half, the parapsides and scutellum white. Legs white or nearly, the antennæ black, the first three funicle joints cylindrical, the second longest, 1 and 3 more or less equal, a third shorter than 2; 6 subglobular, a third shorter than 5, while 4 is a fourth shorter than 5; proximal club joint nearly half of the club. Fore wings rather narrow and graceful, with about fourteen lines of discal cilia across the widest part of the blade, the longest marginal cilia about half the greatest width. Hind wings rather narrow and curved, with five lines of fine discal cilia near tip, the third and fourth lines soon disappearing. Strigil present. Scutellum rectangular, the mesopostscutellum much longer than it and joined to the phragma (two pairs of sclerites between scutellum and postscutellum). Fore wing with a more or less distinct subfuscous stripe across it at about the middle. Valves of ovipositor slightly exserted. Tibial spurs single.

Male not known.

Described from one female captured by sweeping in a jungle pocket, September 3, 1913 (A. P. Dodd).

Habitat.—Nelson (Cairns), Queensland.

Type.—In the Queensland Museum, Brisbane, the above specimen on a slide with the following specimen:

Genus *Anaphoidea* Girault.

1. **Anaphoidea galtoni** Girault.

Male.—Funicle joints each a little over twice longer than broad, otherwise like the female.

From one specimen captured with the female type specimen (Roma, Queensland).

August, 1914

GEOMETRID NOTES — WITH DESCRIPTIONS OF NEW SPECIES AND VARIETIES.

BY L. W. SWETT, BOSTON, MASS.

Stamnodes pearsalli, n. sp.

Expands 34 mm. Palpi short, pinkish-tinged; head roseate gray, between the antennæ is a reddish line. Thorax and abdomen fawn-coloured, tinged with reddish. Wings fawn-coloured or grayish brown, with a pinkish tinge in the fringe and on the costa. There are four black patches on the fore wing at the costa; from the body to the first spot the costa is reddish. The first black spot is about 3 mm. from base of wing; between first and second black spots there is a whitish streak, beyond which the costa is grayish. The third spot is about 10 mm. from base of wing and is larger than the others; it is apparently the beginning of a faint black line or shading, which runs out almost at right angles with costa to M_1, then runs back in a straight line until it reaches the inner margin at about two-thirds out. This line is shaded with white on the outside, and shows as a white patch at the costa, about 1 mm. in width. Beyond, to the outer margin, the wing is fawn without markings, except a fourth black patch near the apex; fringe long and pinkish. I can see no discal spots on hind or fore wings. Hind wings fawn-coloured like fore wings, but without markings. Beneath the markings are much more striking than above. Costa grayish with pinkish striations to the third black spot or about 12 mm. out from base, there is a trace of a faint white line beyond. Near the apex is an oblong gray patch surrounded with reddish striations. At the end near the apex there are two sharp teeth. Perhaps in some specimens this patch might be called triangular. The entire central portion of the fore wings is lightish and rather transparent. On the outer margin, just below apex, is a reddish triangular spot. The hind wings are fawn-coloured, densely striated with red. Towards the outer margin and running for a short distance with M_1 is a red line, running from just above centre of the wing towards outer margin, and fading out just before reaching there. From inner margin another broad, red line runs toward outer margin for about 4 mm., then fades from sight; it is shaded by a white line.

August, 1914.

Holotype.—One ♀ from Mt. Lowe, California, April 11, 1913, received through the kindness of Mr. Harry H. Newcomb.

I take pleasure in naming this species after my friend, Mr. R. F. Pearsall, who has done so much to clear up this group.

Cleora newcombi, n. sp.

Expands 29–30 mm. Palpi short and grayish, head whitish between the antennæ. Fore wings dark gray, heavily striated with black, body and thorax dark gray, the body with characteristic geminate black spots. The basal black band is quite broad on fore wings, starting from a black patch on costa, about 4 mm. out from base, and curving in towards body. The line is geminate with black shading. Beyond this line, about the centre of the wing, a line starts from the black spot on the costa and runs straight across the wing to the inner margin. About three-fourths out from body a third black line runs sinuately across the wing, bending in towards body as it reaches inner margin at about the middle. This black line is accentuated on the veins by black dots. Beyond there seems to be a double row of lunules, gray centred and blackish outside; about the centre of the fore wing at outer margin they form a patch much lighter than the rest of the wing. The discal spot, when present, is very faint. Hind wings of same colour as fore wings, basal band black, running in a regular curve to outer margin, the black discal spot large and prominent. Extra discal black line very close to discal spot; starting from inner margin it curves upward towards discal spot, then suddenly runs straight to outer margin. Quite close to this extra discal line and running parallel to it is another somewhat paler line; beyond there is a clear space, then a curved, wide, black band shaded with whitish and appearing almost as lunules. The scollop of the hind wing is bounded by a narrow black line, fringe long and grayish. Beneath fore wings lighter gray than above, except towards the body and on costa, where it is heavily striated with black. There is a prominent black discal spot, but no further markings, except the black shadings. Hind wings pale ashen with no lines or markings except black discal spot.

Holotype.—One ♂, Venice, Calif., July 11, 1913, H. H. Newcomb.

Paratype.—One ♂, Venice, Calif., May 6, 1913, H. H. Newcomb.

I take pleasure in naming this species after my friend, Mr. H. H. Newcomb, who has rendered me valuable assistance in the way of specimens.

Sicya macularia, var. **lewisi,** n. var.

Expands 26 mm. Palpi a little longer than *macularia*, shaded with pink. Wings shaped much as *macularia*, but with less of a curve below apex, outer margin being straighter. Wings lemon yellow without markings to outer margin, except rosy shading along costa, a minute black discal spot and a red spot on centre of inner margin. A reddish brown line runs from near apex to inner margin beyond this line, the entire outer margin is chocolate brown. Along the median vein there is a chocolate shading, but so pale as to look like a streak. The hind wing is paler than fore wing, a reddish, irregular line runs from inner margin to outer in a curve. Beyond this line the margin is chocolate colour, as the fore wing. Beneath the fore wings are marked as above, with chocolate outer margin. Hind wings have small reddish discal spot, and the outer line appears as spots on the veins, outer margin pale chocolate.

Holotype.—One ♂, Mt. Wilson, Calif., July 11, 1913, H. H. Newcomb.

I name this variety in memory of my father, Lewis Swett, who assisted me in many ways in building up my collection of Geometrids.

This seems to be a distinct species, but *macularia* is so variable it is possible that this is a tendency towards melanism, and I prefer to regard it as a variety.

Cingilia catenaria, var. **immacularia,** n. var.

Expands 40 mm. This variety has the same colourings as to head, thorax and body as the normal form. The wings are smoky white, without any trace of lines, except a black dot close to body, just beyond this is a faint dot on costa, then on median vein and on vein 1A. The edge of the wing has minute black dots at end of veins. Beneath the wings are paler than above, only the black

discal spots showing through. This, apparently, is a rare variety and worthy of name, it is so entirely different from the common *catenaria*.

Holotype.—One ♂, Norway, Maine, S. J. Smith.

All the types described in this paper are placed in my collection at the Museum of Comparative Zoology, Cambridge, Mass.

THE MONTREAL BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The following Resolution was unanimously passed at a meeting of the Montreal Branch and copies have been forwarded by the Secretary to the relatives of the late Henry H. Lyman.

Resolved:—"That the members of the Montreal Branch of the Entomological Society of Ontario have learned with great sorrow, that when the 'S. S. Empress of Ireland' sank on the 29th day of May, she had on board one of our oldest and most active members, Mr. Henry Herbert Lyman, accompanied by Mrs. Lyman, and that both are amongst those who are lost.

From the time that Mr. Lyman joined our Society in 1875 up to the Annual Meeting held last month, in his successive capacities as a Member of the Council, President, Vice-President and Treasurer, he has been so intimately connected with the work we have been able to accomplish that it is difficult to realize and express the extent of the loss we have sustained.

His wide knowledge of the butterflies, both in nature and in literature, his extensive travels to the great museums of this Continent and of Europe, his friendly help and criticism, and frequent hospitality at his late residence 'Thornhill' where so many enjoyable meetings have been held, will long be gratefully remembered; as well as the encouragement in the study of Nature produced by his numerous papers published in the various scientific periodicals, which papers he invariably read first at our gatherings.

We beg to extend to the members of his family the expression of our sympathy in their double bereavement, and assure them that the feeling of loss is not confined to this City, but is shared by Entomologists throughout America and beyond the seas."

GEO. A. MOORE, SECRETARY.

SOME PROCTOTRYPOID EGG-PARASITES OF SUGAR-CANE INSECTS IN JAVA.

BY ALLAN P. DODD, NELSON, N. Q., AUSTRALIA.

In a small collection of egg-parasites received from Mr. P. van der Goot, Entomologist, Javan Sugar Experiment Station, Pasoeroean, Java, were three vials containing Proctotrypoidea as follows:—

No. 1.—"Bred from the eggs of *Diatrea striatalis*. Described by Dr. Zehnter as *Ceraphron benificiens* Zehnter." In "Des Zuckerrohrund seine Kulter," Kruger, 1899, p. 350, *Ceraphron benificiens* Zehnter is figured. The specimens received agree entirely with this figure, and I have no doubt the specimens received by me are Zehnter's *Ceraphron benificiens*. This species is not a Ceraphron, but belongs to the family *Scelionidæ*, subfamily *Telenominæ*, genus *Phanurus* Thomson, and should, therefore, be known as *Phanurus benificiens* Zehnter.

No. 7—"Reared from eggs of an unknown moth on leaves of sugarcane." These parasites are the same as the foregoing, namely *Phanurus benificiens* Zehnter.

No. 5—"Reared from eggs found on sugarcane; eggs enclosed." The eggs are probably those of a *Pentatomid*. The parasite is herewith described:—

Family *Scelionidæ*.

Subfamily *Telenominæ*.

Genus *Telenomus* Haliday.

1. Telenomus saccharalis, sp. nov.

Female—Length 0.55 mm; very small for the genus. Coal black, legs and antennæ golden yellow, last four antennal joints dusky yellow.

Antennæ 11-jointed, scape slender, equal to combined length of pedicel and funicle joints; pedicel much wider and longer than each funicle joint; funicle joints small; first and second funicle joints subequal, longer than wide; third shorter; fourth as wide as long; fifth transverse; club 4-jointed, much wider than funicle, its joints much wider than long, second the widest.

Forewings narrow, hyaline; when closed extending beyond tip of the abdomen; marginal cilia long, equal to one-third greatest wing width; the discal cilia very fine and dense; submarginal vein attaining the costa at about two-fifths wing length; the marginal vein nearly as long as the stigmal which is oblique, knobbed at tip; the postmarginal twice as long as the stigmal.

Abdomen much narrower and shorter than the thorax.

(From one specimen, two-thirds inch objective, one inch optic, Bausch and Lomb.)

Male—Antennæ 12-jointed, first and second funicle joints small, a little longer than wide; third distinctly longer, as long as pedicel; fourth and fifth subequal, as wide as long; six-nine subequal, wider than long; last joint as long as pedicel.

The male type has the fifth and sixth funicle joints of one antenna, and the sixth and seventh of the other united in one joint.

(From one specimen, same magnification). Described from a ♂ and a ♀, labeled as above.

Habitat—Java.

Host—Eggs of a Pentatomid (?).

Types—In the Queensland Museum, Brisbane, Q'ld, a male and a female on a slide together.

DEPARTMENT OF ENTOMOLOGY—ONTARIO AGRICULTURAL COLLEGE, GUELPH.

After a long connection with the College, extending from his student days to the present year, Mr. Tennyson D. Jarvis has resigned his position as Associate Professor of Entomology and Zoology. He is now living at Grimsby East and devoting himself to the cultivation of a fruit farm. In consequence of this change, the following appointments have been made: Mr. Lawson Caesar, Provincial Entomologist, promoted to be Associate Professor; Mr. A. W. Baker to be Lecturer, and Mr. G. J. Spencer to be Demonstrator. These gentlemen are all graduates of the College and have received the degree of B.S.A. from the University of Toronto.

C. J. S. B.

FIELD NOTES AND QUESTIONS.

(Notes on rare or otherwise interesting captures, habits of insects, etc., will be gratefully received by the editor).

Heliomata infulata Grote. This pretty little Geometer is usually very rare here, perhaps only half-a-dozen specimens having been observed in twenty years, but one day at the end of May 1913, while collecting in a locust thicket I noticed several specimens flying and managed to secure two. A heavy shower came up, compelling me to seek shelter, but after the rain I returned to the spot and captured 20 specimens inside two hours. A few days later I again visited the spot and was likewise disturbed by rain but this proved advantageous as the moth which generally is very shy and swift on the wing, appeared quite sluggish and easy of capture. Eighty specimens were taken in all in a space of about 7 acres. In the surrounding district of 100 acres of apparently the same conditions only a stray specimen or two could be discovered.

Fred Marloff, Oak Station P.O., Allegheny Co., Pa.

How Lepidoptera Winter. We are not infrequently asked in what stage butterflies and moths pass the winter months? It is not an altogether satisfactory answer to say that every one of the four stages is represented, as the enquirer is sure there *must be* some rule and the others be exceptions. In Newman's "Text Book of British Butterflies and Moths" 1913, there are 117 pages devoted to a list of species, giving collecting notes in tabular form and it may be of interest to know how the British species, including the micros figure out, as doubtless in the cooler parts of North America the proportion will be about the same. Counted roughly and omitting species of doubtful occurrence, out of 68 Butterflies, 9 winter as eggs; 38 winter as larvæ; 12 winter as pupæ; 9 winter as imagoes; of 781 moths, 108 winter as eggs: 306 winter as larvæ; 330 winter as pupæ; 37 winter as imagoes; so that about 80% winter either as larvæ or pupæ, almost exactly half of each; 15% as eggs and 5% as imagoes.

A. F. Winn, Westmount, Que.

Sphingidæ at Sugar. While collecting on St. Therese Island, on the Richelieu River, from July 16th to 19th last, several species of hawk moths visited the sugared patches, not resting, but hovering as they do over flowers. Those taken proved to be 6 *Sphinx kalmiæ*, 1 *Ampelophaga chœrilus*, 2 *Ceratomia amyntor*.

W. Chagnon, St. Johns, Que.

Notes on the Eggs of Macronoctua onusta Grote.

A female of this moth was picked up from a window sill in the business part of Montreal on September 22nd, and boxed for eggs after being fed on sugar and water. Next morning a little cluster of greenish eggs was on one side of the box but evidently the moth did not like the conditions as she was wandering about, poking her extended ovipositor into all parts of the box and the 11 eggs laid were not deposited in an orderly manner, some being flat, some on their edges others on top of one another.

The moth was transferred to a breeding cage with a supply of leaves of Iris germanica from the garden, and at once began climbing up and down the leaves. She soon selected a leaf with a long crack at the base. Into this crack an egg was placed and others were laid alongside of it in a row, the moth remaining in one position merely moving her body. Other eggs were laid during the day between the edges of the leaves where they overlap and this is probably where most are placed in nature to pass the winter.

When laid the egg is pale greenish but in a few days turns purplish. It is very much flattened on top and bottom and may be likened in shape to a vest button. The width is .6mm. and height .27mm., rounded at the edges. The ribs are shallow and show most on the sides. Hatched May 27-29.

Mr. Henry Bird tells me the larvæ will feed on *Gemmingia chinensis* as well as on the various species of Iris.

A. F. Winn, Westmount, Que.

SCUTIGERA FORCEPS IN ONTARIO.

In the June number of the "Canadian Entomologist" I notice that Dr. Gordon Hewitt has recorded an occurrence of *Scutigera forceps* in Canada. During the past four or five years I have received several specimens of this Centipede taken in Ontario for indentification; two of these taken in Toronto I still have. It is probable that this myriapod is more common than is supposed, for if found by housekeepers it is more likely to be immediately smashed than brought for the attention of naturalists.

C. W. Nash, Provincial Biologist, Toronto.

Bombycia improvisa and *tearlii* Hy. Edw. A correction.

On page 184 of the May number appears a note by Mr. Cockle, which calls for "a correction of a correction." He states that Holland is in error in referring *tearlii* as a synonym of *improvisa*. So far that is correct, but the specimen figured by him on Plate XL, fig. 27 as *tearlii* is neither that species nor *improvisa*, but has been described by Barnes and McDunnough as *fasciata*, (Journ. N. Y. Ent. Soc., XVIII, p. 160, Sept. 1910). Those authors figure both Henry Edwards' species in their "Contributions", Vol. I, No. 4, Plate XII, ff. 4 and 19, and the female type of *fasciata* is shown in fig. 5 of the same plate. *Improvisa* and *fasciata* occur together on Vancouver Island, whence *fasciata* was described. *Tearlii* occurs in Alberta. I should prefer that the above correction were made by others, but proffer this as an alternative.

F. H. Wolley Dod, Midnapore, Alta.

BOOK REVIEWS.

The Entomologist's Monthly Magazine. We beg to offer our our hearty congratulations to the editors of "The Entomologist's Monthly Magazine", (London, England), on the completion of the fiftieth year of its publication. The first number was issued on June 1st, 1864 under the editorial direction of Messrs. H. T. Stainton, R. McLachlan, E. C. Rye, Rev. T.

Blackburn and Dr. H. Guard Knaggs—five of the most distinguished entomologists of the day. The present writer had the good fortune to be in England that year and made the acquaintance of the two first named, and subsequently corresponded with Dr. Knaggs, the author of "The Lepidopterists' Guide" of which three editions have been published. Mr. Stainton, editor of the "Entomologists' Annual" and author of an admirable manual on the "British Butterflies and Moths" and various works on the Tineina, extended the hospitality of his house at Lewisham to entomologists during one evening in the week, everyone being made welcome and given the opportunity of consulting his extensive collections and valuable library. These gatherings led to the formation of many warm friendships and brought isolated workers into touch with the leading devotees of the science.

As time went on the pioneers of the Magazine one by one passed away and their places were filled by others equally able and distinguished, so that the publication has never failed to maintain its early reputation and attractiveness, and we may confidently hope that it will continue for another half century to record the observations and investigations of the insect world for generations to come.

The jubilee number is made especially interesting by the record of its editorial management during fifty years and the portraits of the eight founders and editors. C. J. S. B.

New South American Scientific Journal. Prof. Charles E. Porter, occupying the chair of general zoology and applied entomology and also director of the recently established Museum and Laboratory of Economic Zoology at the National Agricultural Institute of Santiago, Chili, has undertaken the publication of a new scientific journal under the title "Anales de Zoologia Aplicada". This journal is to be especially devoted to original studies on species beneficial to and parasitic on man, domesticated animals and cultivated plants in America. The well-known "Revista Chilena de Historia Natural", edited by Prof.

Porter, is being continued, but only for systematic papers. The "Anales de Zoologia Aplicada" will be published quarterly, in 8° on excellent paper, profusely illustrated with text figures and when necessary with plain or coloured plates. The "Anales de Zoologia Aplicada" will accept original contributions on American parasites (Protozoa, Vermes, Arthropoda), which may be in English, French or Spanish. Announcements of books, other scientific periodicals and instruments relating to the subject matter of the journal will be printed on coloured special pages. The director wishes to exchange the "Anales de Zoologia Aplicada" with all special journals of economic zoology and entomology. The subscription price is 25 Francs a year. Advertisements on coloured pages 25 fr. per page for each number. The address of the director of the new journal is:

Prof. C. E. Porter, C.M.Z.S., F.E.S., Casilla 2974, Santiago, Chili.

The enterprise should have all the encouragement possible.

FREDERICK KNAB.

OBITUARY

EDWIN FIRMSTONE HEATH

We regret to record the death of Mr. E. Firmstone Heath, of the Hermitage, Cartwright, Man. For some time he had been ill, but not until the early days of April was he confined to his bed. When medical aid was summoned it was found that his heart was in a very critical condition, and this was accompanied by congestion of the lungs. After five weeks of intense suffering he died on May 14th, 1914.

Mr. Heath was born at Standhill, Kingswinford, County of Stafford, England, on August 9th, 1840. He was the eldest son of the late Edwin Heath of the 88th Regiment (Connought Rangers). He inherited a love for entomology from his father, and at an early age began to form a collection of insects. For the last 25 years he studied the insects of Manitoba, more particularly the Lepidoptera. He was a most enthusiastic collector, and brought together a representative collection of the Lepidoptera of that province. The late J. B. Smith corresponded regularly with him

and determined many of his specimens of Noctuidæ. Many of these collected at Cartwright, Man., were described as new species by Dr. Smith. For many years Mr. Heath was a valued correspondent of the late Dr. James Fletcher, and it was through Dr. Fletcher that the writer became acquainted with him. I have been in constant communication with Mr. Heath, particularly with regard to important captures, records of which have been included in the "Entomological Record", published annually in the Report of the Entomological Society of Ontario. Like other Canadian entomologists, I have always found him a most enthusiastic collector and an exceedingly interesting correspondent. I shall indeed miss his friendly and helpful letters.

Mr. Heath was a regular contributor to this journal, his papers being chiefly records of Lepidoptera occuring at Cartwright. Many of these were new records for the province.

The last article he published appeared in the April, 1914, issue of the Canadian Entomologist, and was entitled, "A Phalangid Drinks Milk". A. G.

The following note was received from the late Mr. E. F. Heath about a year ago, but by an oversight its publication has been unduly delayed.

THE EDITOR OF THE CANADIAN ENTOMOLOGIST,
Dear Sir:

On the night of the 8th inst. (1912), I captured at my "sugared" trees a specimen of *Thysania zenobia* Cram. in very good condition. I can only account for its appearance on the supposition that it must have come north, in the pupal stage, in a bunch of bananas, or by some such means. That I should get it is the more extraordinary for I lie between three villages, the nearest being four miles distant, and the other two, six and seven miles respectively.

Yours faithfully,
E. FIRMSTONE HEATH.

The Hermitage, near Cartwright, Man.

Mailed August 14th, 1914.