

THE METAMORPHOSES OF AEGIALITES.

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## THE METAMORPHOSES OF *ÆGIALITES*.

BY H. F. WICKHAM, IOWA CITY, IOWA.

Within the past few weeks I have received from the Rev. J. H. Keen a number of fresh specimens of larvæ and pupæ of *Ægialites Californicus*, Mots., or as it has been called for years, *Æ. debilis*, Mann. These had been taken by Mr. Keen somewhere in the vicinity of his home at Metlakatla, B. C., and were especially welcome to me since they gave an opportunity for the study of the early stages of a beetle whose position has always been considered problematical.

An account of the habits of the beetles has been published by Mr. Keen in the CANADIAN ENTOMOLOGIST, (Vol. XXXV., p. 125), showing that they live in crevices of shaly rocks along the sea shore, and that they are active all the year round. The larvæ and pupæ are found in July and August. My series shows larvæ of various sizes from half to full grown, and they differ not at all in general appearance. The following description is made from a full-grown individual, which had been preserved in spirits.

Form elongate, subparallel, moderately convex, upper surface alutaceous and rather finely rugulose, naked excepting a few inconspicuous setæ, lateral segmental prominences membranous, each with a long bristle. Colour above brownish with a distinct olivaceous tinge, head, thorax and terminal abdominal segments sometimes a trifle darker, middle of the back with a longitudinal pale line. Under surface light yellowish, the segments with indistinct longitudinal and oblique dark markings, head fuscous beneath, lower side of pygidial processes castaneous. Length about  $7\frac{1}{2}$  mm., width about  $1\frac{1}{2}$  mm.

Head subquadrate, about  $1\frac{1}{3}$  times as broad as long, widest slightly behind the insertion of the antennæ, sides slightly and scarcely perceptibly arcuately narrowed to the base, vertex with a rather well-marked subtriangular chevron, the apex of which is directed backwards. Frontal margin oblique at sides. Labrum free, margin bristled,

Ocelli, five in each group; three are arranged in a transverse row immediately behind the antennal sockets, the remaining two are about equidistant from each other, and from the nearest ocellus in the front row.

Antennæ inserted in large sockets at the sides of the front; the basal articulating segment is membranous, protruding and bears three chitinized joints, the first of which is short and thick, subcylindrical, very sparsely bristled; the second is longer and more slender, slightly clavate and attenuate towards each end, also sparsely bristled, a heavy seta close to the tip. The third, the terminal, joint is small, subcylindrical, tipped with a long seta and two or three smaller ones.

Mandibles subtriangular, strongly ridged and toothed; apex sharp, produced, just inside of the tip is a broad lobe bearing three denticles, while half way between this lobe and the base is a large triangular tooth.

Maxillæ blade-like, apical and inner marginal portion clothed with stout, rather short, thickly placed bristles. Palpi of three short subequal joints.

Labium small, ligula rounded in front, beset with fine bristles and pits. Palpi short, two-jointed, the basal joint about as broad as long, the apical more slender, narrowed slightly to the tip.

Prothorax broader than long, dorsal scute with a prominent bristle on each side behind the front angles; the anterior margin of this scute is nearly straight, the sides are moderately arcuate, the base narrower than the apex. The spiracle is located in the lateral membrane near the hind angles, and is very large and prominent. Prosternal scute broader anteriorly, front margin arcuate, apex rounded.

Mesothorax much shorter than the prothorax, dorsal scute with a long bristle on each side near the middle of the margin, sides of this scute rounded, not quite covering the dorsal aspect of the segment. Ventral scute less strongly chitinized, subquadrate or roughly pentagonal in outline, quadrisetose. No spiracle.

Metathorax about like the mesothorax, the scute on the ventral surface slightly differing as shown in the figure.

Abdomen with nine segments visible from above, anus inferior, projecting. The segments one to eight are similar, each with a broad dorsal scute, the sides membranous and prominent. Each scute bears a row of four short bristles arranged transversely near the hind margin, the membranous prominences each bear a long, slender seta. Ventral scutes imperfectly chitinized, each with six oblique longitudinal impressions, and about eleven setæ arranged in two rows as shown in the figure. Ninth

segment longer and narrower, sparsely covered above and beneath with setigerous tubercles, hind angles produced, curving outward and upward in the shape of horns which are thickly bristled. Between these horns the hind margin bears two smaller smoother processes which curve inward. Anus with two strong distant teeth on the anterior margin.

Spiracles in nine pairs, those of the prothorax prominent and projecting as described above. Those of the abdomen are dorso-lateral in aspect and are found in segments one to eight. In a balsam preparation the spiracular peritreme appears to be continuous with the body of the dorsal scute, as shown in the drawing. In specimens simply taken from alcohol there is apparently a suture between.

Legs stout, the three pairs nearly equal in length, coxæ rather prominent, fissured or emarginate internally so as to expose a small portion of the basal part of the trochanter, femur broader at tip than at base, somewhat longer than the tibia, which narrows slightly towards the apex. All of these last-mentioned three joints are sparsely bristly. Claw large, toothed obtusely near base and bearing two bristles on the inferior surface.

The pupa, when preserved in spirits, is yellowish white, about 4.75 mm. long and 2 mm. across the broadest part. The most remarkable characters are to be found in the armature of the prothorax and of the last abdominal segment. The front and side margins of the prothorax are beset with a series, about fourteen, of long, fleshy spine-like bodies, each of which bears a long seta near its tip. The disk bears six similar organs, while the head is armed with a row of three on each side, and a single one on the occipital region. There are also several on each leg. The abdomen bears a quadruple row of long bristles, two pairs to each segment, and the lateral segmental prominences are each armed with a pair of setigerous processes like those of the thorax. The terminal segment of the abdomen is highly modified, the apex being squarely truncate at middle, the hind angles produced into rather long pointed processes with curved tips. This segment bears two long bristles at the base of each of the processes, as well as a pair on each side nearer the base; the under side of this joint is more thickly spinous than the upper. The figure of the pupa shows the general form and the location of the larger bristles, but no attempt has been made to incorporate the small, inconspicuous ones, as many would almost certainly be overlooked on the whitish surface, and the drawing might thus give rise to erroneous impressions.

As related by Dr. Le Conte in the "Classification," this beetle has been placed in several diverse families by different authors. "Mannerheim hesitated between Scydmaenidæ and Tenebrionidæ; Motschulsky, on account of the form of the tarsi, placed it among the Parnidæ; Gerstæcker placed it in Tenebrionidæ, near *Helops*." A study of the characters of the rather remarkable larva does not, in my opinion, point to the correctness of any of these references. It is decidedly not of a Parnide type, nor is it in the least like the larva of *Helops* as described by Waterhouse and Perris. To me it is a larva not corresponding exactly with those of any of the families of Heteromera as far as I am acquainted with them, though approximating the Pyrochroidæ in many respects—the maxillary and antennal structures, the depressed body (this, however, much more marked in *Pyrochroa*), the strong chitization of the abdominal tip and the development of large horn-like processes on the ninth abdominal segment. From the Pyrochroid larvæ known to me it may readily be distinguished by having four horns on the last segment instead of two, by the absence of accompanying cul-de-sacs and by the position of the abdominal spiracles, which in *Pyrochroa* are ventro-lateral instead of dorso-lateral.

Considering the very meagre knowledge that we have of Coleopterous larvæ, I think that we should not lay too much stress on their use in defining the larger groups in our systems of classification; but there seems nothing in the structure of the one above described to indicate that Dr. Le Conte was wrong in erecting a distinct family for the reception of the genus *Ægialites*.

#### EXPLANATION OF PLATE 2.

1, Full-grown larva, ventral view, much enlarged; 2, antenna; 3, mandible; 4, maxilla; 5, labium; 6, hind leg; 7, scute of dorsum of second abdominal segment, showing spiracles and setæ; 8, pupa, from beneath.

#### TÆNIOCAMPA COMMUNIS, DYAR.

The number of types given for this species as 3,500 is erroneous. The correct number is 3,430, as the Kaslo specimens number 3,425, not 3,495 as incorrectly written. A species as common as this has naturally been often taken before, and I may state that it is generally known as *T. furfurata*, Grt., but incorrectly so.

HARRISON G. DYAR.

## NEW SPECIES OF HEMEROBIUS.

BY NATHAN BANKS, EAST END, VA.

Preparatory to a revision of the Nearctic Hemerobiidæ I present descriptions of a few new species of Hemerobius. A few of the names have been used already elsewhere, but without description. Outline figures of the male genitalia will be given in the forthcoming revision.

*Hemerobius transversus*, n. sp.—Face shining black, vertex and antennæ pale yellowish; thorax pale, a black stripe across front part of the mesothorax; abdomen brownish; legs pale yellowish. Wings with the margins faintly but broadly clouded with brown; the gradate series marked with dark brown, and a brown band between the first and second series. The first gradate series is from base of second fork of radial sector obliquely backward; second and third series as usual; all nearly complete. There are four sectors in one specimen and three in the other, but the last is forked twice before gradate series. The median is not bent toward the cubitus, so the connecting veinlets are subequal in length; the costal area is very broad at base. In hind wings the veins are all pale, except a brown cross-vein closing postcostal cell; the first fork of radial sector is as far out as fork of median vein.

Expanse, 20 mm. From Denver, Colorado.

*Hemerobius Nevadensis*, n. sp.—Head pale yellowish, a brown dot between the antennæ, the latter pale yellow, darker at tips. Thorax dark brown, with a broad median yellow stripe above. Abdomen dark brown, nearly black; legs pale yellow. Wings hyaline, the veins mostly pale, the radial sectors and some others dotted with brown; around the margin are brown spots alternating with whitish; the gradate series are rather heavily marked with brown, and the veinlets connecting median, cubital and anal veins near base are also brown. In hind wings the venation is pale, except around the margin, where it is brown. The fore wings are moderately long, the costal area rather narrow at base; the lower branch of median is not bent toward the cubitus, so that the connecting veinlet is as long as that connecting cubitus to anal. In hind wings the first fork of the radial sector is plainly before the forking of median.

Expanse, 16 mm. Ormsby Co., Nevada, July (Baker).

*Hemerobius dorsatus*, n. sp.—Head pale yellow, cheeks brownish, and a short brown line from middle of face down on clypeus; antennal sockets marked with brown; antennæ pale, but darker at tips; thorax dark brown on sides, with a broad median stripe of yellow; abdomen

brown, legs pale yellow. Wings hyaline, very evenly marked with brown fimbriae, veins dotted with brown, the gradate series more heavily brown, outer and posterior margin with brown spots alternating with pale. In hind wings the venation is brownish and the pterostigma rather reddish. Fore wings moderately long and narrow, costal area quite broad at base; the lower branch of the median vein is slightly bent toward the cubitus. There are four radial sectors, the first three not forked till near tip, the fourth twice forked before gradate series. In the hind wings the first fork of the radial sector is much before forking of median vein.

Expanse, 16 mm.

From Ft. Collins, August, and Veta Pass, 1st July; Colorado.

Sometimes there are but three branches of radial vein, then the last is forked three times before second series of gradate veins.

*Hemerobius pictus*, n. sp.—Pale brown, prothorax rather darker, antennae pale, black-ringed at base and black at tip. Legs pale yellow. Fore wings hyaline, with four broad brown bands in the middle area of wing, the two intermediate rather close together. Around the outer and posterior margin are pale brown spots alternating with smaller whitish spots, about eight of these dark spots; costal area pale brown. Hind wings hyaline, costal area and venation pale brown. The wings are rather short, the costal area moderately broad at base. The first sector of radius forks before origin of second sector, but is not connected back to radius.

Expanse, 12 mm. South-western Colorado (Osler).

A very pretty species of the two-sector section, and differing from others in pale venation of hind wings and the several bands on the fore pair.

*Hemerobius speciosus*, n. sp.—Head yellowish-brown, darker above; antennae pale; thorax almost black; abdomen dark brown; legs pale yellowish. Wings hyaline, marked with dark brown; venation mostly pale, with a few scattered brown dots, more brown toward margins; apical half of both anterior and posterior margins alternately brown and yellowish. An indistinct brown patch in the costal area before pterostigma; five or six round, almost black, dots along radius, one at base of each sector, except the first, which is beyond first sector, and one under the pterostigma; another similar spot on cubitus, where it is connected to anal vein; a series of four or five obliquely across wing following the first gradate series, the anterior one being on the first fork of the fourth radial

sector; and beyond is a crescent of five spots, most of them contiguous, on the upper part of the second gradate series, the posterior four of these are geminate with a minute white point; a larger triangular dark spot near ends of cubitus and anal veins. Hind wings with the costal neuration toward middle and towards apex distinctly brown; between it is very pale. The fore wings are very broad, but acute at tips; the costal area very broad at base. There are four radial sectors, but the first arises nearer base than usual, and at first diverges but little, but curves before origin of second sector; none of the sectors are connected back to the radius. The median is not bent toward cubitus at connecting veinlet.

Expanse, 16 mm.

One specimen from Plummèr's Island, Maryland, Sept.

#### DESCRIPTIONS OF FOUR NEW HORN-TAILS.

BY WILLIAM H. ASHMEAD, M.A., D.S.C.

Genus *Sirex*, Linné.

*Sirex taxodii*, new species.—♀. Length, 11.5 to 13 mm.; ovipositor very nearly the length of the abdomen. Black; a spot back of eyes and the process of the last dorsal segment reddish-yellow; antennal joints from 11 to apex, an annulus at base of middle and hind tarsi, and at base of hind tibiæ, yellowish-white. Wings brown-black, with a faint purplish tinge in certain lights.

♂.—Length, 12 mm. Agrees well with the female, except that the metanotum and the abdomen are reddish-yellow, the apex dusky or blackish, the angles of the pronotum faintly reddish, the apices of the front and middle femora and their tibiæ and tarsi are yellowish; the hind tibiæ have an annulus at base, the hind tarsi have an annulus at base, while the extreme tip of the basal joint and joints 2 to 5 are yellow. The antennæ are 20-jointed, the joints 12 to 20 being yellow, the rest black.

Types.—Cat. No. 7681, U. S. N. M.

Tryon, N. C. Described from 2 ♀'s and 1 ♂, labelled No. 1611; bred by Mr. W. F. Fiske from the Cypress (*Taxodium distichum*, L.).

*Sirex Fiskei*, new species.—♀. Length, 27 mm.; ovipositor about two-thirds the length of the abdomen. Head and thorax black, the thorax above brownish; abdomen reddish-yellow, the basal two-thirds of first dorsal segment, dorsal segments 3 and 4 and the fifth segment laterally black. The antennæ are apparently 22-jointed, black, with joints 13 to 22 yellowish or yellowish-white; legs black, an annulus at the base of the middle tarsi, the basal third or more of the hind tibiæ, and the base of the hind tarsi, white or yellowish-white. Wings purplish-black.

Type.—Cat. No. 7682, U. S. N. M.

Tryon, N. C. Described from one female taken by Mr. W. F. Fiske on Pine.



Genus *Paururus*, Konow.

*Paururus Californicus*, new species.—♀. Length, 23 mm.; ovipositor hardly half the length of the abdomen. Uniformly dark blue; the wings hyaline, but with the apices of both wings margined with fuscous, the stigma and veins black or brown-black. Antennæ 20-jointed.

Type.—Cat. No. 7683, U. S. N. M.

Placer Co., California (Albert Koebele); Hoquiam, Wash. Described from 2 specimens. The specimen from Washington State was taken by Mr. H. D. Burke, Aug. 28th, on spruce, and bears the label No. 2202b, Hopkins.

*Paururus Hopkinsi*, new species.—♀. Length, 20 to 22 mm. ovipositor hardly one-third the length of the abdomen. Uniformly dark blue, with brown-black wings that have a faint purplish tinge in certain lights. Antennæ apparently 23-jointed, the terminal joints being brownish.

♂. Length, 18.5 mm. Dark blue, with abdominal segments 5 and 6, the apices of front and middle femora and their tibiæ and tarsi, an annulus at base of hind tibiæ, and the fourth joint of hind tarsi, yellow. Wings yellowish hyaline, the apical margins fuscous.

Types.—Cat. No. 7684, U. S. N. M.

Tyron, N. C., and Kanawha, W. Va. Described from many specimens taken by Dr. A. D. Hopkins and W. F. Fiske from dying pine trees. The species is allied to *P. pinicola*, Ashm.

*Paururus pinicola*, Ashmead.—F. W. Konow, without seeing a specimen of this species, has incorrectly made it a synonym of *P. nigricornis*, Fabr., a species known to me in both sexes. The male of *P. pinicola* has never been described, but as Messrs. Hopkins and Fiske have taken it in quantities at Kanawha, W. Va, together with the female, I give below a brief description:

♂.—Length, 11.5 to 19 mm. Dark blue, with the abdomen, except the basal three segments, reddish-yellow; the apices of the front and middle femora and their tibiæ and tarsi except the last joint, a narrow annulus at the base of hind tibiæ, and the fourth joint of hind tarsi, are honey-yellow. Antennæ 17-jointed. Wings usually yellowish-hyaline, rarely wholly hyaline; the apices margined with fuscous, the costal cell and the stigma, except the outer edge, which is dark brown, always distinctly yellowish.

## DIFFUSION OF THE HAWK MOTHS IN NORTH AMERICA.\*

BY F. M. WEBSTER, URBANA, ILL.

In the issue of *Psyche* for April, 1903, I published a paper on the diffusion of insects in North America, in which reference was made in a footnote to the probable trend of diffusion in the Sphingidæ, and this may be looked upon as supplementary to that publication. In the former paper I could not deal with this phase of the problem of diffusion of insects, to the extent that this family deserves, nor am I certain that this is possible even now, but it seems desirable to point out some suggestive features of the present distribution and probable diffusion of this interesting family of moths.

The Sphingidæ, or Hawk moths, are noted for their stout, spindle-shaped bodies, and for possessing the most powerful wings of all the Lepidoptera, these last being long and slender, and provided with exceedingly strong muscles, thus resembling those of sea birds. They are in this way fitted for long flights, and are not infrequently driven by the winds far out at sea, where they are encountered by ships long distances from any land. They are primarily tropical insects, though they have become widely diffused, have adapted themselves to almost frigid climates, and are thus found throughout all the principal regions, except in New Zealand, where there is but a single form closely allied to, if not identical with, the almost cosmopolitan *Sphinx convolvuli*, Linnaeus. That these insects have existed structurally the same since a very remote period is shown by the occurrence of an insect in Prussian amber that belongs to this family, and has been referred to the genus *Sphinx*. The specimen cited by Wallace as having been found in the Upper Oolite of Bavaria seems to have been another insect and not one of the Hawk moths.

We have in North America 82 species belonging to 31 genera. Of these, 48 species, or more than one-half, are found in the eastern United States, and 21 of these are known to occur southward through Florida and in South America, while of the remainder many are known to extend southward into Mexico. The 21 species have most assuredly reached North America by way of what I have termed the Antillian trend of diffusion. Of the remaining 26 of the 48 species, some few of them range far enough to the west to indicate a diffusion from Mexico, or northward through that country, though the majority of them are more or less closely

\*Read before Section F, American Association for the Advancement of Science, St. Louis, Dec. 29, 1903.

allied to South American forms. Of the remaining 34 species, many can be traced into Mexico, where, owing to lack of knowledge of the insect fauna, they are lost in obscurity.

Taking up the genera, and following Dr. Dyar's recent List, because of the more definite information given relative to the distribution of the species, we find many interesting facts. In the genus *Hemaris* we have one species occurring over the eastern portion of the country with varieties scattered from the Pacific Northwest through British Columbia and California to New Mexico; another occurs in Colorado and Utah; the other two from Labrador and Canada to Florida, and west to the Mississippi river. Some day we may find out that the Pacific coast and south-western forms are more remote from the eastern forms than we now suppose, and have had their origin in the west, while we may be able to find a similar connecting link between the eastern forms and the stem species from which both branches have evolved, somewhere in Central America, or north-west South America. The genus *Lepisesia* has one species in arctic America; another ranging from Northern California to Utah; one in Southern California; one generally distributed over the Southern States; one each in Texas and New Mexico, and another extending from Mexico into Georgia, all of which indicates a northern trend of diffusion from Mexico or beyond. The three genera, *Aellopos*, *Triptogon* and *Calliomma*, each with a single species; the first inhabiting South America and the Southern States; the second South America, Mexico, West Indies, Florida and occasionally northward, and the last being found also in South America and Florida. The next three genera, *Amphion*, *Sphecodina* and *Deidamia*, each with a single species, the first ranging from Florida to Canada, and west to Iowa; the second and third having much the same habitat. *Deilephila* has two species, both introduced, but the genus is represented in South America also. The genus *Theretria* has two species, one ranging from South America, Central America and the West Indies, through the Southern States and north into Canada, while the other is found in both South America and Florida. *Argus*, with a single species, occurs in South America and Florida, northward along the coast to Canada, though it is rare north of Florida. *Pachylia*, likewise with a single species, is found in South America and Florida. *Pholus* (*Philampelus*) with five species, two ranging from South America through Central America, Cuba and the Southern States, northward along the eastern coast to New England; another generally distributed over the entire United States and Canada, and another covering the country east of the Great Plains; the fifth and

last ranging through Mexico into Arizona certainly indicate their ancient home and that they have come to us both from the south-east and south-west, from the South American tropics. *Ampelophaga* comprises three species; one ranging from Florida to Canada and west to Iowa, and another from Georgia to Canada and west to Missouri and Iowa, while the third extends from Brazil throughout the Atlantic Coast States and west to the Mississippi valley. Two genera, *Cocytius* and *Pseudosphinx*, have one species each, the former occurring in the Antilles and Florida and the latter extending from South America through the Antilles into Florida. The genus *Dilophonota*, seven species, every one of which occurs in South America and Florida, some occasionally farther to the northward. The two genera, *Cautethia* and *Diludia*, containing respectively one and two species, all three of which are found in the Antilles and Southern Florida. *Phlegethontius* contains five species; one ranging over the United States and Canada, and another from South America, Mexico and West Indies, northward over the entire United States into Canada; a third being found in South America and the West Indies, northward as far as New York; the fourth extending from Brazil to Canada and over the United States to the Pacific coast and in Hawaii, while the fifth is the cosmopolitan species, *P. convolvuli*, which ranges over the British Islands, Europe, Asia, Africa, Australia, New Zealand and the entire Southern States. Dr. Dyar, considers the last two as one, the latter species. The genus *Sphinx* has nineteen species and two doubtful. Omitting these doubtful species, two cover the entire United States from Florida to Canada and westward; two from Georgia to Canada and west to Mississippi River States; one from Florida to Canada and west to Mississippi River States; two range over the Atlantic States east of the Mississippi; one is found from New England to Newfoundland and west to Ohio; two cover the Southwestern States by their distribution; one the Southern States; one is known from Missouri only; one each occur in Texas and Colorado; one in Arizona, and one extends from Arizona to Utah; two are confined to California, and the last ranges over the Western and Rocky Mountain States, the genus together showing about an equal number of species that can be accredited to the south-east and south-western diffusion. *Dolba*, with one species, occurs from Florida to Canada and west to Iowa, while *Chlenogramma*, also with a single species, is known from Georgia to Canada and west to States bordering the Mississippi River; *Ceratonia* has four species, two ranging from the Carolinas to Canada and west to States bordering the Mississippi; one

ranges over the Southern States as far north as Southern Illinois, Indiana, Ohio and Pennsylvania, while the fourth is confined to Texas. *Lapara* with two species, one covering the territory from Florida to Canada and west to the Mississippi Valley, and the other nearly the same area. *Exedrium* with its single species is confined to Florida; *Marumba*, also with a single species, ranges over the United States and Canada. *Smerinthus* with two species; one covering the entire northern portion of the United States and Canada, and the other confined to the eastern section from Virginia to Canada and west to Iowa, while the closely-allied genus *Paonias* has three species, one being found from Pennsylvania to Canada, and the other two from Florida to Canada and west to the Mississippi. *Cressonia* has but one species, that occurs from Florida to Canada, and west to the Mississippi River in the north and to Texas in the South; the last genus, *Arctonotus*, has also a single species, that occurs throughout the Pacific coast.

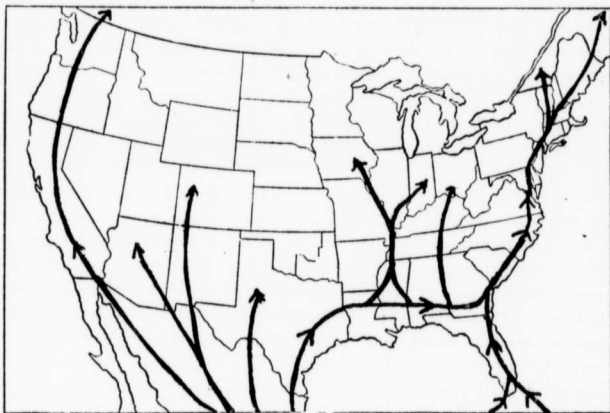


FIG. 3.—Map illustrating the trend of diffusion in the Sphingidae of North America.

When we consider the number of species that we know occur from South America northward through Florida, and from there range more or less north and west, but not sufficiently far west to indicate a Mexican habitat, and those so closely allied to these, also distributed over the eastern United States, we find that in this family of insects the south-

eastern or Antillian trend of diffusion has greatly affected the Sphingid fauna of America north of Mexico. I cannot leave the subject, however, without calling attention to the fact that South American forms make their way into the United States by several lines of diffusion. A species may make its way up through the Windward and Leeward Islands and the larger islands of the West Indies into Florida; it may make its way northward through Panama to Honduras, and thence through Cuba to Florida, or continue northward through Central America and Mexico, sometimes both, but in the latter case we are likely to find it in both Florida and Texas. With the Sphingidæ it would seem that the species had for the most part either followed the Antilles, or crossed over from Honduras, and entered the United States by way of Florida, sometimes holding closely to the Atlantic coast, and in other species spreading westward around the lower extremity of the Appalachian Mountain system. But, excepting those species that we know have been introduced from other countries within the temperate zone, we can trace almost every North American species of Sphingidæ, either directly or by closely-allied species, to their ancient and original home in tropical South America, and of the doubtful remainder there are few indeed that cannot be traced into Mexico, where we lose track of them in the obscurity surrounding the entomological fauna of that country.

#### CONCERNING SOME PHILIPPINE MOSQUITOES.

BY C. S. LUDLOW, M. SC., EASTON, PA.

In connection with the work on the Philippine mosquitoes carried on by the authority of the Surgeon-General, U. S. Army, and "for and with the co-operation of the Medical Corps, U. S. A.," a lot of mosquitoes recently received from Cottabato, Mindanao, P. I., makes it possible to describe a new *Myzomyia*; to state definitely all the differences between *Stegomyia scutellaris*, Walker, and the variety *Sumarensis*, Ludlow; and to make a small correction in the description of *Myzorhyncus pseudobarbistrois*, Ludlow.

*Myzomyia Thorntonii*, n. sp.—Female: Head dark brown, with tuft of white scales on the vertex, and white hairs projecting forward between the eyes, a few white scales around the eyes; antennæ brown, verticles and pubescence white, basal joint testaceous, a few white scales on first and second joints; proboscis brown on basal half, apical half dull yellow, with narrow brown band at apex, tip dull yellow; palpi, ultimate joint

white with narrow basal brown band, penultimate also white with narrow basal brown band, followed by a broad white band, and the remainder of the proboscis brown, divided nearly in half by a narrow white band. About the middle of the exterior brown section is a small yellow spot, and there are a few yellow scales near the base of the palpus. Eyes brown; clypeus brown.

Thorax light brown, with white (frosty) tomentum, a dark median line, and sparsely covered with golden-brown hair-like scales and a few flat white ones on the cephalad end; prothoracic lobes with brown flat scales; scutellum light laterally, and broad dark median line, hair-like golden-brown scales and brown bristles; metanotum brown.

Abdomen very dark brown, rather heavily covered with brown (golden brown in some lights) hairs.

Legs: coxæ and trochanters all brown, with a few white scales; femora and tibiæ all dark brown, with distinct white spots (6 or 7) on the sides; metatarsi on fore legs basally and apically white banded, and a few white spots, first three tarsal joints basally and apically white banded so as to make rather broad bands, last joint brown, but giving light reflections; metatarsi and all the tarsal joints on the mid leg have narrow white apical bands, sometimes the metatarsi have white intermediate spots, and sometimes the band on the last joint is lacking; on the hind leg the metatarsi and tarsal joints, except the last, all have narrow white apical bands, and one or two white spots. These metatarsal and tarsal spots vary greatly in individuals, there being sometimes only one small spot, sometimes several, and sometimes the metatarsal spots are very large so as nearly to cover the apical half of the joint. Oddly enough this occurs in one specimen on one leg and not on the other. Ungues simple and equal.

Wings markedly spotted, costa mostly dark, a light spot at the apex extending on apex of 1st longitudinal, and upper fork of 2nd long. vein, a second spot a little exterior to base of 2nd posterior cell, a third at the junction of the subcosta, a fourth at some distance from the third, and two or three small ones near the base of the wing. The large spots all extend on the 1st longitudinal, and there are additional white spots on the 1st long. vein in the area between the third and fourth costal spots, and sometimes between the second and third costal spots, but so irregularly placed as to be of little value for identification, the two wings of the same insect varying markedly. The wing field is well spotted, about six light spots on the 3rd long., and the other veins spotted in much the same way except the stem of the 2nd posterior cell, which is dark. Fringe is mottled,

the light spots occurring for the most part at the apices of the veins; on the inner (short) fringe scales the light spots occur as far as the 6th long., on the long scales the spots are distinctly yellow as far as the 5th long., and merely pale at the apices of the more caudad veins; 1st submarginal cell longer (4:3), and narrower than the 2nd posterior, its base nearly one-sixth of its length interior, stem of 2nd posterior much the longer; supernumerary cross-vein is nearly equal to mid, which it meets, and posterior cross-vein somewhat longer and a little more than its own length distant. These vein positions vary somewhat; halteres white.

Length, 3-3.3 mm.

Habitat: Oras Samar, P. I., and Cottabato, Mindanao, P. I.

Taken June 20 (Cottabato), Aug. 20 (Oras).

This is a very beautiful and well marked species near *M. albirostris*, Theob., but the additional broad band on the palpi, and the spotted legs, make it easily distinguishable, while the wing markings resemble those of *M. elegans*, James. It has only been sent in twice, and the two specimens from which the description was written were collected by Dr. James W. Thornton, Cont. Surg. U. S. A., after whom it is named.

The specimens of *Stegomyia scutellaris*, Walker, sent in early in 1903 from Samar, were found to vary from the type, and as these variations occurred in all the specimens from that island, it was decided to create a variety, attention being called to some differences, and the insect was published as *S. scutellaris*, Walker, sub-species *Samarensis*, Ludlow.\* Since then a number of very perfect specimens from Samar, Leyte and Mindoro have made the differentiation more perfect, and the complete list of differences is given below.

*Stegomyia scutellaris*, Walk., var. *Samarensis*, Ludlow.—This variety differs from the type as follows:

- I. Has two white lateral bands on head; no bands on antennæ of female.
- II. The silvery median line on thorax extends nearly the whole length of the mesonotum, tapering from the cephalic end to just in front of the scutellum, where it divides, forming two short, very fine submedian lines; there is also a narrow straight white line on each side, exterior to these, extending cephalad from the scutellum about one-third of the length of the mesonotum, dividing its width almost exactly into quarters.

\*Journ. N. Y. Ent. Soc., Sept., 1903.



III. Femora of hind legs are white at the base, with a white line reaching almost to the knee; on fore and mid legs this line is not so distinct nor is it so long; the metatarsi of the hind legs have a basal white band, and those of the fore and mid legs a basal white spot.

IV. The first submarginal cell varies in length, but is as long as, usually longer, and sometimes more than twice as long as its stem.

Under *Myzorhyncus pseudobarbirostris*,† Ludlow, after "antennæ a lighter brown," delete "minute apical bands on the joints," the effect is caused by reflections.

This seems to be a rare mosquito, having been taken once at Hagonoy, Bulacan, Luzon, Oct., 1901, by Dr. Kellogg, and once at Cottabato, Mindanao, June, 1903, by Dr. Thornton.

It is also necessary that *Culex annulifera*,‡ Ludlow, appear as *Culex annuliferus*, Ludlow.

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#### DR. JOHN HERBERT SANGSTER.

We regret to record the death of Dr. J. H. Sangster, which took place in Toronto on the 27th of January. He was one of the original members of the Entomological Society of Ontario, and during its early years took an active part in its proceedings, but for a long time past he had ceased to take any interest in the Society or its pursuits.

He was born in England in 1831, and coming to Canada when a child received his education in this country. The principal part of his life was devoted to scholastic work, his first position being that of an assistant master in the Model School at Toronto. Subsequently he was placed in charge of the Provincial Grammar School; later on he became Head Master of the Ontario Normal School, and finally Professor of Chemistry and Botany in Victoria University. During the earlier portion of his career he published a number of schoolbooks, which were for a long time in general use in the Public Schools of the Province, and made his name familiar throughout the length and breadth of the land. He also wrote extensively on public topics in the newspaper press. Since his retirement from active work he lived in Port Perry, Ont., and was highly respected by all who knew him.

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†Journ. N. Y. Ent. Soc., April, 1902.

‡Journ. N. Y. Ent. Soc., Sept., 1903.

## THE YOUNG LARVA OF ARSENURA RICHARDSONI, DRUCE.

BY ALPHEUS S. PACKARD, LL.D.

The eggs of this rare species were kindly sent me from Tacubaja, Mexico, by Mr. O. W. Barrett. The food-plant of the caterpillar was unknown to him. Heretofore we have only had the figures of the mature larva of three species of this genus, and four sketches of the caterpillar of *A. armida*, the better known species of this interesting genus, which ranges from Mexico to Brazil. The larva figured by Madam Merian, Stoll, Burmeister, and by Peters, is represented as being smooth, without any tubercles, horns, or hairs. The partly grown larva, when about one-half grown, is drawn as having a pair of high horns on the prothoracic and a longer pair on the third thoracic segment, and a caudal horn on the 8th segment, also a shorter median horn on the 9th abdominal segment. Peters\* states that this armature is retained until the last moult. He also figures the caterpillar of *A. aspasia*, H. Sch., which has four thoracic and a caudal horn; one would infer from his brief account that this larva was fully fed, since he figures the pupa, but it may be found to belong to the penultimate stage. He also figures the larva of *O. xanthopus*, Walk. The small young (in stage III.?) has a pair of long, slender filamental metathoracic horns about half as long as the body, and a caudal filamental horn of nearly the same length. The older larva has no caudal horn, but retains the two thoracic appendages, which are about a quarter as long as the body. He does not positively say whether this is the full-fed larva or not, but the pupa (subterranean) is figured.

We had from a study of this genus (also of *Rhescyntis* and *Dysdæmonia*), referred these moths to the subfamily Agliinæ, the venation being similar to that of *Aglia tau*. And it is a matter of no little interest to find that the young freshly hatched larvæ, now for the first time described, is somewhat similar in armature to that European genus, whose nearest allies belong to the South American fauna.

*Stage I.*—Length, 4 mm. Head large and round, wider than the body, and shaped as in *Adelocephala*. The body is rather thick, and tapers somewhat to the end. The first thoracic segment is rather wide,

\*Die Heteroceren-Raupen (und Puppen) des H. T. Peters' schen Manuskriptwerkes; Biologische Beiträge zur Brasilianischen Schmetterlings-fauna, Neudamm (1898)—1901.

but not so wide as the head; the front edge is somewhat raised, *i. e.*, flares up, and bears a remarkably complex armature. The two dorsal tubercles are broad, thin (in a fore-and-aft sense), and divided into seven heads or subtubercles, one or two of which are smaller and shorter than the others, each digitiform tuberculet bearing a long spinulate black seta; the setæ are of nearly equal length, and nearly as long as the entire main or master tubercle. As compared with those of *Eacles imperialis*, Stage I., these tubercles are much thinner, and are 7-headed instead of being 2-headed, *i. e.*, simply forked.

Below on the front edge of each side is a smaller tubercle of the sub-dorsal series about one-third as long and large as those of the dorsal pair, ending in three subtubercles, each of which bears a black spinulated seta. Just below the spiracle is a small, simple, infrspiracular tubercle, and below this a low minute 3-headed one. Behind this series of four tubercles (on each side) is a dusky, narrow, chitinous band or rudimentary prothoracic plate or shield, which passes down each side of the segment, not quite reaching a point opposite the spiracle, *i. e.*, not as far down as the spiracle.

On the 2nd thoracic segment are two dorsal tubercles (*i*), which are small, digitiform, 2-headed, the heads diverging. These are smaller than the corresponding pair on the 1st abdominal segment, but larger than those of the hinder pair (*ii*) on the same abdominal segment.

On the 3rd thoracic segment is a pair of enormous horns, which are slightly more than half as long as the body. They are not stiff, and easily bend over, but with a thin integument, the surface of which is crowded with short, erect spinules, some of which are conical, others blunt. These two appendages are nearly as thick as the segment is long, their greatest diameter being a little above the base; they are forked at the end, each fork being about twice as long as thick, and much rounded at the end, and giving rise to a stout spinulated seta, which is of moderate length, *i. e.*, about twice as long as the greatest diameter of the horn itself. The horns of this pair are much larger than those of *Agilia tau* of the same stage, and differ in the trunk, and two branches of the fork being much thicker, while the short spinules do not give rise to a hair. It is most probable that the caterpillar moves these horns with more or less freedom, and that they are deterrent structures.

On the back of abdominal segments 1-7 are two pairs of dorsal tubercles, those of the anterior pair (*i*) digitiform, as long as the horns are thick;

they are separated by a space nearly as long as one of the tubercles themselves. Those of the second pair (*ii*) are a little wider apart, but situated close to the anterior pair, and with shorter and smaller setæ. The presence of a second pair of tubercles on the tergum, the four tubercles arranged in a short trapezoid, is a very primitive feature. I have observed them in the 1st stage of *Cerura Heterocampa*, *Macrurocampa*, and other *Notodontidæ*, as well as in *Anisota* and *Adelocephala*, but not in *Eacles*.

The caudal horn is about as thick as the metathoracic horns, the distal half fully as thick through, and the two divisions of the fork are of the same size, including the terminal setæ. It is also equally flexible, and its armature is the same, the surface being beset with microscopic conical spinules which do not end in a hair. The horn is about half as long as the anterior horns, extending a little beyond the end of the dorsal setæ.

The horn is the fused homologues of the anterior pair of tubercles of the abdominal segments in front, for directly behind its base is a pair of short tubercles of the same size and shape as those of the posterior pair.

The 9th abdominal segment is armed dorsally with a pair of separate tubercles like, in shape and size, the anterior ones on segments 1-7, but situated close together at their base. The suranal plate is triangular, about as long as broad, with three small marginal tubercles on each side, and one twice as large near the base of the plate. The surface is not tuberculated. The anal legs are flat, square, not rough and tuberculated, but bearing three small setiferous tubercles near the lower edge.

The tubercles of the subdorsal 2nd row (*ii*) are simple and digitiform, as are those of the third or supraspiracular row (*iii*). These tubercles arise from a broad base, forming a dark or reddish discoloration. The tubercles of the lower or 4th supraspiracular row (*v*, *vi*) are on the abdominal segments united at their base, those of the 2nd and 3rd thoracic segments minute and single, as usual in all *Ceratocampidæ*.

The setæ are peculiar in the microscopic spinules being stout, conical, often blunt. They are of nearly equal length, the longest one being nearly or about two-thirds as long as the segment is thick, and necessarily add very much to the defensive nature of the armature of the young larva.

The ground colour, as shown by Mr. Joutel's drawing, is a reddish ochreous, the bases of the tubercles being surrounded by light reddish brown; the tubercles are all red, the middle of the big two dorsal horns and of the caudal horn being yellowish. There are no longitudinal or transverse stripes.

## TWO NEW COLLETES FROM COSTA RICA.

BY MYRON H. SWENK, LINCOLN, NEBRASKA.

*Colletes niger*, n. sp.—♀. Black, shining, with long erect jet black pubescence; clypeus prominent, with coarse close punctures tending to form striæ on either side of a shallow median longitudinal depression, and with a deep transverse depression just before the sharply truncate apex; face above and on sides of clypeus much more closely and finely punctured, and covered with a long and dense pubescence which extends over the clypeus itself; vertex and cheeks very finely punctured, the former practically bare except for a tuft of long hairs in the intercellular space, the latter with abundant long hairs; ocelli pale, opalescent; occiput fringed with long erect pubescence; malar space smooth, its length about two-thirds width of mandible at base; mandibles slender and polished, deeply grooved without, notched almost at the tip, which is blunt and slightly rufescent in some lights; labrum with a rounded median pit at base; antennæ entirely glossy black, the first joint of the flagellum as long as the second and third together; no prothoracic spines; disc of mesothorax sparsely covered with erect hairs and with a few fine punctures, the pubescence becoming longer and denser and the punctuation finer and much closer on the sides, especially anteriorly; scutellum with a narrow impunctate line at base followed by a coarsely but evenly punctured surface, the postscutellum finely roughened and densely covered with long erect pubescence; base of metathorax bounded by an indistinct rim and a transverse series of rectangular pits, medially subquadrate but imperfect, laterally more perfect and twice as long as broad; enclosure funnel-shaped, shining, the neck very wide, almost as broad at base as long; sides of metathorax dull, finely roughened, rather sparsely pubescent; pleura evenly, closely and finely punctate, and with sparse, long pubescence; tegulæ black; wings long, smoky, hyaline, slightly iridescent, the nervures and stigma black; first submarginal cell about equal to second and third, which are subequal, together, the second receiving the first recurrent nervure at its middle, the third the second recurrent nervure two-thirds from the base and narrowed one-half toward the appendiculate marginal cell; legs with moderately heavy pubescence, long on anterior femora, shorter and quite dense on posterior femora where forming a pollen-carrying scopa; pubescence on inner surface of tarsi dark brownish; spurs testaceous, claws rufescent at apex; abdomen short and moderately shiny, the first segment with sparse, fine punctures, becoming closer and

less fine apically, the second and following segments finely and very indistinctly punctured, all the segments, and especially the basal one, sparsely covered with long bristly hairs, denser and tending to form fringes on the apices of the segments, which are depressed on segments 1-4. Length, 10-11 mm.

♂.—Similar to the ♀, but smaller; the pubescence of the face longer and denser, and together with that of the cheeks near the mandibles mostly grayish; the pubescence on under parts in general mixed with pale hairs, often conspicuously so on anterior femora; malar space longer, as long as width of mandible at base; antennæ much longer, with the basal joints of flagellum subequal; wings unusually long, extending well beyond the tip of abdomen. Length, 8-9 mm.

Fourteen ♀♀ and four ♂♂. Volcano Irazu, February 23, 1902 (L. Bruner). Types in collection of University of Nebraska. An extremely abundant species on the volcano, at an elevation of 8,500 to 9,500 feet, where the earth in many places is completely riddled with its burrowings.

*Colletes Bruneri*, n. sp.—♀. Black; clypeus bare and rough, coarsely and confluent punctured, transversely depressed before apex; face crowded with small confluent punctures forming a rough surface, and covered with short dirty gray pubescence; vertex finely punctured, bare except for a tuft of pale fulvous hairs between the ocelli; occiput fringed with long, pale fulvous hairs; cheeks finely roughened, with sparse short gray pubescence: malar space so short as to be almost lacking; mandibles dull black, grooved, notched near the blunt reddish-tinged tip; labrum dull, roughened by numerous fine striæ; antennæ dull black, the first joint of flagellum but a trifle longer than second or third; prothorax without spines; mesothorax finely, closely and deeply punctured laterally, sparsely so on the disc, and covered with short, bright fulvous pubescence; scutellum coarsely punctured posteriorly, postscutellum finely roughened, both with long, erect, dense fulvous pubescence; metathorax bounded by a double rim, between which are the usual subrectangular pits, which are half as wide as long; enclosure shiny, funnel-shaped, with a short, wide neck; sides of posterior truncation dull, rough, with sparse, pale fulvous pubescence; pleura thinly pubescent, with large, close, deep punctures; tegulæ pale testaceous; wings smoky hyaline, slightly iridescent, nervures and stigma blackish; third submarginal cell narrowed one-third toward the marginal; legs thinly covered with short gray

pubescence, the apices of the tarsal joints with a tuft of rufous hairs within; spurs testaceous, claws ferruginous; abdomen short, dull, the first segment evenly covered with fine, deep punctures, separated about the width of one, the second and third segments more finely and closely punctured, fourth and following segments with the punctuation fine but indistinct; apical margins of the three basal segments conspicuously depressed; no hair bands, but the whole abdomen sparsely covered with short pale hairs, which are somewhat elongated and tinged with fulvous on extreme base of first segment. Length, 10 mm.

♂.—Unknown.

One ♀, Monte Redondo, March 3, 1902 (L. Bruner). Altitude 4,000 feet. Type in collection of University of Nebraska.

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#### THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

(Continued from page 36.)

The Club held a second informal meeting in the Southern Hotel, St. Louis, on December 31, 1903. Dr. James Fletcher presided, and the discussions which were presented during the evening indicated the cleverness of the president in selecting speakers and assigning interesting topics. The evening was spent in a congenial and unusually profitable manner until the incoming of the new year.

Prof. Lochhead, of Guelph, presented to the Club a number of incidents relating to a trip to Killarney, Lake Huron, and the numerous islands in that vicinity. The habits of the native Indians were described in an interesting manner. These Indians are in a prosperous condition, as evidenced by the good horses and carriages which they own, and by other possessions. The Jesuit missionary schools have apparently had a great influence upon the prosperity of the Indians through their training in mechanical and other sciences. On St. Joseph Island the drama of Hiawatha is played every year by the Ojibwa Indians. The version of the drama followed is that of Longfellow, and the daughters of Longfellow were once present by invitation. The play is given out-of-doors, with logs for ordinary seats and bearskin seats for an extra price of 25 cents. A sepulchral voice calls the people together. The whole career of Hiawatha is presented in all its details, accompanied by excellent representations of

festivities. Good music is rendered in harmony. The concerted choruses are peculiarly effective, partly on account of their unique quality of cross-syncope. Many exceedingly dramatic features occur in the play, especially where Paupukeewis leaps 50 feet from a rock out into the lake, and where Hiawatha leads Minnehaha home, and his departure. During pantomime parts the meaning of the action is explained by the dramatic director through a megaphone.

The president called on Dr. D. G. Fairchild, who gave an account of some of his experiences in Java. The speaker described in an interesting manner his observations on the fungus-cultivating termites. As is generally known, these insects are enormously abundant and injurious throughout the tropics. Timbers are destroyed in all situations; in a few cases even ocean-going steamers have been destroyed. The observations of the speaker were made chiefly in the neighbourhood of the botanic gardens at Buitenzorg. It was soon found that the interesting comb-like nests of the termites were composed exclusively of the excrement of the insects. This structure serves as a nutrient medium for the growth of the fungus felt which lines all the passages. The conidiophores of the fungus are interesting structures. Each species of white ant cultivates a different species of fungus. The speaker's observations were chiefly confined to *Termes bellicosus*. Young white ants are fed almost exclusively on the conidiophores of the fungus. The speaker described the furious combats which are frequently observed between different species of termites. The individuals from different nests of the same species do not fight. The workers fight even more furiously than the soldiers. One group of termites was observed which did not cultivate any fungus, and which carried on their combats by ejections of fluid from the head. This fluid appeared to be very obnoxious. The nests of termites vary in size, from that of a man's hand to 25 ft. in height. Some species have five or six queens, and the queens lay about one egg per second. Many of these observations were corroborated by Mr. C. L. Marlatt, who referred to some of the habits of white ants, and who also spoke of toads as feeding upon these insects.

The subject of power sprayers was discussed by Mr. A. F. Burgess, with special reference to compressed air sprayers, as invented and perfected by manufacturers in Pennsylvania, Ohio and Illinois. According to one of these schemes the air tank is charged with air under a pressure of 160



lbs., and this air under pressure is conducted into a second tank containing the spray. The apparatus is furnished with an attachment of 12 nozzles set at intervals of 8 and 10 in., and according to the representations of the manufacturer a pressure of 160 lbs. is sufficient to spray 50 gals. The pressure may be maintained by connecting the apparatus by gearing with the wagon wheels. According to the experience of a number of the members present, however, this apparatus is still quite defective, and requires numerous modifications before it can become of real practical value.

A letter from Mr. Tepper, of South Australia, to Dr. Howard was read before the Club. In this letter the efficacy of kerosene in killing mosquitoes was questioned. It was argued that there are various natural agencies which prevent undue prevalence of mosquitoes. Kerosene, however, was once tried by the writer with good results. Considerable importance was attached to the action of mosquito larvæ in preventing stagnant water from becoming putrid. Apropos of this letter mention was made by Dr. Fairchild of acetozone, which is claimed by the manufacturers to be one hundred thousand times more powerful than peroxid of hydrogen as a disinfectant. It was suggested that this substance might be tested in killing mosquito larvæ. The value of formalin as an insecticide was also discussed, but in the experience of a number of members its power had proved very slight.

Mr. C. P. Gillette considered it very undesirable to use an excess of lime with Paris green in spraying for the codling moth, and attention was called by other members to the fact that Kedzie's formula for arsenite of lime is extensively used for this insect.

Doctor Fairchild reported the use of an unknown fluid mixture by an orange-grower in Florida for the purpose of influencing the maturity of the oranges. Oranges thus treated become sweet and mature, in so far as the flavour is concerned, while they are still green and before they have matured in appearance. The proprietor of this method is thus able to ship green oranges and secure a higher market price than for oranges which have not been so treated.

Dr. Fletcher enquired if anyone had had experience with Fuller's carbolic insecticide, and stated that good results had been obtained in Canada from the use of a mixture, said to contain carbolic acid, oil and Stockholm tar, in combating San Jose scale. Prof. Lochhead spoke to the same effect. Professors Piper and Gillette had noticed the burning

effect of this mixture on leaves, but the president stated that trees had received three applications in summer in Canada without any apparent injury, while 90 per cent. of the scale was killed.

Mr. C. P. Gillette gave an account of some observations on insects in Colorado. The speaker illustrated his remarks by means of insect specimens. A short-winged form of *Melanoplus bivittatus* was exhibited, and also of *M. femur-rubrum*, the latter showing great variation in colour. The speaker stated that *Chorizagrotis agrestis* occurs in Colorado in three forms, and is extremely injurious to a great variety of crops. The males are uniformly darker than the females, and this fact has, in a few cases, led to errors in determination. He also described a species of Chermes on pine and spruce, and gave an account of its life-history. In spring the insect is found on the under side of small twigs of *Abies pungens*. The eggs are deposited on the old wood near the new growth in masses of 150 or more. The swelling of the needles and consequent gall formations are due to the attacks of young lice, and not to the punctures of the adult females in laying the eggs. In Colorado there is apparently a new species of Chermes in addition to *C. abietis*. The young of this new species also locate on the new growth, but do not form galls. The insect passes the winter in a larval stage and is strictly oviparous. There is some evidence of another species of Chermes on *Pinus ponderosa*. The speaker also referred to the injury to apples from the use of strong arsenical sprays and Bordeaux mixtures.

Mr. R. A. Cooley, of Montana, also spoke on the same subject.

The question was raised whether breeding experiments in insects might reasonably be expected to lead to valuable results, and was discussed by several members. During this discussion mention was made of experiments which had been made in attempting to lengthen the tongues of bees, and of experiments to determine the effect of foodstuffs and other conditions of environment upon the life history of silkworms and the quality and quantity of silk produced.

Dr. E. P. Felt spoke on the subject of the exhibit of economic insects to be sent to the St. Louis World's Fair, and the arrangements which had been made for displaying it.

For the next meeting of the Club, which will be held in connection with the meeting of the Association for the Advancement of Science in Philadelphia, the Club elected Henry Skinner as president, and E. V. Wilcox as secretary.

E. V. WILCOX.

## JOCULAR ENTOMOLOGY.

The action of our friends who publish *Entomological News*, in putting on the title-page of that excellent journal the figure of an insect, with the legend "*Ignotus ænigmaticus*, Slosson," creates a situation hitherto unknown in entomology.

In Mrs. Slosson's delightful article on "A Coleopterous Conundrum," in the *CANADIAN ENTOMOLOGIST* for July, 1903, she asks this question: "Shall I ever find more specimens of what I have sometimes, in chat with friends, called *Ignotus ænigmaticus*? I trow not." This is the sole basis for the application of the name, as fully admitted in the *January News*.

If we adopt the principle upon which the *News* acts, it will afford great relief to those who have been labouring in descriptive entomology for lo! these many years. It is evident that our pains have been wholly unnecessary. Chatting with our friends, we need only mention any Latinized jingle that occurs to us under the inspiration of the moment; then let this leak into print, and all is accomplished.

We may expect that the general adoption of this method will bring about a rapid increase of new genera and species. Now that it is unnecessary to go through the tedious process of describing, figuring, comparing and writing out, no one need hesitate to enter the field. It is highly probable that some of us name insects in our sleep, and never knew it before. Let us merely employ an amanuensis to sit by and take down our mutterings, after a long evening spent in the old-fashioned sort of entomological labour, and doubtless in the morning we shall be rewarded by a fine list of new genera and species, some of which will perhaps be so interesting as to subsequently adorn the covers of entomological journals.

One of my friends has an infant son, two years old, who has already named several new genera and species. His chat is not very fluent, but his names are not preoccupied, and compare very well in appropriateness with the one given above. Some of the endings look rather unlike old-fashioned Latin, but this is easily cured. If I were to enumerate some of his appellatives, there is no reason to doubt that they would stand hereafter as valid names for the species to which he has applied them. I refrain from giving them publicity, as I think his father would like to do it.

J. M. ALDRICH, Moscow, Idaho.

## GASTROPHILUS EPILEPSALIS LARVÆ AND EPILEPSY.

BY G. H. FRENCH, CARBONDALE, ILL.

In the October number of the St. Paul Medical Journal, Dr. Burnside Foster, the editor, gives a very interesting case of larvæ found in the cutaneous tissues of a three weeks old infant, that a specialist in Dipterology identified as the above species. The case was not one of Dr. Foster's patients, but was from Superior, Wis. If the identification is correct, and I see no reason why it should not be, for the specialist was the same one who identified the first larva found in the boy at Chester, Illinois, as a *Gastrophilus*, and he had one of the types before him for comparison, the case is important. How they came to be in the child's skin is an interesting question, and in a brief note in reply to Dr. Foster's article, I suggested an examination of the excreta of the mother.

In the November number of the same journal, Prof. F. L. Washburn, State Entomologist of Minnesota, publishes a paper on the same subject. In the issue for January 16th of the Journal of the American Medical Association, Prof. Washburn has an article that is nearly a copy of the one in the St. Paul Medical Journal. It is of a few statements in these two articles that I wish to speak.

I do not know whether the fly producing these larvæ is a *Gastrophilus* or not, and that question can not be settled till some of the living larvæ are found and bred. One of the best authorities on Diptera in the United States says they are, and there it will have to rest till breeding proves him right or wrong.

I never assumed that by naming this larva *Epilipsalis* it was the cause of epilepsy. In fact, epilepsy is not a disease, but a symptom resulting from some irritation somewhere in the body of a neurotic with a spasm tendency. But that this has been in five cases the source of irritation, or at least one of the sources, there is no question in the minds of those knowing the conditions. In two of these cases, the two best known to myself, the removal of the parasites from the system cured the cases. Again, in the five cases where these larvæ had been found previous to the Wisconsin infant, the hosts were epileptics. I have said before that from the wide distribution of the insect the probability is that it is not an uncommon human parasite, but that its small size—one-twelfth of an inch long—and causing so little irritation in ordinary individuals, its presence has been overlooked. Previous to Dr. Foster's case it had been found in three places in Illinois, one in Kentucky and one in Indian Territory.

Prof. Washburn says: "This intestinal parasite *evidently* has no connection whatever with epilepsy, and is wrongly named." The italic is mine. The last clause of the statement is answered above. As to the

rest of it, if Prof. Washburn were a little more familiar with human pathology he probably would not have written the sentence. The writer has spoken before hundreds of physicians on this subject, some of them the best nerve specialists in the United States, and not one of them has ever raised a question as to its being one of the causes of epilepsy.

Prof. Washburn questions my assumption that the larvæ might be reproduced in the intestines by parthenogenesis. I do not believe I wish to add anything to my original statements in the CANADIAN ENTOMOLOGIST when naming the species in 1900. At the time of writing then I gave the subject a careful investigation in the literature of this country and of Europe.

I do not know how these larvæ gain access to the digestive canal of man. That is one of the things for future investigation.

#### JOHN ALSTON MOFFAT.

It is with profound regret that we announce the death of our dear and greatly-esteemed friend, MR. JOHN ALSTON MOFFAT, which took place at the Victoria Hospital on Friday evening, February 26th. For the last six months Mr. Moffat had been in poor health, but continued to frequent the Society's library and to discharge, as far as his strength permitted, the various duties that devolved upon him. He was very unwilling to give up, and resisted as long as he could the attacks of weakness and old age. At last, on the day before Christmas, his condition was such that he could bear up no longer, and with great reluctance he went to the Victoria Hospital, where he remained till the end came. His ailment was pronounced to be "senile decay," aggravated by much digestive weakness. He suffered much discomfort, though little acute pain, and bore with great patience and gentleness all that he was called upon to endure. At the advanced age of fourscore years, he knew that his days were numbered, and was quite prepared to leave this world when the summons came.

For the last fourteen years Mr. Moffat has been the Librarian and Curator of the Entomological Society of Ontario, and during that time endeared himself to all with whom he came in contact by his gentleness, kindness and courtesy. It was always a pleasure to him to identify specimens, and to exhibit the beautiful objects in the Society's cabinets to anyone who was interested in natural history. We shall miss him sadly at our meetings, and our library will seem desolate without his familiar voice and figure. He was a constant contributor of notes to this magazine and of more elaborate papers in our annual Reports. The volume for 1903, which is now in type, contains an article from his pen, entitled "Recollections of the Past"; this will be read with great interest by his many friends. It contains some reminiscences of his life, and relates how he came to study entomology, through the necessity for an outdoor life caused by ill-health.

C. J. S. B.