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# PROCEEDINGS

OF THE

# ENTOMOLOGICAL SOCIETY

OF

# WASHINGTON.

Volume XIV, 1912.

(Meetings of November 2, 1911 to October 3, 1912.)

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OF THE

# ENTOMOLOGICAL SOCIETY

OF

# WASHINGTON.

Volume XIV, No. 1.

JANUARY--MARCH, 1912.

(MEETINGS OF NOVEMBER 2 AND DECEMBER 7, 1911.

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# THE ENTOMOLOGICAL SOCIETY OF WASHINGTON.

ORGANIZED MARCH 12, 1884.

The regular meetings of the Society are held on the first Thursday in each month, from October to June, inclusive, at 8 P. M.

Annual dues of active members, $3.00; of corresponding members, $2.00; initiation fee (for active members only), $1.00.

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PROCEEDINGS

OF THE

# ENTOMOLOGICAL SOCIETY

## OF WASHINGTON.

VOL. XIV JANUARY – MARCH, 1912 No. 1

### MEETING OF NOVEMBER 2, 1911.

The 253d regular meeting of the Society was entertained by Professor A. L. Quaintance in the Saengerbund Hall on the night of November 2, 1911, with twenty-five members (Messrs. Babcock, Baker, Barber, Busck, Crawford, Cushman, Dyar, Ely, Foster, Gahan, Gill, Hammar, Howard, Jones, Knab, Myers, Popenoe, Quaintance, Russell, Sanford, Scott, Schwarz, Walton, Webb) and two guests (Siegler and Wood) present. First Vice President Quaintance occupied the chair. The minutes of the previous meeting were read and corrected. The report of the committee to prepare the Obituary and Bibliography of the late D. W. Coquillett was submitted and referred to the Publication Committee.*

Mr. Schwarz proposed the name of Dr. K. Escherich, of Tharandt, Germany, for corresponding membership, to be acted upon at the next meeting.

Mr. Gahan read the first paper of the program, "Descriptions of two new genera and six new species of parasitic Hymenoptera," which was followed by a short discussion on the confusion that has resulted from the publication of the supposed hosts of parasites.

*Already published, Proc. Ent. Soc. Wash., XIII, 196, 1911.

## DESCRIPTIONS OF TWO NEW GENERA AND SIX NEW SPECIES OF PARASITIC HYMENOPTERA.*

By A. B. Gahan.

The descriptions of one new genus and three new species of Ichneumonoidea, one new genus and two new species of Chalcidoidea, and one new species of Proctotrypoidea are contained in this paper. Types of all will be deposited in the United States National Museum.

### ICHNEUMONOIDEA.

### BRACONIDÆ.

### MICROGASTERINÆ.

**Apanteles (Pseudapanteles) terminalis,** new species.

1900. *Pseudapanteles terminalis* Ashm. MS. in Smith's Ins. N. J., 1899, p. 593.

*Male.*—Length 3.5 mm. Black, except legs and anal one-third of abdomen, which are brownish testaceous. Whole head, except occiput, strongly rugoso-punctate and covered with short whitish pubescence; mandibles blackish brown; eyes hairy; clypeal fovea deep and rounded; labrum conspicuous; palpi pale yellowish; scape brownish testaceous, the flagellum wholly black. Thorax rugoso-punctate with whitish pubescence, the posterior half of the mesopleuræ smooth, impunctate. Propodium wholly rugoso-punctate, with distinct median and lateral carinæ, the latero-posterior angles prominent, giving an appearance of concavity to the posterior face of the propodium. Anterior and median coxæ brownish, posterior pair black, all trochanters, femora, and tibiæ brownish testaceous, darkest above, all tarsi more or less dark brown, the two anterior pairs slightly testaceous. Wings hyaline, the costal, postmarginal, radius, first intracubital, apex of the median, and more or less of the discoidal veins and the stigma brownish; remainder of the venation paler. First dorsal tergite one and one-half times as long as wide, the sides parallel or nearly, second segment half the length of the first, the third still shorter. The first three dorsal segments are strongly rugoso-punctate, the first two entirely black and the third with a broad crescent-shaped black spot basally, its lateral angles and apex like the following segments and ventral surface testaceous.

*Female.*—Scape, pedicel, and three basal joints of the flagellum brownish testaceous; mandibles reddish brown; all coxæ as well as femoræ, tibiæ, and tarsi pale testaceous; wing veins and stigma brownish testaceous. Ovipositor exserted about the length of the abdomen. Otherwise like the male.

*Contribution from the Entomological Laboratory of the Maryland Agricultural Experiment Station.

*Type:* No. 12758, U. S. National Museum.

Described from seven specimens, as follows: Three males from Jacksonville, Florida; one male from Cedar Point, Maryland; one male and one female from Long Island, New York, and one male from College Park, Maryland. The College Park specimen is in the collection of the Maryland Experiment Station; all others are in the United States National Museum. The male and female from Long Island are undoubtedly the specimens selected by Dr. Ashmead as types for the species.

## RHOGADINÆ.

### ALLORHOGAS, new genus.

Transfacial line equaling or nearly the facial line. Head transverse, the temples rather broad, two-thirds the width of the eyes; antennæ long filiform; ocelli in a small equilateral triangle; labial palpi three-jointed, the maxillary palpi four-jointed. Head and thorax very finely reticulately sculptured; parapsidal furrows complete and deeply impressed, the median lobe of the mesocutum with a broad median longitudinal furrow; scutellum small; mesopleuræ with a distinct furrow; propodium more or less rugose, rather abruptly declivious posteriorly, with two distinct carinæ originating at the median point on the anterior margin and diverging in a curve posteriorly to the apex of the truncation, where they merge with the lateral longitudinal carinæ. Wings with three cubital cells; the marginal cell completely closed; the recurrent nervure interstitial with the first transverse cubital; radius arising from the middle of the stigma, its first abscissa very slightly shorter than the second, the latter about half the length of the second abscissa of cubitus. Abdomen oblong-ovate, sessile, slightly longer than the thorax; the first segment longer than wide, striate with two carinæ laterally at the base; second segment and apical half of the third strongly striate, the suture between distinct but not deeply impressed; ovipositor exserted about two-thirds the length of the abdomen.

*Type: Allorhogas gallicola*, new species.

In Ashmead's "Classification of the Ichneumon Flies" this genus would fall near *Clinocentrus*. It may be distinguished from that genus by the non-compressed abdomen. From *Oncophanes* and *Epirhyssalus* it is separated by the fact that the abdominal segments are not tumid. In Szepligeti's classification of the Braconidæ the genus agrees most nearly with *Semirhytus*, but the thorax is not smooth, the parapsidal furrows are deeply impressed, and the recurrent nervure is interstitial. The latter character differentiates it from *Rhogas*.

**Allorhogas gallicola,** new species.

*Female*—Length 4 mm. Antennæ 30-jointed, the flagellum blackish brown, darkest apically, the basal joints and scape somewhat testaceous. Face more distinctly pilose than the rest of the head, its sculpture, except on the median line which is nearly smooth, slightly coarser and more distinctly punctate than the vertex; mouth opening rather small; eyes, mandibles at the apex, and spot enclosed by the ocelli black; remainder of head, thorax, and abdomen brownish-testaceous; the metathorax and propodium slightly darker than the rest of the body; scutellum small, separated from the mesoscutum by a deep, wide furrow which is broken by several transverse ridges; carinæ of the propodium with numerous short transverse striæ radiating from them. Palpi and legs slightly paler than the body, the hind tibiæ brownish and the apical joint of all tarsi brown. Wings hyaline; tegulæ and veins at base yellowish; stigma and veins outwardly brownish. Apical half of third abdominal segment and base of the fourth faintly lineolate, others smooth; ovipositor blackish.

*Male.*—Similar to the female in every respect except that the propodium is slightly more rugose and somewhat darker than in the female and the antennæ are 28-jointed.

*Type:* No. 14358, U. S. National Museum.

Described from a single female reared May 20, 1911, and two males reared April 27 and May 18, 1911, respectively, at College Park, Maryland, from cynipid twig-galls on *Quercus pinifolia*. From these same galls were reared specimens of *Synanthedon scitula* Harris, and it is reasonable to suppose that the braconid is parasitic on that moth. In the National Museum are two specimens, apparently the same species, bearing the number $2610^{0\,1}$ Ft. Grant, Arizona. The record to which this number refers shows that the specimens were bred from twig-galls of oak from the above-mentioned locality, and is interesting as indicating a wide distribution for the species.

## ALYSIIDÆ.

### DACNUSINÆ.

**Synaldis incisa,** new species.

*Female.*—Length 2 mm. Black; smooth and shining. Antennæ submoniliform, brownish-testaceous, darker toward the apex; first flagellar longer and more slender than the second, the second not twice as long as thick, following joints shortening and narrowing gradually toward the apex, about one and one-half times as long as wide, the joints toward the apex slightly pedicellate. Head smooth and shining; face somewhat pilose, with a faint median carina between

the antennæ: vertex divided by a deep median furrow extending from the ocelli to the occipital foramen. Mesothorax smooth, shining impunctate; the parapsidal furrows absent, the mesoscutum with a short median longitudinal furrow or incision near its posterior margin; mesopleuræ with a distinct furrow; propodium rugose with a short median carina anteriorly becoming lost in the roughness of the sculpture posteriorly. Wings hyaline; the stigma very narrow, only slightly thicker than the postmarginal vein, which is thickened throughout its whole length; the first cubital cross-vein is entirely absent, the second removed nearly one-third the length of the radius from the origin of the latter; the cubital nervure abruptly cut off just beyond the cross-vein; marginal cell reaching to the apex of the wing; costal, radial and postmarginal veins and the stigma brownish, remainder of the neuration pale. Palpi and legs brownish-testaceous, darkest above. Abdomen not longer than the head and thorax, smooth, shining, black; ovipositor exserted half the length of the abdomen, brownish-testaceous.

*Habitat:* Manhattan, Kansas.

*Type:* No. 14357, U. S. National Museum.

Two slides bearing a large number of specimens were received from T. J. Headlee for identification. These specimens were taken from cages in which the Hessian fly was breeding and are possibly parasitic on that insect.

The species may be distinguished from *S. ulmicola* Ashm. by the incision on the mesoscutum and by the more rugose propodium. Types removed from slide and mounted on points; paratypes in the collection Kansas Agricultural College, slide-mounted.

## CHALCIDOIDEA.

## TORYMIDÆ.

### MONODONTOMERINÆ.

**Ditropinotus flavicoxus,** new species.

*Female.*—Length 2.5 mm. Head and dorsum of the thorax golden green, strongly punctate, the punctures of the head somewhat finer than those of the thorax. Antennæ dark brown, nearly black; the scape and club orange yellow. Face below antennæ with sericeous white pile. Pleuræ, underside of thorax (except mesosternum, which is usually green), legs including all coxæ, and abdomen honey-yellow; the anterior coxæ and middle tibiæ are usually somewhat paler than the rest of the legs, and the apical tarsal joints are dark. Abdomen very finely, transversely lineolate, the ovipositor about half the length of the abdomen and black.

*Male.*—Entirely green, the abdomen slightly bronzed above. Antennæ wholly black. Coxæ and femoræ, except apically, dark brown, the tibiæ, tarsi, and apices of femoræ pale yellow. Body sculpture similar to that of the female.

*Habitat:* College Park, Maryland.

*Type:* No. 14356, U. S. National Museum.

Eight female and six male specimens collected by Mr. E. N. Cory, July 19, 1909, in a room in which were stored quantities of meal and other ground feed badly infested with several different coleopterous and lepidopterous pests of this class of stored products. It is probably, though not certainly, parasitic on some insect which infests stored cereals.

The species differs from *D. aurcoviridis* Crwfd. in the female having all of the coxæ honey-yellow instead of green and in the absence of any green markings on the abdomen. The sculpture of the propodium is also slightly different. The males are not distinguishable.

## ENCYRTIDÆ.

### ENCYRTINÆ.

#### AGROMYZAPHAGUS, new genus.

Body metallic. Head transverse, seen from in front slightly broader than long; cheeks half the length of the eyes; eyes bare, nearly circular, converging above and extending to the occiput; vertex rather narrow; frons somewhat flattened, finely punctate, and with numerous larger, deeper punctures surrounding the forward ocellus; ocelli in a nearly equilateral triangle, the two lateral close to but not touching the eye margins; antennæ 11-jointed, inserted below the eyes, the scrobes triangular; scape slender, not reaching to the front ocellus; pedicel shorter than the first funicle joint; funicle joints thickened, cylindrical, the first joint slightly the longest, following joints subequal, one and a half times as long as wide; the club is flattened, not as long as half the funicle, its apex bluntly rounded, the first joint slightly longer than wide, the two following transverse. Thorax robust; mesoscutum short and broad, not more than half as long as wide and very finely shagreened; scutellum convex, as long as the mesoscutum, rounded posteriorly and delicately sculptured; metathorax smooth, impunctate, and without pubescence. Wings hyaline; the marginal vein short, not much longer than thick; postmarginal shorter than the marginal; stigmal about as long as the marginal and postmarginal together. Abdomen conic ovate, flattened above, not longer than the thorax; ovipositor not exserted. The male differs from the female in having the club of the antennæ shorter than the two preceding funicle joints, the funicle joints hairy, not especially thickened,

and distinctly notched above at the sutures; the first funicle joint is two or more times as long as the pedicel.

*Type:* *Agromyzaphagus detrimentosus*, new species.

In Ashmead's Classification of the "Chalcid Flies" this genus apparently falls nearest to *Coccidencyrtus*, but differs from that genus in that the antennal club is less than half the length of the funicle. The fact that the eyes are bare distinguishes it from *Ageniaspis* and the short pedicel will serve to separate it from most of the other genera.

**Agromyzaphagus detrimentosus,** new species.

*Female.*—Length 1.5 mm. Antennæ black with very short whitish pile, scape slightly metallic; scrobes deeply impressed; eyes reddish brown; face and cheeks bluish-green tinged with brassy, the former finely shagreened, the latter delicately lineolated. Head above and mesocutum finely shagreened, brassy green; scutellum copper-colored its sculpture finer than that of the mesoscutum; mesopleuræ steel-blue, very finely lineolate; metathorax and abdomen smooth, shining, impunctate, nearly black, but often slightly metallic. Wings hyaline, the anterior and posterior margins without cilia, the apical margin with very short cilia; veins brownish. Coxæ all metallic green; trochanters testaceous; anterior femoræ dark brown, their apices and tibiæ and tarsi pale yellow; median femoræ and tibiæ dark brown, the apex of femoræ, base and apex of tibiæ, and their tarsi pale yellow; posterior femoræ and tibiæ black, more or less metallic, their tarsi yellowish.

*Male.*—Exactly like the female, except in the antennal characters, as pointed out in the description of the genus and the fact that the flagellum is wholly testaceous instead of black.

*Type:* No. 14355, U. S. National Museum.

*Habitat:* College Park, Maryland.

Described from eleven females and seven males reared July 19, 1911, by Mr. O. G. Babcock and the writer, from the puparia of an agromyzid fly belonging to the genus *Leucopis*. The flies, which are probably *Leucopis nigricornis*, were feeding in the larval state upon an aphis infesting apple and also one infesting a species of thistle.

## PROCTOTRYPOIDEA.

## PROCTOTRYPIDÆ.

### SCELIONINÆ.

**Hoplogryon kansasensis,** new species.

*Female.*—Length 2.5 mm. Black, more or less shining. Antennæ strongly clavate; scape long and reaching about to the forward ocel-

lus, slightly testaceous; pedicel conical, much narrower and less than half as long as the following joint, dark brown; flagellum about twice as long as the scape, blackish; the first joint not wider at base than the pedicel but much wider at its apex, second joint distinctly shorter than the first, one and a half times as long as thick, third and fourth joints subequal, transverse, about twice as wide as long; club joints transverse, but distinctly longer than joints three and four of the funicle, the two apical sutures slightly oblique, the apical joint rounded at its apex. Head black, strongly transverse; mandibles deeply toothed and brownish; clypeus strongly transversely striate; lower part of face, eye margins above, the temples, cheeks, and vertex also deeply striate; remainder of the face smooth and shining but with many deep punctures arranged in irregular rows on the upper half. Thorax black; mesothorax and scutellum coarsely punctate, mesopleuræ rugoso-striate; metathorax more or less rugoso-striate with three long pointed projections, one on the median line reaching to the middle of the first abdominal segment, and one at each posterior lateral angle considerably shorter. Wings slightly smoky, with a row of stiff black bristles along the subcostal and marginal veins. Legs including all coxæ brownish testaceous. Abdomen shining black, longer than the head and thorax, spatulate, the first segment wider at apex than long, its base narrow; second segment also much wider at apex than at base and about half as long as wide; third segment as long as two and three together, the following segments very short; segments one, two, and three are strongly longitudinally striate, the striations gradually fading out and disappearing before the apex and at the sides of the third.

*Habitat:* Manhattan, Kansas.

*Type:* No. 14354, U. S. National Museum.

One specimen was received from T. J. Headlee which had been secured from a cage in which experiments with the Hessian fly were being carried on and it is possibly, though not likely, a parasite of the fly.

The species is closest to *H. bethunei* Sanders, recently described, but differs as follows: The thorax is densely punctate instead of rugose, the metathoracic teeth are much longer, and the flagellum is more strongly dilated.

—Mr. Busck gave a very interesting account of the rearing of the man-infesting bot of tropical America.

## ON THE REARING OF A DERMATOBIA HOMINIS LINNÆUS.

By August Busck.

The literature on *Dermatobia* infesting man is very large and the biology of the species is fairly well studied and understood. Dr. Raphael Blanchard, in his classical paper, "Sur les Œstrides américains dont la larve vit dans la peau de l' homme" (Ann. Soc. Ent. France, vol. 61, pp. 109-154, 1892), gives a comprehensive review of the literature on this species from the first record in 1749 to the date of his article, and Dr. A. Neiva has lately given full synonymy and life-history with illustrations of all stages in his "Algumas informações sobre o Berne" (Chacaras e Quintaes, vol. II, no. 1, 1910, reprinted as a separate publication in Rio de Janeiro, 1911).

The following notes do not pretend to add anything new, but are merely an account of an actual breeding of the parasite from man, of which there is as yet no published record.

The writer has on several occasions become infested with the larva of *Dermatobia*, but has been unable to indulge his desire to breed the fly, because the inconvenience of an infestation interfered with work on hand. Acquiring, however, an infestation towards the close of my last stay in Panama, this summer, and in a reasonably inoffensive part of the body, upper left arm, I determined to let it remain and succeeded in rearing the fly.

The infestation took place at Cabima, Panama, on May 29; only one cast skin was observed during the larval period; this was shed and pushed out nearly entire through the aperture in my skin on July 19; on September 9 the larva had attained full growth and left the arm, posterior end first. It was at this time nearly 1 inch long (24 mm.) and 10 mm. in diameter. On being placed in a jar with wet sand it immediately burrowed down 2 inches to the bottom of the jar and pupated. The fly issued on October 23.

No exact observation on the oviposition is recorded in print and none was made by the writer; the egg is known only from dissected females, but there is no doubt that the larva hatches at once at the time of oviposition and normally bores into the skin just where it is deposited; for this reason the bulk of the infestations occur on exposed parts of the body, the arms, legs, and neck; but it is plainly either possible for the larva to travel some distance, if not satisfied with its first situation, or else survive a fall from this exposed place to another under the clothing of the host; the writer was thus infested by another larva earlier in the season just under the

shoulder blade, whereto the larva must have dropped or crawled from the neck. All my other infestations occurred on places which were exposed at the time.

The natives believe the swellings on their legs are caused by their wading across streams, at which time of course the fly has a good opportunity to oviposit.

To any observing person the infestation is noticeable from the very beginning, and the irritation is easily distinguished from the abundant mosquito and tick bites with which one is inflicted when "in the bush."

Within a week can be seen with the naked eye the characteristic, moist aperture in the skin through which the larva pushes and withdraws its anal end for breathing.

The larva, even when large, does not cause much pain if not interfered with, though it has the habit at times of rotating around its own axis with telling effect on the host's feelings.

On the whole, however, the inconvenience is greater than the pain, the constantly exuding fæces of the larva necessitating a bandage so as not to soil underclothing and bed linen. Towards maturity the larva gradually enlarges the aperture in the skin and its final egress is more relief than pain.

But I am inclined to ascribe to the larva a more serious effect on its host. During no period of my entire adult life have I required as much sleep as during the months of infestation with this parasite; from 3 to 5 hours were almost daily regretfully added to my normal sleeping hours and during the day I felt less alert and energetic than is my wont. This was the more noticeable to myself and to my nearest associates, because I for more than twenty years have been in the habit of indulging in a minimum of sleep. When the larva had left my arm this desire for sleep stopped and I was able to return to my normal habits.

I am well aware that the evidence of this single experience is not sufficient to establish the guilt of the larva; other causes not perceived by me may have produced my condition, but I wish to record my belief that the *Dermatobia* larva was the cause. Is it not possible that these larvæ produce some virus which has a quieting effect on the host? Ability to quiet the host during incubation would be a distinct advantage to the species.

During his stay in Panama the writer observed what is now known to be the same species in monkey and dog.

Having been the victim of a pretentious surgical operation, with subsequent stitches and bandages, which was thought necessary to remove a half-grown larva in my back, which I could not myself reach around and attend to, I may be ex-

cused a note on the technique of removing such a larva from a suffering host. There is no need of knife and bloodshed; at any time of its life the larva may be easily removed simply by pressure, after the aperture has been softened and somewhat enlarged by insertion of a pair of thin forceps; but the shape of the larva should be kept in mind; its thin anal end lies toward the surface of the skin and the swelled bottle-shaped part is downwards; hence it is necessary to apply the pressure well below the swelled part or it will only tend to force the larva further down.

Mr. Knab spoke of the widespread and common occurrence of *Dermatobia* throughout tropical America and of the Mexican and Central American records in numerous papers that have appeared on the subject. Several different species have been thought to exist, but it now appears that they are all one. Both Aldrich and Coquillett seem to have been skeptical of the occurrence of *Dermatobia* north of Panama, or unable to cope with an insect usually observed only in the larval stages. Mr. Busck said that in Trinidad the larvæ commonly infested the head, but this was not so in Panama. Mr. Knab said there are no actual observations on the mode of oviposition. The several stages of the larvæ differ and were at one time considered different forms. In tropical Africa a muscid parasite of man (*Cordylobia*) lives under the skin in the same way. It was supposed that the eggs were deposited directly on the exposed skin, as persons bathing became most frequently infested. Recently von Pelser-Berensberg determined that the eggs are not deposited directly upon the skin but on the clothing and do not hatch until two days later. Mr. Hammar said that while in South America he had been infested with *Dermatobia* several times. There appeared to be two kinds of larvæ, black and white. The natives believe the eggs are laid on the foliage. He had found young larvæ crawling on the skin before entering. Mr. Crawford spoke of the finding of a cast skin in the burrow with the maggot which he was having cut out in Costa Rica. Mr. Schwarz spoke of Dr. LeConte's observations and method of extraction as published in his edition of Say's entomolgical writings. Mr. Hammar said the native remedy was to tie chewed tobacco over the hole. Mr. Knab stated that the larva does not penetrate below the connective tissue.

—Mr. H. M. Russell, under the title "A Hymenopterous Parasite of Thrips," gave an abstract of his observations in California.*

—Under the heading Notes and Exhibition of Specimens Dr. Dyar called attention to a published charge by Prof. John B. Smith that type labels in the National Museum had been tampered with (Journ. N. Y. Ent. Soc., XIX, 151, 1911). He said that the basis of this serious charge was that Professor Smith had, a number of years ago, confused together two similar species of Noctuidæ. Smith had described a species from four specimens, and, as it now appears, of these he left two in the National Museum and took two for his own collection. It so happened that the two in the National Museum were of one species, the two in Smith's hands, another. Recently Smith, in revising the genus, based the species in his redescription upon the specimens in his hands and described the other form under a new name, unconscious of the fact that this form already constituted part of the types of his earlier species. Dr. Dyar had pointed out, from the types in the National Museum, that Smith had redescribed his own species, and he proposed another name for the species which Smith held under the old name, being unaware of the existence of other types in Smith's hands. Hereupon Smith claimed that the types in the National Museum were really conspecific with those in his hands and that if they were not so, then the type labels had been changed! He states that the two species are "so utterly different in size, in color, in maculation, and even in wing form, that mere error of association is excluded."

Dr. Dyar expressed himself as deeply incensed at this ridiculous charge, which, he said, was prompted by malice and supported by misstatement. He exhibited specimens of the forms in question, showing that they were in fact near allies and not widely separated species, as Smith's statements would imply. Such might very easily have been originally confused by Smith. In fact, Smith in his original description refers

*Already published, Proc. Ent. Soc. Wash., XIII, 235, 1911.

to the great variability of the form before him. Dr. Dyar further stated that he had a suspicion that the forms would ultimately prove to be varieties of one species, in which case it would be found that Smith's earlier position, which he now so radically repudiates, was in fact the more correct one.

In regard to the names of these forms, Dr. Dyar said that in spite of the discussion, the types of the original *Pleonectyptera finitima* Smith had not been fixed. The species was based on four specimens and Dr. Dyar proposed herewith to restrict the types to the two in the National Museum. This makes *P. tenalis* Smith synonymous with *P. finitima*, and leaves the name *P. cumulalis* Dyar available for the other form, all as stated in Dr. Dyar's paper published in the Pomona College Journal of Entomology.

—Mr. Walton presented the following:

## NOTES ON CERTAIN SPECIES OF FLIES.

By W. R. Walton.

**Microdon lætus** Loew.

The writer has already published a note regarding this syrphid in Entomological News. It is listed among the additional species but not described in Dr. Williston's Synopsis of the North American Syrphidæ. The type locality is Cuba, but the present specimens were collected near Harrisburg, Pennsylvania, by Mr. Frank Craighead and H. L. Adams, respectively. There is also one additional specimen in the collection of Mr. E. Daecke at Harrisburg, which was collected by the writer.

**Eristalis montanus** Williston.

Dr. Williston described this species from a unique male taken at Como, Wyoming, at an elevation of 7,000 feet, and the female has since been described by Mr. W. D. Hunter (Can. Ent., vol. xxviii, p. 98). Specimen was taken at Soda Springs, Idaho. Mr. Hunter subsequently collected several specimens in northwestern Nebraska. All the specimens so far recorded have been taken at elevations exceeding 4,000 feet. The present specimen was collected at Real del Monte, Mexico, a silver-mining camp 9,000 feet above sea level, by Mr. H. T. Van Ostrand. This is one of the few species of *Eristalis* from North America not hitherto represented in the collection of the U. S. National Museum.

**Eristalis vinetorum** Fabr.

The present specimen was collected at Hertford, North Carolina, by the writer, during the past summer. This seems to be the most northerly latitude yet recorded for the species, which is common enough from Georgia southward.

**Synthesiomyia braziliana** B. & B.

This species, the type locality of which is Brazil, has hitherto been recorded from but few localities in the United States. Hough records it from Florida and Georgia and Mr. H. G. Hubbard collected one specimen from a cave in Florida, which by the way, is credited in Aldrich's catalogue to Mr. C. W. Johnson, who first published the record. The present specimen was collected by Mr. D. K. McMillan at Brownsville, Texas.

It is herewith exhibited in company with a species of *Sarcophaga* in order to call attention to the extreme similarity in habitus of the two species.

**Johnsonia elegans** Coq.

Mr. Coquillett erected the genus *Johnsonia* for this species on a single specimen, collected by Mr. C. W. Johnson, at St. Augustine, Florida, in 1895. Mrs. Annie Slosson subsequently collected several specimens in the same State. The present specimen was taken at Eberlys Mill, near Harrisburg, Pennsylvania, by the writer. The genus is undoubtedly a valid one, but the several individuals to which Mr. Coquillett has applied a common specific name differ so markedly as to indicate that at least two species may be included.

The present individual is one-third again as large as the type specimen and has been determined by Mr. Coquillett. It is exhibited in company with a tachinid fly, namely, *Tricophora ruficauda* van der Wulp, to which it bears a remarkable, though of course superficial, resemblance.

—Dr. Dyar spoke of the larva of *Doa ampla* Grote, which had been sent to him by Prof. T. D. A. Cockerell. Prof. Cockerell found the larva at Boulder, Colorado, on an euphorbiaceous plant, and originally sent it for determination. Dr. Dyar at that time had no idea what it was; but later Prof. Cockerell succeeded in breeding the adult. Dr. Dyar said that the species had been variously referred to different families, having been first described as a lithosian, in the European genus *Emydia* Boisd. The moth by its venation is

neither a lithosian nor an arctian, nor does it belong to the Liparidæ. It will come in the group called Hypsidæ by Sir G. F. Hampson, a group including the forms that we have classed under the term Pericopidæ. The larva is smooth, brightly colored, the setæ degenerated and nearly lost, but the subventral ones with duplicated hairs. It is thus the possessor of many-haired warts, which have degenerated to give place to a bright and conspicuous coloration. The larvæ of the Pericopidæ possess a similar structure, except that in general the warts and hairs are well developed and functional, although in some, like *Composia fidelissima* H. S., the hairs are few and the coloration of the skin is bright. Therefore there is nothing in the structure of the larva of *Doa ampla* to prevent its reference to the Hypsidæ. Dr, Dyar further said that he would add a description of the larva for publication, which follows:

*Larva.*—Head small, rounded, notched behind at the vertex, flat before, smooth shining black, the epistoma and bases of antennæ white. Body with the thorax roundly enlarged, swollen, the rest evenly cylindrical, subtruncate behind. The enlarged thorax is black, with large rounded angular white spots, while the central region is yellow with broad black bands. Thoracic white spots subdorsal and lateral on joints 2 and 3; on joint 4 they are yellow, the lateral one partly divided; broad black dorsal and lateral stripes on joints 5 to 12, the lateral one joined to a series of quadrate black patches in the centers of the segments; subventral region and bases of feet black; venter pale. On joint 11 posteriorly to the end of the body the black color again prevails, broken by a subdorsal and lateral white spot on joints 12 and 13. Thoracic feet and anal shield black.

*Cocoon.*—An open mesh of brown silk, in which the pupa has considerable play. The cast larval skin is included. The pupa is uniformly brown.

—Mr. Schwarz remarked shortly on the northward flight of the cotton worm moth (*Alabama argillacea*), a phenomonon which has not been observed in the city of Washington for about twenty-five years. During the present year, 1911, the moths were first observed in the city on September 19 and from that date they were observed almost daily until October 19, being present sometimes in enormous number of specimens. They were also observed on Plummer's Island, Mary-

land, on September 23 and October 3, where they were attracted by the acetylene light.

In this connection Doctor Howard stated that he and Dr. K. Escherich, of Tharandt, captured an apparently fresh female of the cotton moth on the window of a parlor car going into Chicago on the afternoon of September 25. He also stated the following instances of northern distribution for this autumn had come to him in his general correspondence:

Through the summer reports of damage by the larvæ came frequently from various parts of the South.

September 15, they were reported as ruining the cotton at Norfolk, Virginia. (T. C. Johnson.)

September 16, the moths were sent in from Romney, West Virginia, where they had been damaging peaches. (J. J. Cornwell.)

September 22, they were sent in from Lookout Mountain, Tennessee, where their occurrence in the house in numbers had alarmed the housekeeper. (Mrs. M. W. Gill.)

September 25, they were captured at Indiana, Pennsylvania, under an arc light, and sent to the Bureau. (G. W. Sloop.)

September 26, they were reported from Cincinnati, Ohio, as damaging ripe fruit, especially peaches, so that it was necessary to pick the fruit in order to save it. (J. Benckenstein.)

September 28, reported from Agate, Nebraska, as swarming about the lamps by thousands and being very annoying in houses. (S. D. C. Bassett.)

September 29, they were sent in as congregating about the arc lights in Cumberland, Maryland. (J. G. Lyon, Jr.)

The same date, they were received from Indianapolis, Indiana. (B. W. Douglass.)

The same date, from Richmond Hill, Long Island, New York. (W. A. Bernhard.)

September 30, Keokuk, Iowa, hundreds of the moths collected on windows and telegraph poles. (J. M. Shaffer.)

October 2 and 5, they were reported in occurring in mills at South Haven, Michigan. (H. Haupt, Jr.)

October 10, reported as occurring in the streets in New York City, Yonkers, Brooklyn, and Newark, and as occurring in numbers in the upper stories of tall buildings. (Theo. Mead.)

October 13, reported from Fairmont, West Virginia, as having been destroyed by the hundreds of thousands by the lights of the town. (H. A. Williams.)

October 18, Charleston, West Virginia, millions reported covering poles and the ground near electric light following an almost continuous rain for 24 hours. (W. O. Daum.)

October 19, reported as swarming in an orchard at Goodland, Indiana, by thousands. (Miss Myrtle E. Alter.)

October 20, Beaver Falls, Pennsylvania, moths flying about the lights at night in great numbers. (M. R. Tullis.)

October 30, correspondent at Shephard, Ohio, reported that one night in September a light shower fell and the next morning the premises were covered with these moths. (Mrs. Chas. Matthews.)

Mr. Gahan spoke of letters from four correspondents of the Maryland Experiment Station, which tell of extensive swarms of this moth in the western part of the State during the latter part of September and early part of October. The first letter is from D. W. Crowther, Smithsburg, Washington County, under date of September 20, and states that the moths are abundant in his peach orchard, and that they collect in large numbers on the specked fruit. September 28, Mr. Edward Harris, of Cumberland, Allegany County, sent specimens and stated that the moth was present in large numbers in the city of Cumberland. Again on October 4, Mr. Harris wrote that the moth was still plentiful and that it had been reported from Piedmont and Keyser, West Virginia.

October 2, a correspondent of a Baltimore paper, whose letter was referred to the experiment station for reply, wrote that Allegany County was deluged with the moths, which collected on the electric-light poles in such numbers as to cover them.

October 4, G. W. Thomas, of Adamstown, Frederick County, sent specimens and stated that they were abundant in his vineyard, where they were apparently eating the punctured grapes.

Numerous specimens were observed by the speaker on the windows of his home at Berwyn, Maryland, one evening during the first week in October.

## Meeting of December 7, 1911.

The 254th regular meeting was entertained in the Saengerbund Hall, 314 C street N. W., by Dr. L. O. Howard. President Webster occupied the chair and twenty-six members (Messrs. A. C. Baker, Banks, Barber, Busck, Caudell, Cory, Cushman, Dyar, Ely, Heidemann, Hopkins, Howard, Hyslop, Jenne, Fred Johnson, Knab, McAtee, Myers, Phillips, Rohwer, Sanford, Sasscer, Schwarz, Vickery, Viereck) and four visitors (Messrs. Demuth, Grosvener, Urich, and Siegler) were present. The minutes of the 253rd regular meeting were read and approved.

Mr. Rohwer read his report as Secretary-Treasurer. The Chair appointed Messrs. Banks and Caudell as auditors. Dr. Howard moved the report be accepted and placed on file and that the recommendations contained in it be referred to the executive committee.

The Chair introduced the subject of the approaching meeting of the A. A. A. S. with its attending corps of visiting entomologists. Motion was made (Schwarz), seconded (Knab), and carried that it is the sense of the Society that we entertain the entomological contingent at a smoker, the expenses to be paid by subscription. Mr. Schwarz stated that at an Executive Committee meeting he had been appointed a committee of one to investigate and find what arrangements could be made. That the only available place and time appears to be the Saengerbund Hall, Friday night, December 29. Motion to accept the arrangements as made was carried. Dr. Howard moved that Mr. Schwarz as chairman of the committee of one for these arrangements be authorized to increase its membership as desirable. Carried.

Mr. Schwarz moved the election of Dr. K. Escherich, of Tharandt, Germany. Carried.

Under new business Mr. Rohwer read the proposed amendments to the Constitution. Mr. Caudell moved their adoption, seconded by Mr. Knab. Carried. Mr. Rohwer moved that the Society publish the revised Constitution in the first number of the forthcoming volume. Seconded by Mr. Caudell. Carried.

The following officers were elected for the year 1912: President, A. L. Quaintance; First Vice-President, August Busck; Second Vice-President, A. N. Caudell; Recording Secretary, E. R. Sasscer; Secretary-Treasurer, S. A. Rohwer; additional members of Executive Committee, H. G. Dyar, Nathan Banks, and E. A. Schwarz. Prof. A. L. Quaintance was elected to represent the Society at the Washington Academy of Sciences.

Mr. F. W. Urich was called upon and gave a very interesting and detailed account of the spittle insect that is so injurious to sugar cane in Trinidad.

## THE CONSTITUTION OF THE ENTOMOLOGICAL SOCIETY OF WASHINGTON.

### Article I.—Name.

The name of this organization shall be The Entomological Society of Washington.

### Article II.—Objects.

The objects of the Society shall be to promote the study of Entomology in all of its bearings, to publish a magazine containing its proceedings and such papers as are accepted for publication, and to cultivate social and friendly relations between those in any way interested in the science.

### Article III.—Members.

Section 1. The Society shall consist of active, corresponding, and not more than ten honorary members. Active members must be residents of the cities of Washington, Baltimore, or vicinity. Corresponding members may be from any State or country. Honorary members can be selected only from among foreign entomologists.

Section 2. Any active member of the Society, in good standing, who may leave the cities above named to reside for a year or more elsewhere, may, on motion of any active member of the Society, or at his own request, be transferred to the list of corresponding members, and shall for the time of absence have the privileges of such members only.

Section 3. Candidates for active membership may be proposed at any stated meeting by any active member, but shall not be elected until the next following meeting, except upon the motion of some person other than the proposer, and upon

unanimous consent of those present. A two-thirds vote of the active members present shall be required to elect an active member. Corresponding members, except those who become such by removal, may be proposed in the same way as active members, but the name must be referred to the Executive Committee, who shall at the next meeting report on the same. A two-thirds vote of the active members present shall be required to elect. Honorary members shall be proposed only by the Executive Committee, and may be elected at any stated meeting without lying over as in case of active members. A unanimous vote of the active members present is required to elect. The election of active or corresponding members may be by ballot or viva voce. Honorary members shall be elected by ballot only.

### Article IV.—Officers.

The officers of the Society shall be a President, a First Vice-President, a Second Vice-President, a Recording Secretary, and a Corresponding Secretary-Treasurer, to be elected by ballot at the annual meeting. There shall be an Executive Committee consisting of the officers of the Society and three members to be elected by the Society in the same manner.

### Article V.—Duties of Officers.

Section 1. The President, or, in his absence, one of the Vice-Presidents, shall preside at the meetings of the Society and of the Executive Committee. It shall be the duty of the President to deliver an address at the closing meeting of the year.

Section 2. The Recording Secretary shall take and preserve a record of the Proceedings of the Society.

Section 3. The Corresponding Secretary-Treasurer shall conduct all of the official correspondence of the Society, shall keep a list of all the members, together with their addresses, and shall give due notice of all meetings. He shall have charge of all moneys of the Society, and shall make disbursements only under the direction of the Executive Committee. He shall collect all fees and assessments, and notify all members who are in arrears, and submit a report of the state of finances of the Society at the annual meeting, or whenever called for. He shall preserve all publications and other property belonging to the Society.

Section 4. The affairs of the Society shall be conducted by the Executive Committee, whose duty it shall be to act on nominations for membership, have direction of the finances,

audit the accounts of the Treasurer and provide for the meetings and for publication, and transact any other necessary business.

### Article VI.—Meetings.

The regular meetings of the Society shall be held, unless otherwise ordered, on the first Thursday of each month. The annual meeting for the election of officers and the delivery of the presidential address shall be the regular meeting for the month of December. The terms of office shall begin January first. Special and field meetings may be called by the Executive Committee. Not more than one half hour shall be devoted to the consideration of business at any regular meeting.

### Article VII.—Fees.

Section 1. The initiation fee of active members shall be one dollar; the annual fee shall be three dollars, due three months after election, except when elected three months or less previously to the annual meeting, when no fee shall be required for the year in which they are elected. Any active member in arrears for one year may, after one month's notification, be dropped from the rolls. No member in arrears shall be entitled to vote.

Section 2. Corresponding members shall pay no initiation fee, but shall pay an annual fee of two dollars, due three months after election and at the first of each following year.

### Article VIII.—Amendments.

The Constitution of the Society may be amended at any regular meeting of the Society by two-thirds vote of the active members present, providing that such amendment has been passed by the Executive Committee and presented to the Society at least one month previously.

### Article IX.—Order of Business.

The order of business at the regular meetings, unless othwise ordered by the Executive Committee, shall be as follows:

1. Reading and approval of minutes.
2. Report of officers and committees.
3. Election of members.
4. Miscellaneous business.
5. Reading of papers, discussions, and exhibition of specimens.

The following papers were accepted for publication:

## ON THE PROBABLE OCCURRENCE OF THE MYMARID GENUS DICOPUS ENOCK IN FIJI.

By A. A. Girault.

Several months ago I sent in the manuscript of a paper describing a North American species of Mymaridæ from a single male specimen sent to me from Canada and which I named *Dicopus halitus*. While on my way to Australia in September, 1911, I had an opportunity of stopping off for a few hours at Suva, Fiji, and during that time managed to collect a few parasitic Hymenoptera. Among these was a single male mymarid generically allied with the American form *halitus* and which also must be for the present referred to the same genus. This Fijian species, like the American form, is very minute, also extremely delicate, and was extraordinarily difficult to capture; it was moving slowly over the pane of a window, but I was not able to keep sight of it for more than the fraction of a second at a time. This fact, taken in conjunction with its fragility, made it necessary to spend three-quarters of an hour in effecting its capture. Thereafter I was exceedingly fortunate in being able to transfer it to a slide of xylol balsam, considering the circumstances and lack of facilities for such work. Whether the species is indigenous to the Fiji Islands or not cannot now be determined, especially since our knowledge of the Mymaridæ is so scanty.

For obvious reasons I believe it incumbent on me to describe the form, which is done herewith:

**Dicopus psyche,** new species.

Position normal; abdomen sessile; tarsi 5-jointed.

*Male*.—Length, 0.20 mm. Very minute; visible as a mere fleck of dust. General color grayish, the legs and antennæ concolorous; fore wings characteristic because of the fact that they are clouded throughout, but in the distal part of the wing blade the clouded area is more confined to the midlongitudinal line of the wing and is consequently margined with a hyaline area in that part. The edges of the fore wing are as usual yellowish. Distal half of the abdomen and coxæ darker; trochanters pallid.

The same as *Dicopus halitus* Girault, but differing in the following structural characters: In the fore wing there is no midlongitudinal line of discal cilia in the distal part of the blade; excepting a single short line of two or three minute setæ, and along each side, between the margin and the middle line, a single line of larger setæ, this line extending to the apex along each side; the middle line is obscure and at the base of the distal third of the wing and does not reach the apex

by some distance. In the antenna a marked difference in that the second funicle joint is not abruptly narrower and slightly shorter than the first, but of equal width and distinctly longer (nearly twice longer); the scape is long, thrice or more the length of the pedicel; the first funicle joint is subequal in length to the pedicel; funicle joints 3 and 4 are subequal, longest of the funicle, each a fourth or more longer than funicle joint 2; funicle joints 5, 6, and 7 subequal, shorter, each slightly longer than joint 2 of the funicle, 8 and 9 subequal, slightly longer, club joint conical, somewhat shorter than funicle joint 9. Scape by far the longest antennal joint. Pubescence of antenna inconspicuous.

*Female.*—Unknown.

Described from a single male specimen captured from the pane of a window in a woodworker's shop, Suva, Fiji, during the afternoon of September 22, 1911. A species characterized by the color of the wings, the grayish body color, and structurally by the slender and moderately long second joint of the antennal funicle.

*Host:* Unknown.

*Habitat:* Fijian Islands (Suva).

*Type:* No. 14483, U. S. National Museum, Washington, D. C.; one male in balsam.

## A NEW SPECIES OF THE MYMARID GENUS POLYNEMA HALIDAY FROM BRITISH COLUMBIA.

By A. A. Girault.

The following new species is not included within the census of Mymaridæ of North America recently published by me.* It seems to be quite distinct from any of the forms so far described from the United States or Mexico and is the first species of the genus to be recorded from Canada. A second species, common in the United States, is also recorded from Canada.

### Family MYMARIDÆ.

### Subfamily MYMARINÆ.

### Tribe MYMARINI.

### Genus POLYNEMA Haliday.

**1. Polynema striaticorne** Girault.

A single female specimen of this species was captured by sweeping in original forest, Stanley Park, Vancouver (B. C)., Canada, September 5, 1911. It had broader fore wings than

*Trans. American Ent. Society, Phila., xxxvii, pp. 253-324.

usual and the caudad coxæ were more yellowish than with the average specimen of the species.

**2. Polynema regina,** new species.

Position normal.

*Female.*—Length, 0.90 mm.; moderately small for the genus. General color black; legs, petiole of abdomen, antennal scape, and pedicel intense orange yellow, the former tinged with dusky only in places—the cephalic femora at proximal third and all tibiæ slightly along their middles exteriorly; distal tarsal joint, however, black; first four funicle joints of antennæ diluted with yellowish. Wings hyaline.

Another species falling within the group of allied species containing *consobrinus* Girault, *aspidioti* Girault, *striaticorne* Girault, *howardii* Ashmead, *euchariformc* Haliday, and *brittanum* Girault, but resembling more nearly the first.

It differs from it as follows: In the nearly uniformly intense yellowish legs, antennal scape and pedicel, and abdominal petiole; then in the shape and ciliation of the fore wings—the discal ciliation is somewhat coarser, the individual cilia somewhat longer, but there are about the same number of longitudinal lines; the marginal cilia are distinctly longer at all margins, the longest (caudo-distad) about three-fourths the wing's greatest width; those at the apex of the wing are nearly as long as the longest cilia of the fore wing in *consobrinus;* the longest are twice the length of the longest cilia of the caudal wing, which is not true for *consobrinus*, where the the two sets of cilia are more nearly equal. The proximal tarsal joints are somewhat longer in *regina*. Otherwise about the same.

*Male:* Unknown.

Described from a single female specimen captured with the species recorded above.

*Habitat:* Canada—Vancouver, British Columbia.

*Type:* No. 14512, U. S. National Museum, Washington, D. C., one female in xylol balsam (mounted on a slide with a specimen of *striaticorne* and a proctotrypoid).

A species characterized by the intense orange-yellow legs, the short proximal funicle joint of the antennæ (distinguishing it from such species as *pscecas* Girault and *cnockii* Girault) and the shape and ciliation of the fore wings. It should also be compared with the species like *maculipes* Ashmead, *zetes* Girault, and *longipes* Ashmead.

## A REVISION OF THE GENUS LASCONOTUS ER.

(Coleoptera; Colydiidæ.)

By E. J. Kraus.*

Since 1890, when Colonel Casey published descriptions of several new species of *Lasconotus*, practically nothing has been written concerniug the species occurring in the United States. In the interval several new forms have accumulated, and the present opportunity is taken to describe them and make a complete revision of the genus.

In the synopsis of species will be found the type locality of each species, and under the discussion of species will be found a complete list of localities from which specimens have been examined. The designation Hopk. U. S. refers to specimens in the Forest Insect Collection, largely collected by Dr. A. D. Hopkins, H. E. Burke, J. L. Webb, and W. F. Fiske during investigations in the Branch of Forest Insect Investigations of the Bureau of Entomology. The designation U. S. N. M. refers to specimens in the U. S. National Museum. For the latter, credit is given in each case, where known.

I wish to express my sincerest thanks and appreciation to Mr. E. A. Schwarz, who turned over to me the abundant material in this group in the U. S. National Museum for study, and to whom I am greatly indebted for more numerous kindly helps and suggestions throughout the preparation of this paper than I can well enumerate; to Dr. A. D. Hopkins, who has kindly allowed me free use of all the material and notes in the Forest Insect Collection; to Mr. S. Henshaw, of the Museum of Comparative Zoology, at Cambridge, Mass., for the privilege of making a personal examination of the LeConte types; to Dr. H. Skinner, of the Philadelphia Academy, who extended a like courtesy with respect to the Horn types; and especially to Mr. W. F. Fiske, who most generously allowed me the use of his unpublished systematic notes on this genus.

The genus *Lasconotus* was described in 1845 by Erichson, who based his description on an undescribed species from Mexico. He characterizes it as follows:

> Die Schienen an der Spitze ein wenig erweitert, und hier ausser den kleinen Enddornen noch mit feinen Dörnchen besetzt. Die drei ersten Glieder der Füsse gleich kurz. Fühlerkeule dreigliedrig. Körperform und fast auch die Sculptur von Ditoma. Die Augen vollkommen rund, ganz unter dem Seitenrande der Stirn liegend, welcher sich oberhalb derselben bis zum Scheitel fortsetzt. Die Spitze der Mandibeln zweizähnig. Die Fühlerrinnen auf der Unterseite des Kopfes undeutlich. Eine neue Art aus Mexico.

*This paper was written by the author while in the employ of the Bureau of Entomology, U. S. Department of Agriculture, under the direction of Dr. A. D. Hopkins, in charge of forestry insects.

Dr. LeConte in 1859 first recognized the genus in America and referred to it a new species, *L. complex*, which, being the species first described in the genus, should stand as its type.

In 1866 Pascoe erected the genus *Illestus*, and referred to it a new species from Mexico, *I. terrenus* Pasc. He separates this genus from *Lasconotus* mainly by the character of not having the side margins of the head covering the eyes. As pointed out by Dr. Horn (1878), this character is well marked in but a few species, becoming gradually less until it is scarcely traceable, and he concludes that *Illestus* is synonymous with *Lasconotus*. I have seen three specimens of *I. terrenus* Pasc. collected at Toluca, Mexico, and determined by Dr. Sharp. They are quite different from any *Lasconotus* known to me in the following readily observable characters. The anterior coxal cavities are apparently open, but in fact very narrowly closed behind, the tibiæ scarcely everted externally and armed with a row of close-set spines instead of two prominent spines and several small ones, and the terminal segment of the maxillary palpi truncate, not at all rounded at the apex. In Pascoe's figure the antennæ are shown as twelve-segmented. This is obviously an error in drawing; it is not observable in the specimens.

The genus *Lasconotus* is quite readily divisible into well-marked groups, but there seems to be no sufficiently well-defined, constant structural character for separating them as distinct genera. The fore tibiæ are usually everted externally, though in some species merely rounded, and always armed at the apex with two prominent spines. Several smaller spines extend from the outer to the inner apical angle, which is armed with two short, straight spurs. The anterior coxal cavities are closed behind the posternal epimera, broad behind the coxæ. There is considerable range in size and general outline, though within the species these characters are very constant. The head, antennæ, ventral surface, and especially the elytral and pronotal sculpture, furnish excellent and remarkably constant taxonomic characters.

Very little is known concerning the exact habits of the species. They are usually found associated with various scolytids inhabiting coniferous trees. Principal among these are *Pityophthorus* (*Tomicus*), and at least two species are found with *Phlœosinus*. Whether they are commensals or predaceous is not well known. The mouthparts, so far as I have examined, would indicate a predaceous habit, but even if so, whether they prey upon the scolytids themselves or the

numerous other insects found in their galleries is still an open question. The larva is also so far unknown.

In the following synopsis and descriptions the sutural interspace in either elytron is considered as the first. The odd interspaces (1, 3, 5, 7, etc.) are always the more elevated, while the even (2, 4, 6, etc.) are frequently so flattened and unarmed as to appear obsolete, or nearly so, and in such instances the intervals between the costæ have apparently a double row of punctures, which character is frequently mentioned in former descriptions. In no instance are the even interspaces truly obsolete, however, and I have mentioned them throughout the descriptions.

The locality given under each species is the *type locality*. A full list of localities from which specimens were at hand is given at the end of the brief summary of each species following the synopsis:

## SYNOPSIS OF SPECIES.

Pronotum subquadrate, with a distinct broad longitudinal impression just within the side margins, extending from anterior to posterior margin..... DIVISION I

Pronotum of varying shape, very narrowly or not at all margined, never with broad longitudinal impression from posterior to anterior margin..... DIVISION II

### DIVISION I.

Interspaces 1, 3, and 5 equally elevated from base to apex; pronotum subquadrate, its side margins straight, not narrowed behind..... SUBDIVISION A

Interspaces 3 and 5 more elevated than 1, and 3 decidedly more elevated from vertex to apex than 5; prothorax more or less narrowed posteriorly..... SUBDIVISION B

### SUBDIVISION A.

Length 2.5 mm. Light ferruginous, elytra parallel, even interspaces appearing obsolete, margins of head very strongly reflexed, front granulate, with a prominent acute longitudinal median tubercle, pronotum as wide as elytra at base, pronotum with two pairs of longitudinal costæ, the outer pair nearly straight on anterior margin, joined in a broad U curve to the middle pair, the latter tortuous, broken at posterior 3 4, but continued parallel and in closer approximation to the posterior margin, where they are joined by a transverse ridge..... *mexicanus*, n. sp.

Mexico (Guanajuato.)

SUBDIVISION B.

Pronotum, when viewed from side, with a strong flexure anterior to middle..... SECTION A1

Pronotum, when viewed from side, straight, without flexure. SECTION A2

SECTION A1.

Length 3.8 mm. Castaneous, elytra slightly narrowed anteriorly, margins of head but slightly flexed, front faintly concave, granulate, epistoma with anterior margin deeply acutely emarginate, prothorax with the side margins acutely angled slightly anterior to middle posterior, to which they are straight and convergent; two pairs of dorsal longitudinal costæ, the outer pair obtuse, feebly sinuate, the inner pair tortuous, dichotomous, near either extremity the branches again united at either margin; even interspaces of elytra a little narrower than strial punctures, the latter regular, subquadrate..... *flexuosus*, n. sp.

Washington (Hoquiam.)

SECTION A2.

Length 4 mm. Piceous, pronotum with two distinct pairs of longitudinal costæ, the middle pair equally elevated throughout, irregularly curved, broken at posterior 1/4, then continued in closer approximation and slightly diverging to posterior margin, outer pair sinuate and broadly joined to inner or outer margin; margins of prothorax broadly rounded, head faintly concave, epistoma slightly elevated, anterior margin deeply rather than broadly emarginate; elytral sculpture as in the preceding..... *complex* Lec.

California (Punto de Los Reyes).

Length 3.7 mm. Piceous, pronotum with middle pair of pronotal costæ broken up into acute elevations connected by feebly elevated ridges, these elevations form an almost perfect square at centre of pronotum, posteriorly and anteriorly, however, represented by two acutely elevated lines, outer pair joined to inner pair on anterior margin in a broad U curve, becoming obsolete or but feebly elevated posteriorly; side margins of prothorax broadly curved, scarcely narrowed posteriorly, posterior angles acute and noticeably curved backward; elytral sculpture and structure as in *flexuosus;* head similar to *complex*, but with epistoma more convex and its anterior margin very feebly broadly emarginate.

*tuberculatus*, n. sp.

South Dakota (Elmore).

DIVISION II.

Interspace 5 not decidedly more elevated than 3, elytra convex or flat, never strongly concave..... SUBDIVISION C
Interspace 5 decidedly more elevated or broader than 3, elytra usually concave dorsally..... SUBDIVISION D

SUBDIVISION C.

With none of the interspaces elevated, but in their place slightly broader, flattened, nude, and impunctate intervals which are interrupted at long distances by small tumid elevations, bearing a dense tuft of whitish setæ..... SECTION A3
With the alternate interspaces strongly elevated or but very feebly elevated and crested with silvery setæ..... SECTION A4

SECTION A3.

Length 2.7–3.4 mm. Prothorax fully as wide anteriorly as long, strongly narrowed from apex to base, the sides broadly strongly sinuate throughout, dorsal area granulato-punctate, the costæ obtuse, crested with yellowish pubescence.
*nucleatus* Casey

California (Monterey).

SECTION A4.

Pronotum with three pairs of more or less clearly defined, obtuse, feebly elevated, tortuous, interlacing costæ crested with silvery pubescence..... SUBSECTION B1
Pronotum with one or two pairs of obtuse costæ either straight or occasionally sinuate..... SUBSECTION B2

SUBSECTION B1.

Elytra with interspaces 3, 5, and 7 with a double or triple row of very short setæ, greatly more elevated than even interspaces, strial punctures deep, regular, well defined, without setæ..... SERIES C1
Elytra with interspaces 3, 5, 7 with a single row of long overlapping setæ, scarcely more elevated than even interspaces, but clearly distinguished from them by bearing the long setæ, strial punctures each with a bristle pointed obliquely backward..... SERIES C2

SERIES C1.

Length 3 mm. Body ferruginous, prothorax broader than long.
*borealis* Horn

Michigan (Marquette).

Length 3.2 mm. Body piceous, prothorax longer than broad, posteriorly narrower than elytra, sides strongly sinuate and narrowed posteriorly, posterior angles acute, anterior broadly rounded; head longer than broad, front granulate,

broadly impressed at either aide, side margins scarcely reflexed, diverging posteriorly; elytra subparallel, interspaces 3 and 5 about equally elevated, strial punctures regular, deep, subquadrate..... *intricatus*, n. sp.
Washington (Hoquiam).

SERIES C2.

Length 2.4–2.6 mm. Piceous, extremely narrow, ninth joint of antennæ much shorter and narrower than tenth; prothorax with with side margins, broadly feebly sinuate, convergent posteriorly and with few coarse sharp granules, anterior angles broadly rounded, posterior obtuse..... *pertenuis* Casey
California (Monterey).

Length 2.7 mm. Piceous, broader linear, ninth joint of antennæ at least as long and broad as tenth; prothorax with side margins strongly sinuate, convergent posteriorly, the marginal granules fine and very densely placed, anterior angles subacute, posterior broadly rounded..... *linearis* Crotch
California (Santa Inez Mountains).

SUBSECTION B2.

Pronotum with median impression not attaining the posterior margin but with two distinct oval impressions at either side and posterior to it..... SERIES C3

Pronotum with median impression broad, usually attaining the posterior margin, and with two short parallel acute costæ within it posteriorly..... SERIES C4

SERIES C3.

Pronotum subquadrate, anteriorly as wide as elytra at base or but faintly narrower..... SUBSERIES D1

Pronotum longer than wide, narrower than elytra, the sides nearly parallel..... SUBSERIES D2

SUBSERIES D1.

Length 3.4–3.7 mm. Interspace 3 elevated from base to near vertex, where it is rather abruptly terminated and replaced by a shining faintly to distinctly punctured area; front of head flattened and faintly punctured, becoming roughly tuberculated towards side margins..... *apicalis* Casey
California (Santa Cruz County).

Length 3.4 mm. Interspace 3 elevated throughout, sometimes slightly flattened or obsolescent just at the apex; prothorax subconvex, side margins straight, narrowed posteriorly, anterior angles obtusely rounded, posterior rectangular, median impression irregularly suboval, posteriorly a smaller elongate impression at either side, surface densely evenly granulate with indistinct, tortuous, feebly obtusely elevated

costæ; elytra flattened, slightly narrowed towards base, interspaces 1, 3, 5, and 7 obtusely elevated, even interspaces slightly narrower than strial punctures, the latter close set, regular, deep, subquadrate, head with side margins scarcely reflexed, divergent posteriorly, front densely granulate, the granules coarser towards the sides..... ..... *schwarzi*, n. sp.
British Columbia (Vancouver).

SUBSERIES D2.

Length 3 mm. Head coarsely densely granulate, prothorax longer than wide, sides nearly parallel and straight, anterior angles rather obtuse, posterior angles sharply rectangular. *vegrandis* Horn
California (Berkeley).

SERIES C4.

Pronotum without distinctly elevated costæ between median impression and the margin..... SUBSERIES D3
Pronotum with a distinct costa between median impression and margin..... SUBSERIES D4

SUBSERIES D3.

Length 2 mm. Median impression of pronotum strongly impressed, the hooked-formed elevations on anterior margin distinct, easily traceable..... *referendarius* Zimm.
District of Columbia to Florida.

SUBSERIES D4.

Length 3 mm. Punctures of elytra striæ about as wide as even interspaces; pronotum longer than wide, sides very broadly curved and narrowed posteriorly, median impression distinctly impressed, costa between margin of pronotum and margin of median impression strongly sinuate anteriorly, joined in a broad U curve to elevated margin of concavity, surface coarsely evenly granulate..... *servus* Horn
California

Length 2.5 mm. Punctures of elytra striæ comparatively large, even interspaces obsolete or nearly so. Body very slender, castaneous, legs and antennæ a little lighter; pronotum a little longer than broad, its sides nearly straight or slightly convergent posteriorly, anterior angles broadly rounded, posterior subrectangular to rounded, a fine, straight, very feebly elevated costa between median impression and margin, median impression suboval, shallow, its margins retuse; extending into the impression for about one-fourth its length are two pairs of acutely elevated lines, the one from the anterior and the other from the posterior margin, the latter pair joined by a transverse curved ridge; surface

densely granulate, coarser in impression, pubescence fine, inconspicuous. Elytra with the sides parallel, interspaces 1, 3, 5, etc., very narrowly, acutely, evenly elevated throughout their length, strial punctures coarse, close set, even interspaces appearing obsolete, the oblique setæ yellowish, exceedingly fine, scarcely perceptible. Head with side margins strongly reflexed, slightly diverging posteriorly, front rather coarsely evenly granulate, with a distinct median tubercle..... *simplex* Lec.

Lower California (Cape San Lucas).

Length 2.2 mm. Species stouter, fuscous, legs, and antennæ ferruginous; pronotum longer than broad, narrower posteriorly than elytra at base, side margins straight or feebly arcuate, convergent posteriorly, anterior angles very broadly and the posterior obtusely rounded, median impression broadly impressed, elongate, attaining the anterior margin, two pairs of short acutely elevated costæ extending into it for about one-fourth its length one pair from anterior and the other pair from posterior margin, a feebly elevated sinuous costa between impression and margin, surface densely evenly granulate, coarser in impression, the pubescence, especially on the costæ, silvery and very conspicuous. Elytra noticeably flattened dorsally, parallel, interspaces 1, 3, 5, and 7 equally feebly rather obtusely elevated and finely tuberculated, even interspaces appearing nearly obsolete, finely granulate, each granule bearing a conspicuous seta obliquely inclined posteriorly. Head with side margins strongly reflexed, front densely evenly granulate, with a prominent median longitudinal strongly elevated ridge.

*planipennis*, n. sp.

Arizona (Grand Canyon Station).

SUBDIVISION D.

Pronotum with a distinct longitudinal elevated costa between the median impression and the lateral margins..... SECTION A5

Pronotum without trace of such costa..... SECTION A6

SECTION A5.

Length 2 mm. Body stout, pronotum about as wide as long, posteriorly narrower than elytra, sides nearly straight and convergent posteriorly, median impression broad, deep, a pair of very short acutely elevated lines within it at anterior margin and a similar pair very poorly defined or obsolete at anterior margin at either side, a single longitudinal costa between impression and side margin, surface densely evenly covered with sharp setigerous granules, which become coarser and tuberculate within the impression; elytra broad,

narrowed toward base, dorsal area slightly concave, interspaces 1 and 3 about evenly elevated, 5 somewhat more than 3, especially toward apex, the former joins 7, then is strongly angled and curved inward, joins 3, and proceeds to apex, where it joins 9 and 1, a very noticeable character; even interspaces appearing obsolete, strial punctures close set, large, each with a bristle pointed obliquely backward, front of head concave, densely granulate, with prominent median tubercle..... *fiskei*, n. sp.

Texas (Montell).

Length 2.3 mm. Body stout, pronotum subquadrate, narrowed posteriorly, side margins broadly evenly arcuate, median impression deep, broad, within it a pair of approximate tubercles close to anterior margin and a pair of acutely elevated parallel lines extending from posterior margin anteriorly for one-fourth the length of the pronotum; at either side an acutely elevated costa, nearly straight from posterior to anterior margin, where it curves inward and joins the marginal tubercle; elytra narrowed anteriorly, strongly concave, interspaces 1 and 3 finely, acutely, evenly elevated from base to apex, 5 greatly elevated, much more than 3, straight to near apex, where it joins 7, is then strongly curved inward, and extends as an elevated ridge to the apex, joining also 3 and 1; even interspaces appearing obsolete, strial punctures dense, close set, coarse, equally distinct throughout, head and the margins strongly reflexed and elevated over the eye; front densely evenly granulate with prominent longitudinal median tubercle.

*bitomoides*, n. sp.

Arizona (Flagstaff).

SECTION A6.

Anterior margin of pronotum with two curvate elevations. SUBSECTION B3

Anterior margin without curvate elevations..... SUBSECTION B4

SUBSECTION B3.

Margins of median impression of pronotum broadly arcuate and slightly converging posteriorly; interspace 3 distinctly elevated from base for at least three-fourths its length... SERIES C3

Margins of median impression sinuate, scarcely or not at all convergent posteriorly; interspace 3 not distinctly elevated beyond its anterior fourth..... SERIES C4

SERIES C3.

Length 2.5–3 mm. Pronotum longer than wide, posteriorly faintly narrower than elytra at base, shining, side margins nearly straight, slightly convergent posteriorly, median impression with a distinct median carina, punctures very fine, simple,

not at the apices of rather coarse tubercles; elytra narrow, faintly more narrowed and concave posteriorly, interspace 1 straight, rather abruptly thickened toward apex, 3 feebly but almost evenly elevated throughout, 5 strongly elevated, more so towards apex, strial punctures small, close set, traceable throughout..... *pusillus* Lec.

District of Columbia to Texas.

Length 2.5 mm. Pronotum subquadrate, subopaque, slightly narrower than elytra, side margins broadly arcuate, scarcely converging posteriorly, median impression without median carina, the punctures, however, situated on the summits of coarse, feebly elevated tubercles; elytra rather broad, interspace 1 not at all more thickened towards apex, in most examples less so, 3 distinctly subobtusely elevated throughout, more strongly at base, 5 strongly elevated to near apex, where it is abruptly flattened, strial punctures very distinct, very readily traceable throughout..... *subcostulatus*, n. sp.

Idaho (Centerville).

SERIES C4.

Length 3 mm. Pronotum subquadrate, opaque, scarcely at all rounded posteriorly, but the posterior angles very broadly rounded, median impression very broad, its margins acute, nearly parallel and not attaining either anterior or posterior margin, anterior margin with two curvate elevations, including margins of impression; elytra broad, strongly concave posteriorly and with the base strongly emarginate, interspace 1 feebly evenly elevated to near apex, where it is rather strongly thickened, 3 strongly, sharply elevated at base for about one-fourth its length, then flattened and traceable for about to near apex, where it is confused with 1, 2, and 4; 5 very strongly elevated to near apex, where it is gradually flattened and curved inward to the apex, strial punctures to interspace 5 scarcely visible, striæ appearing as feebly impressed narrow lines..... *laqueatus* Lec.

Arizona.

SUBSECTION B4.

Length 2.8 mm. Pronotum broader than long, posteriorly slightly narrower than elytra at base, the side margins broadly curved and narrowed posteriorly, median impression very broad, deep, its margins broadly curved, punctures very fine, simple; anterior margin of prothorax without trace of curvate elevations; elytra very broad and concave, interspace 1 just visibly elevated, 3 elevated at base for about one-sixth or one-seventh its length, then flattened, but traceable to apex, 5 strongly acutely elevated from base to

near apex, where it is rather abruptly flattened, strial punctures small, elongate, the striæ appearing as feebly though distinctly impressed lines..... *concavus* Casey
New Mexico (Las Vegas).

**Lasconotus mexicanus,** new species.

*Type:* No. 14185 U. S. N. M. One specimen from the late Dr. E. Dugès, Guanajuato, Mexico.

This species resembles *L. complex* Lec. in many respects, but is readily distinguished by the characters given above. It differs from the other species in the group in having the third interspace not more elevated at the apex than the fifth and by its much smaller size.

**L. flexuosus,** new species.

*Type:* No. 14186 U. S. N. M. Hopk.; U. S. No. 2289d1.

A single specimen collected by H. E. Burke, at Hoquiam, Washington. A remarkably distinct species somewhat allied to *complex*, but very different in prothoracic structure.

**Lasconotus complex** Lec. 1859, p. 282.

One of the larger species and the first representative of the genus to be described. Associated with various scolytids in galleries and beneath bark of Monterey and lodgepole pine and Sitka spruce. Represented by some fifty specimens.

Hopk. U. S.—California: Monterey. Utah: Kamas. Washington: Hoquiam, Satsop.

U. S. N. M.—California: Placer County (Hubbard & Schwarz, Koebele). Oregon: Clatsop. Washington: Spokane Falls. Vancouver, British Columbia. Dr. Horn also records Nevada.

**Lasconotus tuberculatus**, new species.

*Type:* No. 14187 U. S. N. M., Hopk. U. S. No. 989ad, one of the five collected by J. L. Webb, at Elmore, South Dakota.

Closely allied to *complex* Lec., but easily distinguished by the fact that the inner pair of costæ are interrupted for long distances by flattened areas bearing rather sharp elevations, whereas in the former they are continuous throughout. There is very little variation, except slightly in size. Associated with various scolytids in galleries and beneath bark of *Pinus ponderosa*, *strobiformis*, *Picea engelmanni*, and *Pseudotsuga taxifolia*. More than 90 specimens have been examined.

Hopk. U. S.—Arizona: Chiricahua Mountains, Flagstaff, Santa Catalina Mountains. California: Las Animas County.

Colorado: Beulah, Palmer Lake, San Isabel National Forest. New Mexico: Capitan Mountains, Cloudcroft, Meeks, White Mountains. South Dakota: Black Hills, Custer, Elmore, Lead, Nemo. Utah: Panguitch. Washington: Hoquiam. Wyoming: Hayden National Forest.

U. S. N. M.—Arizona: Chiricahua Mountains.

**Lasconotus borealis** Horn. (Proc. Amer. Philos. Soc., XVII, 1878, p. 570.)

Medium-sized, slender species, the pronotal structure very similar to *linearis* Crotch, and the elytral structure allied to *flexuosus*, being, however, relatively more convex and the odd interspaces equally elevated throughout. I have seen but four specimens, one bred from spruce infested by *Pityophthorus*, from Grand Island, Michigan. Another taken by Mr. E. A. Schwarz on birch or alder at Marquette, Michigan, which Mr. Schwarz tells me is one of two taken by him at the same time. The other was given to Dr. LeConte. Dr. Horn described it and it is now in the LeConte collection. The fourth is in the Horn collection and is from the White Mountains, New Hampshire.

**Lasconotus intricatus** new species.

*Type:* No. 14188, U. S. N. M.; Hopk. U. S. No. 4020–1, one of three specimens collected by Mr. H. E. Burke at Hoquiam, Washington, under bark of *Picea sitchensis*.

This species is very closely allied to *borealis*, but is readily distinguished by its relatively more slender prothorax and much darker color.

**Lasconotus nucleatus** Casey. 1890, p. 314.

A most remarkable and distinct species. It differs from every other in the genus by its peculiar elytral structure, having none of the interspaces elevated throughout, but instead the odd interspaces are broader, flattened, but interrupted at long distances by small tumid elevations bearing a dense tuft of whitish setæ.

A series of 15 specimens shows very little variation, except very slightly in size and a few examples have the anterior margins of the prothorax more broadly rounded. Mr. Schwarz tells me he collected the specimens on twigs of *Pinus radiata* infested by *Pityophthorus* sp.

U. S. N. M.—California: Eureka (H. S. Barber), Monterey (E. A. Schwarz). Oregon: Astoria (Hubbard & Schwarz).

**Lasconotus pertenuis** Casey. 1890, p. 313.

The most slender species of the genus, very closely allied to the following, though easily recognized by the antennal structure and much smaller, narrower body and the coarser interruptions of the margins of the prothorax. I have seen but two specimens taken at Santa Cruz Mountains, California, by Mr. A. Koebele, and two in the LeConte collection from California. Colonel Casey's specimens are from Monterey.

**Lasconotus linearis** Crotch. 1874, p. 75.

This species and the preceding are peculiar in showing a tendency towards color markings on the elytra, which have the base and apex chestnut brown, the remainder dark piceous. Described from material "under" bark of sycamore or small forest tree at the Hot Springs in the Santa Inez Mountains (Crotch). There is very little variation in the series of four specimens examined, except in some the light markings of the elytra are more distinct. They were collected by beating young pine trees. If Crotch's specimens really came from beneath the bark of sycamore it is remarkable.

U. S. N. M.—California: Los Gatos (E. A. Schwarz).

There are also four specimens of this species in the LeConte collection from California.

**Lasconotus apicalis** Casey. 1890, p. 315.

One of the larger species closely allied to *vegrandis*, but easily separated by the elytral structure and the shape of the prothorax as noted in the synopsis. In this species is seen the beginning of the union of interspaces 5 and 7, which are then prolonged as a single elevation toward the apex, a character which reaches its extreme development in *bitomoides*, and also the reduction of interspace 3, which is most extreme in *concavus*. There is some variation in this species in size and especially the amount of reduction of interspace 3 at the apex. In some specimens the smooth, unelevated area is of considerable extent, perhaps one-third the length of the interspace, while in others it is limited to one-fifth or one-sixth the length. Associated with *Phlœosinus* sp. in 'Cedar' and *Cupressus macrocarpa*.

Hopk. U. S.—California: Monterey.

U. S. N. M.—California: Los Gatos.

**Lasconotus schwarzi**, new species.

*Type:* No. 14189 U. S. N. M., collected by Hubbard & Schwarz at Victoria, Vancouver Island.

This species is most closely allied to *vegrandis*, but differs markedly from it, in its larger size, broader, flatter body, and prothoracic structure. A series of 15 specimens showing some variation. Some specimens have the prothorax more narrowed posteriorly, but are otherwise typical. Associated with scolytids in Douglas fir and pine. Named for Mr. E. A. Schwarz, who collected the examples.

Hopk. U. S.—Idaho: Centerville. Washington: Rock Creek.

U. S. N. M.—Vancouver Island (Victoria). Washington: Tenino (Hubbard & Schwarz.)

**Lasconotus vegrandis** Horn. 1885, pp. 140–141.

This species is readily distinguished from *schwarzi* by its more slender form, the more sharply produced posterior angles of the prothorax and more delicate structure throughout. A series of six specimens showing but little variation. Associated with *Phlœosinus* sp. in *Thuja*.

Hopk. U. S.—California: Wawona.

A single specimen in the Horn collection from California.

**Lasconotus referendarius** Zimm. 1869, p. 254.

An exceedingly minute, distinct species, easily known from *simplex*, its nearest ally, by the deep median impression of the pronotum and the more distinctly thickened apical margin of the same. A series of some 70 specimens shows very little variation except slightly in size and some have the anterior elevations of pronotum more acute. Associated with various scolytids under bark of *Pinus strobus*, *palustris*, *virginiana*.

Hopk. U. S.—Alabama: Montgomery. District of Columbia: Rock Creek Park. North Carolina: Biltmore, Chadbourne, Hendersonville, Pink Beds, Pisgah Ridge, Tryon. Texas: Deweyville, Kirbyville. Virginia: Richardsville.

U. S. N. M.—District of Columbia (Hubbard & Schwarz, Linell). Florida: Tampa, Crescent City, Biscayne (Hubbard & Schwarz). Georgia: St. Catherine Island. Texas (Belfrage).

**Lasconotus servus** Horn. 1885, p. 141.

This species is not closely allied to any other; it resembles *referendarius* in elytral characters and the following species in pronotal structure, though in both cases this resemblance is but slight. The wide, flat, even interspaces are a striking character. I have seen but 5 specimens, which are very constant. They occur under bark of yellow pine, associated with *Pityophthorus* sp.

Hopk. U. S.—California: Yosemite Valley.
U. S. N. M.—Arizona: Williams (Barber & Schwarz).

**Lasconotus simplex** LeConte. 1866, p. 378.

Readily recognizable by its linear form, acute, narrow, equally elevated, odd interspaces of the elytra and the very coarse strial punctures. It is at once separated from *planipennis* by its smaller size, narrower form, shallower pronotal impression, and less conspicuous pubescence. A series of 11 specimens show more than the usual specific variation. Some specimens have the pronotum more narrowed posteriorly, the median impression deeper and nearly attaining anterior margin, and the sculpture stronger throughout. Associated with *Pityophthorus* sp. in *Pinus ponderosa* and *P. strobiformis*.

Hopk. U. S.—Arizona: Santa Catalina Mountains, New Mexico: Cloudcroft.

U. S. N. M.—Arizona: Chiricahua Mountains (Hubbard & Schwarz). New Mexico.

**Lasconotus planipennis,** new species.

*Type:* No. 14190, U. S. N. M.; Hopk. U. S., No. 5097. One of eight specimens collected by J. L. Webb at Grand Canyon, Arizona.

The main differences between this species and *simplex* are pointed out under that species. A series of 24 specimens showing some variation, more especially in size and color. Associated with scolytids in *Pinus edulis*, *murrayana*, and *strobiformis*.

Hopk. U. S.—Arizona: Grand Canyon. California: Delglades. New Mexico: Capitan Mountains. South Dakota: Black Hills, Elmore. Wyoming: Hayden National Forest.

U. S. N. M.—California: Lake Tahoe (Hubbard & Schwarz). New Mexico: Las Vegas Hot Springs (Barber & Schwarz).

**Lasconotus fiskei**, new species.

*Type:* No. 14191, U. S. N. M.; Hopk. U. S. No. 3868. One of 12 specimens collected by W. F. Fiske at Montell, Texas. Intermediate between the preceding and the next species. It is smaller and stouter than *simplex*, having elytral characters similar to the following species, but the fifth interspace is less elevated and the dorsal area of elytra is flat, not concave. Associated with *Pityophthorus* sp. in *Pinus edulis*.

In naming this species for Mr. W. F. Fiske I wish to acknowledge the use of the manuscript notes which he had prepared on this genus, and which have been of great assistance on several of the species.

**Lasconotus bitomoides,** new species.

*Type:* No. 14192, U. S. N. M.; Hopk. U. S., No. 5018c, collected by J. L. Webb at Flagstaff, Arizona.

A remarkable species resembling in general appearance a *Bitoma*. This species and the preceding show the beginning of the characters of the *pusillus* group, the reduction of interspaces 1 and 3, and the strong elevation of 5. The elevated oblique ridge from interspace 5 to the apex is a striking character and very strongly developed. It is broader and stouter than *fiskei* and at once separated from that species by the concave elytra, also the two small but parallel costæ extending from the posterior margin together with the more distinct median impression. Two specimens; associated with scolytids in *Pinus edulis*.

Hopk. U. S.—Arizona: Chiricahua National Forest, Flagstaff, Santa Catalina National Forest. New Mexico: Capitan, Capitan Mountains.

U. S. N. M.—Arizona, Williams (Schwarz & Barber.)

**Lasconotus subcostulatus,** new species.

*Type:* No. 14193, U. S. N. M.; Hopk. U. S. No. 5286b. One of 8 specimens collected by J. L. Webb at Centerville, Idaho.

This species and *pusillus*, though closely allied, are distinct and readily separated by the characters outlined in the synopsis above. The slender form, more elevated first and third interspaces, less concave elytra, broad median impression of the prothorax, and its peculiar punctation, serve to separate it at once from *laqueatus*, with which it has been confused. See also under *laqueatus* below. A series of a hundred specimens, all remarkably constant, slight variation in size, a few have the strial punctures more marked, but they are very distinct in all. In *Pinus pondorosa*, *monticola*, *murrayana*, and *Picea sitchensis*, associated with scolytids.

Hopk. U. S.—California: Summerdale, Yosemite Valley. Colorado: Boulder. Idaho: Centerville, Kootenai. Montana: Missoula. Oregon: Grant's Pass. South Dakota: Black Hills, Elmore, Lead. Washington: Buckeye, Hoquiam.

U. S. N. M.—California: Placer County, Sacramento (Hubbard & Schwarz, Koebele). Nebraska: Pine Ridge (Soltau). Oregon: Hood River. Washington: Spokane Falls (Hubbard & Schwarz).

**Lasconotus pusillus** LeConte. 1863, p. 57.

Closely allied to the preceding, but very distinct, as outlined under *laqueatus*. LeConte gives "Southern States,

Georgia and South Carolina." A series of 40 specimens varying but little among themselves. Associated with various scolytids in *Pinus palustris, virginiana, ponderosa.*

Hopk. U. S.—Georgia: Clyo. North Carolina: Boardman, Tryon. Texas: Call, Deweyville.

U. S. N. M.—Florida: Biscayne, Palatka, Tampa (Hubbard & Schwarz). Nebraska: Pine Ridge (Soltau.)

The distribution as given by Dr. Horn includes also *laqueatus* and *subcostulatus.*

**Lasconotus laqueatus** LeConte. (Proc. Acad. Nat. Sci. Phila., 1866, p. 378.)

This species is intermediate between *pusillus* and *concavus*, resembling the former in its somewhat elongate form and the hook-shaped elevations on anterior margin of prothorax, and the latter in the broad thoracic impressions and elytral structure, except interspace 5 is not so strongly elevated, the strial punctures are more readily traceable, and the prothoracic impression narrower.

There has been considerable confusion in regard to this species, *subcostulatus*, and *pusillus.* Dr. LeConte (1865) based his description on material from Dr. Elliott Coues, Arizona. The specimen now bearing the name label in the LeConte collection agrees precisely with the original description, but in the same series are five other specimens labeled "Or." These specimens are all typically *subcostulatus* and totally different from the true *laqueatus.* In the Horn collection I find that Dr. Horn has placed representatives of all these species under *pusillus.* Among them are 2 specimens of *laqueatus*, 1 from Pinal Mountains, Arizona, and the other from Montana; 7 specimens of *subcostulatus*, 2 of which are from Montana, 4 from Nevada, and 1 from Washington; and 2 specimens of *pusillus*, one of which, bearing the name label, is from Georgia, the other from Florida. Dr. Horn's (1878) description of the unnamed specimens from Vancouver applies precisely to *subcostulatus*, as do also all the characters assigned by Col. Casey (1890) to *laqueatus.* The range of *subcostulatus* is northward and of *laqueatus* southward from southern Montana and southwestern South Dakota. I have specimens of both species from Colorado (Boulder), South Dakota (Black Hills), and Nebraska (Pine Ridge), and in the Horn collection from Montana.

A series of 15 specimens showing some variation, more especially in width. Found associated with scolytids under bark of *Pinus ponderosa.*

Hopk. U. S.—Colorado: Boulder. New Mexico: Capitan, Meeks. Texas: Davis Mountains.

U. S. N. M.—Nebraska: Pine Ridge (Soltau).

**Lasconotus concavus** Casey. 1890, pp. 315–316.

A robust species showing the extreme development of the characters of the *pusillus* group. Interspace 1 is just visibly elevated, 3 elevated at base for about one-sixth its length, and 5 very strongly elevated from base to near apex; the strial punctures are just traceable. The prothoracic impression is very broad, with punctures fine and simple. A series of about 125 specimens. Commonly associated with scolytids in *Pinus ponderosa* and *strobiformis*.

Hopk. U. S.—Arizona: Chiricahua National Forest, Flagstaff, San Francisco Mountains, Williams. Colorado: Mancos. New Mexico: Capitan, Capitan Mountains, Meeks, Vermejo.

U. S. N. M.—Arizona: Chiricahua Mountains (Hubbard & Schwarz), Bright Angel, Williams (Schwarz & Barber). New Mexico: Las Vegas Hot Springs (Schwarz & Barber).

**Lasconotus atomus** Grouvelle. 1908, p. 49.

I have not seen a specimen, but it is apparently distinct from any of the species occurring in the United States. I quote the following from Grouvelle's description:

Elongate, parallel, moderately convex, feebly shining, ferruginous, a little smoky; antennæ, except the club, and the legs more reddish. Antennal club smoky, first segment narrower than the two following. Head granulate, wider than long at the level of the eyes, sides straight, converging anteriorly, anterior margin rounded, on the disc five impressions somewhat confluent, two anteriorly and three in line on the summit of the head. Prothorax granulate, the form of an inverted trapezoid, just about as long as wide anteriorly, anterior margin rounded, feebly sinuous at the extremities, sides nearly straight, finely margined and crenulate; base truncate, strongly excavated at the extremities; anterior angles feebly produced anteriorly, rounded, posterior almost right, well marked; at the middle of the disc a longitudinal furrow well marked anteriorly, and at each side of the furrow, two longitudinal carinæ; the internal less accentuated, divided anteriorly and posteriorly into two short carinæ, the external well marked, entire, flexuose. Scutellum puncture-like. Elytra parallel, a little less than 3 times as long as wide, when taken together; each with three sensibly equal discoidal carinæ, the first attaining the apical margin of the elytra, the two others united before attaining that margin, intervals between the carinæ with two lines of large punctures.

In the young decayed branches of *Clusia rosea* and *Atrocarpus*. Guadeloupe, West Indies.

From the description it seems somewhat allied to *mexicanus*. If this species is a true *Lasconotus* it is remarkable that it should be found in the decaying branches and especially of the above-named trees, both of which are non-coniferous.

**Lasconotus sulcifer** Sharp. 1894, p. 464.

I have not seen a specimen. I quote the following from Dr. Sharp:

Antennæ with joints 3 to 8 quite small, the 3-jointed club large and abrupt. Head deeply and broadly impressed. Thorax longer than broad, finely margined at the sides, delicately punctate and pubescent, with a broad depression along the middle, limited on each side by an obtuse costa; these costæ do not reach quite to the front margin, but they are each surrounded at the end by a slight curvate elevation; the extreme base of the thorax is strongly constricted, the true hind angles being thus concealed. The elytra have the shoulders prominent in front; they are broadly and deeply longitudinally depressed along the middle; the suture is scarcely costate in front, but is distinctly so towards the apex; the first interstice is feebly costate, but only on the basal portion; the third interstice limits the broad depression and is strongly costate, and outside it there is also another costa, strongly raised and extending from the base to the apex; the intervals bear obscure serial punctures.

Closely allied to *L. pusillus* Lec., but narrower, with the shoulders more prominent anteriorly, the elytral depression much more marked, and the costæ more sharply elevated. We have received nearly 20 examples; they vary in color, some being brownish, but in other respects are very constant.

Guatemala, San Geronimo (Champion).

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## A NEW MICROLEPIDOPTERON OF THE GENUS EPICALLIMA DYAR FROM PENNSYLVANIA.

By AUGUST BUSCK.

**Epicallima lucidella,** new species.

Labial palpi golden yellow. Antennæ velvety black with silvery white tips; basal joint smooth without pecten. Face, head and thorax bronzy. The deep black ground-color of the forewings occupies but a small part of the wing as a margin on the base, along dorsum and around the apical edge to the brilliant deep golden-yellow area which occupies the larger costal half of the wing and sends a long process out towards the apex; at basal third is a narrow perpendicular black-edged metallic blue fascia, crossing the golden area and terminating in a pale yellow dorsal spot; on the cell are two pairs of paralel longitudinal metallic blue streaks, all edged with black; on the middle of costa is a small pale yellow spot and at apical third is a similar pale costal dash. Cilia blackish with strong golden reflexions. Hind wings and abdomen black. Legs black, with the tips of the tarsi and the spurs silvery white.

Alar expanse: 12-13 m.m.

*Habitat:* Oak Station, Allegheny County, Pennsylvania. (Fred Marloff, collector.)

*Type:* No. 14435, U. S. Nat. Mus.

A brilliant species suggesting some of the European metallic species, but very different in pattern. Among the American species it comes nearest the smaller *edithella* Busck, from which, however, it is also amply differentiated in pattern.

## A READJUSTMENT OF MUSCOID NAMES.

By Charles H. T. Towsend.

In these days dipterological nomenclature is getting a severe shaking up, and the Muscoidea come in for their share. The late resurrection of Meigen's 1800 paper, the recent discovery of various long-perpetuated nomenclatural errors as judged by the rules of the International Code, and the designation of certain genotypes by the late Mr. D. W. Coquillett call for a considerable amount of change in the names of muscoid genera, tribes, subfamilies, and in one notable case a change of family name. These changes are detailed below so far as they are apparent to me at this time.

### Family PHASIIDÆ.

### Subfamily PHASIINÆ.

### Tribe PHASIINI.

1. **Phasia** Latr. (1804).

*Type: Syrphus hemipterus* J. C. Fab., being the only species given by Latreille, as *Thereva coleoptrata* J. C. Fab., which is a synonym of the above, according to Bezzi and Stein.

*Syn.: Alophora* R. D. (1830), Girschner et al., which has the same type.

*Repr. habit:* Subcutaneous oviposition (Pantel, Towns.).

This compels dropping of *Alophora*, which will hereafter be known as *Phasia*, and likewise changes the meaning of the tribal and subfamily names derived from *Phasia*.

2. **Hyalomyia** R. D. (1830).

*Type: Phasia pusilla* Meig., being designation by Westwood in 1840.

*Syn.: Parallophora* Girsch. (1888), which has same type.

*Repr. habit:* Unknown, but judged same as *Phasia*.

This compels dropping of *Parallophora*, hereafter to be known as *Hyalomyia*.

3. **Alophorella,** gen. nov.

*Type: Thereva obesa* J. C. Fab., hereby designated.

*Syn.: Hyalomyia* Girsch. (1888) et al. (nec. R. D.).

*Repr. habit.:* Subcutaneous oviposition (Pantel).

This and 2 call for a complete shift of the name *Hyalomyia*, hereafter to carry a different meaning.

## Subfamily ECTOPHASIINÆ.

### Tribe ECTOPHASIINI.

4. **Ectophasia**, gen. nov.

*Type: Syrphus* (*Thereva*) *crassipennis* J. C. Fab. (female equals *T. analis* J. C. Fab.), hereby designated.

*Syn.: Phasia* Auctt. (nec Latr.).

*Repr. habit.* Host-oviposition of flat macrotype egg (Pantel et al.).

This and 1 call for a complete shift of the name *Phasia*, which hereafter carries a totally different significance.

Note.—Bezzi and Stein indicate *Eratia occlusa* R. D. (1863) as synonym of above genotype. The description appears to me incompatible with specimens of *crassipennis* but conforms much better to those of *Elomya lateralis* Meig., whose abdominal spots show moreover a tendency toward the trigonal pattern. In the non-existence of Desvoidy's types and improbability of the above synonymy I do not consider the name *Eratia* available for use here.

### Tribe RHODOGYNINI.

5. **Rhodogyne** Meig. (1800).

*Type: Musca rotundata* L., being the only species given by Meigen with his *Gymnosoma* (1803), which is manifestly the same genus, according to Heudel.

*Syn.: Gymnosoma* Meig. (1803).

*Repr. habit*: Host-oviposition of flat macrotype egg (Pantel, Towns, et al.).

This calls for the dropping of *Gymnosoma* and its derivative names, euphonious and long in use.

## Family MUSCIDÆ.

## Subfamily MESEMBRININÆ.

### Tribe MESEMBRININI.

6. **Mesembrina** Meig. (1826).

*Type: Musca meridiana* L., being designation by Westwood in 1840.

*Syn.: Metamesembrina* Towns. (1908), which has same type.

*Repr. habit*: Dung-larviposition, maggot apparently being carried through at least first stage in utero (Portchinski).

7. **Hypodermodes**, gen. nov.

*Type: Musca mystacea* L., hereby designated.

*Syn.: Mesembrina* Towns. (1908), (nec Meig.).

*Repr. habit:* Dung-oviposition of few large eggs, the maggot omitting its second stage (Portch.).

This and 6 call for shift of *Mesembrina* from meaning given in Tax. Musc. Flies (1908).

SUBFAMILY MUSCINÆ.

TRIBE STOMOXYDINI.

8. **Hæmatobia** St. Farg. & Serv. (1828), R. D. (1830).

*Type: Conops irritans* L., being designation by Westwood in 1840.

*Syn.: Lyperosia* Rdi. (1856–1862), which has same type.

*Repr. habit:* Dung oviposition (Riley & Howard).

Calls for dropping of *Lyperosia* and reinstatement in the economic literature of the generic name, *Hæmatobia* for the horn-fly.

9. **Lyperosiops** gen. nov.

*Type: Stomoxys stimulans* Meig., hereby designated.

*Syn.: Hæmatobia* B. B. et Auctt. system. (nec St. Farg. & Serv., nec. R. D., nec Auctt. econom.).

This and 8 call for shift of *Hæmatobia* from its former significance.

FAMILY EXORISTIDÆ.

SUBFAMILY EXORISTINÆ.

TRIBE EXORISTINI.

10. **Exorista** Meig. (1803).

*Type: Musca larvarum* L., being the only species.

*Syns.*: *Tachina* Auctt. (nec. Meig., nec. B. B.); *Eutachina* B. B. (1889–1893).

*Repr. habit*: Host-oviposition of flat macrotype egg (Towns., Pantel, et al.)

This and 19 compel the dropping of the name *Tachina* and its derivatives, names which are probably the most familiar next to *Musca* in the whole superfamily. This, by far the largest family of the Muscoidea, will hereafter be known as the EXORISTIDÆ instead of the Tachinidæ. I hereby designate *Musca larvarum* Linné (*Exorista larvarum* L., Meig., 1803) the type of the family as the form most appropriate to discharge this function. Some may consider *Musca grossa* L. (*Larvævora grossa* L., Meig., 1800–1803) entitled to the honor, as being the original *Tachina*, but I believe that usage, propriety and still other considerations call more loudly for the above designation.

NOTE.—In this connection a word may be said on the classification of Girschner, followed by Bezzi and Stein, which groups nearly all of the Muscoidea in the single family heretofore called Tachinidæ and hereafter to be known as Exoristidæ, the comparatively small remnant of *Musca* and its allies being thrown into the Anthomyiidæ. From a

purely nomenclatural point of view, if the genera *Musca* and *Anthomyia* are placed together in any group from family down, that group should clearly take its name from *Musca*. The genus *Musca* dates from the beginning of zoological nomenclature (1758). *Anthomyia* goes back only to 1803.

From a taxonomic point of view, the consensus of anatomical and reproductive characters allies *Musca* and its kindred much more closely with *Calliphora* than with *Anthomyia*. It seems quite incompatible with evident relationships and phylogenies to separate *Musca* and its allies from the group *Tachinidæ* of Girschner.

### Subfamily PSEUDODEXIINÆ.

#### Tribe MACQUARTIINI.

11. **Paraporia,** nom. nov.

For *Veaporia* Towns. (1908) preocc. by Gorham in Coccinellidæ (1897).

*Type*: *Aporia quadrimaculata* Macq.

*Syns.*: *Aporia* Macq. (1846) preocc.; *Veaporia* Towns. (nec. Gorham).

*Repr. habit.*: Unknown, but judged larviposition near host.

#### Tribe OCYRTOSOMATINI.

12. **Ocyrtosoma** nom. nov.

For *Cyrtosoma* B. B .(1891–1893), preocc. by Walker in 1829.

*Type*: *Cyrtosoma rufum* B. B.

*Syn.*: *Cyrtosoma* B. B. (nec Walk.).

*Repr. habit*: Unknown, but judged larviposition near host.

### Subfamily PHANIINÆ.

#### Tribe CYLINDROMYIINI.

13. **Cylindromyia** Meig. (1803).

*Type*: *Musca brassicaria* J. C. Fab., being the only species.

*Syn.*: *Ocyptera* Latr. (1802-1805).

*Repr. habit*: Host-larviposition (Towns).

This change gives us new names for the long-familiar and euphonious *Ocyptera* and its derivatives, which must be dropped.

Note.—Latreille appears to have given the generic name *Ocyptera* in 1802 with no species, but in 1804-1805 gave three species with it including the above, without designating a type. Curtis designated above genotype for *Ocyptera* in 1837.

In the light of our present knowledge this tribe appears to form a natural division of the subfamily Phaniinæ. I employ

*Phania* as the type of the subfamily, following Brauer & von Bergenstamm, notwithstanding Robineau-Desvoidy's earlier use of *Ocyptera* as the type of the group, since *Phania* is far more typical of the group as a whole and *Ocyptera* and its derivatives are now dropped. The subfamily is characterized in general by a great or considerable development of the female genitalia and presumably in most cases for the purpose of subcutaneous larviposition or perhaps oviposition originally. I place the Compsilurini here, and probably most if not all of the forms having the habit of subcutaneous larviposition will eventually be found to belong here. The group seems to bear a considerable affinity to the subfamily Phasiinæ, which has a corresponding development of the female genitalia for the purpose of subcutaneous oviposition. The Phasiinæ are in turn allied with the Conopidæ on the same character, though much differentiated from them in others. I can not follow Bezzi and Stein in grouping *Cylindromyia* with the Pseudodexiine and Pyrrhosiine stocks.

TRIBE EUTHERINI.

14. **Imitomyia,** nom. nov.

For *Himantostoma* H. Loew (1863), preocc. by Agassiz, in 1862.

*Type*: *Himantostoma sugens* H. Lw., the only species.

*Syn.*: *Himantostoma* H. Lw. (nec Agassiz).

*Repr. habit*: Unknown, but judged larviposition.

SUBFAMILY ERYCIINÆ.

TRIBE CROCUTINI.

15. **Crocuta** Meig. (1800).

*Type*: *Musca geniculata* DeG., being only species given by Meigen in 1803, as *Stomoxys minuta* J. C. Fab. (by error appearing *irritans*), for his *Siphona*, which is the same genus according to Hendel.

*Syns.*: *Siphona* Meig. (1803); *Bucentes* Latr. (1809).

*Repr. habit*: Host-larviposition (Pantel et al.).

This compels dropping the time-honored name *Siphona* and its derivatives.

TRIBE ERYCIINI.

16. **Huebneria** R. D. (1847).

*Type*: *Tachina affinis* Fall., being designation by Robineau-Desvoidy in 1863 of *Carcelia nigripes* R. D., which is a synonym of the above genotype according to Bezzi and Stein.

*Syn.*: *Exorista* Auctt. p. p. (nec Meig., nec B. B.).

*Repr. habit*: Host-larviposition (Pantel).

This resurrects one of Robineau-Desvoidy's generic names for a type whose reproductive status is known.

NOTE.—The emendation of *Hubneria* to *Huebneria* is permissible under the rule of the International Code applying to manifest typographical errors.

TRIBE VORIINI.

17. **Voria** R. D. (1830).

*Type*: *Tachina ruralis* Fall., being the only species.

*Syn.*: *Plagia* Meig. (1838), for which Róndani designated in 1856 *Tachina verticalis* Meig., which is a synonym of above genotype according to Bezzi and Stein.

*Repr. habit:* Host-larviposition (Pantel, Towns.).

This drops *Plagia* and its derivatives, euphonious names.

SUBFAMILY HYSTRICIINÆ.

TRIBE ERNESTIINI.

18. **Ernestia** R. D. (1830, Myod. p. 60).

*Type*: *Tachina rudis* Fall., being the only speeies, as *Ernestia microcera* R. D., which is a synonym of the above genotype according to Bezzi and Stein.

*Syn.*: *Panzeria* R. D. (1830, Myod. p. 68), (nec Meig., 1838), with *Panzeria lateralis* R. D. the only species, which is same as above genotype according to Bezzi and Stein.

*Repr. habit*: Leaf-larviposition (Towns., Pantel).

This drops *Panzeria* and its derives.

TRIBE LARVÆVORINI.

19. **Larvævora** Meig. (1800).

*Type*: *Musca grossa* L., being designation by Wachtl in 1894 for *Tachina* Meig., which is same genus according to Hendel.

*Syns.*: *Echinomyia* Duméril (1801–1823), Latr. (1805); *Tachina* Meig. (1803), B. B. (1889), (nec Auctt.).

*Repr. habit*: Leaf-larviposition (Towns., Pantel).

This drops *Echinomyia* and its derivatives, euphonious and time-honored names.

SUBFAMILY MASICERATINÆ.

TRIBE STURMIINI.

20. **Ugimyia** Rdi. (1870).

*Type*: *Ugimyia sericariæ* Rdi., the only species.

*Syn.*: *Crossocosmia* Mik (1890), with same genotype.

*Repr. habit*: leaf-oviposition of microtype egg (Sasaki, Towns.).

This drops *Crossocosmia*, which has been in use since 1890.

NOTE.—Bezzi and Stein call Róndani's names, both generic and specific, nomina nuda in effect, stating that they are without description. This does not appear to be so. I have not access at this time to the original publication, but Mik's paper indicates that Róndani described the larva and puparium in a way which by the rules of the International Code is sufficient for the founding of either genus or species, provided only that the form referred to be unmistakably indicated. No one has the slightest doubt as to the identity of either the species or genus referred to by Róndani under the above binomial. If Róndani gave no description of any stage, then Cornalia's description and figure, however poor, fulfils the provisions of the Code as such, since they carry no doubt of the identity of the form referred to. Hence the binomial holds in any event.

It should be stated here that Meinert accepted Sasaki's observations as to the leaf-oviposition habit at the time. It would appear that Róndani did so likewise in his founding of the new genus.

TRIBE NEOPALINI.

21. **Neopales** Coq. (1910).

New name for *Pales* R. D. (1830), (nec Meig., 1800), whose type is *Tachina pavida* Meig. (nec Illig.), according to the synonymy given by Bezzi and Stein.

*Syn.*: *Pales* R. D. (nec Meig.), the name having been used by Meigen in 1800 for a tipulid.

*Repr. habit*: Leaf-oviposition of microtype egg (Towns.).

This drops the name *Pales* from the Muscoidea.

TRIBE EPIMASICERATINI.

22. **Epimasicera,** gen. nov.

*Type*: *Tachina westermanni* Zett., which Bezzi and Stein state equals *Tachina mitis* Meig., hereby designated.

*Syn.*: *Exorista* Auctt. p. p. (nec Meig., nec B. B.).

*Rep. habit*: Leaf-oviposition of microtype egg (Pantel).

This generically places another form whose reproductive habit we know.

NOTE.—This species is not referable to any of Robineau-Desvoidy's genera, nor to any other previously erected genus so far as I can find. Brauer and von Bergenstamm referred it (*mitis* Meig.) to their *Parexorista*, which it cannot be. *Eusisyropa blanda* O. S., which they also referred to their *Parexorista*, I believe does not possess a microtype egg, though a form with exceedingly similar external characters does possess such egg. *Exorista futilis* O. S. possesses the microtype egg and was referred to *Parexorista* by Brauer and von Bergenstamm. It may belong to *Epimasicera*.

TRIBE SALMACIINI.

23. **Salmacia** Meig. (1800).

*Type*: *Musca capitata* DeG., being designation by Curtis in 1835 for *Gonia* Meig. (1803), which is the same genus according to Hendel.

*Syn.*: *Gonia* Meig. (1803).

*Repr. habit*: Leaf-oviposition of microtype egg (Towns., Pantel).

This drops the familiar *Gonia* and its derivatives, euphonious names in use for over a century.

FAMILY DEXIIDÆ.

SUBFAMLY DEXIINÆ.

TRIBE CALIRRHOINI.

24. **Calirrhoe** Meig. (1800).

*Type: Stomoxys siberita* J. C. Fab., being only species given with *Prosena* St. Farg. & Serv. (1828), which is same genus according to Hendel.

*Syn: Prosena* St. Farg. & Serv. (1828).

*Repr. habit:* Unknown, but judged larviposition in vicinity of host.

This drops the long-familiar *Prosena* and its derivatives.

FAMILY SARCOPHAGIDÆ.

SUBFAMILY MILTOGRAMMINÆ.

TRIBE METOPIINI.

25. **Neowinnertzia,** nom. nov.

For *Winnertzia* Schiner (1861), preocc. by Róndani in 1860.

*Type: Metopia mesomelæna* H. Loew, hereby designated.

*Syn.: Winnertzia* Sch. (nec Rdi.).

*Repr. habit*: Unknown, but judged to be larviposition from double-sac uterus.

NOTE.—I am aware that Bezzi and Stein recognize *Winnertzia* Sch. as a synonym of *Mesomelæna* Rdi. I here record my strong disapproval of duplicate binomials.

26. **Taxigramma** Macq. (1849).

*Type*: *Miltogramma heteroneura* Meig., being on authority of Bezzi and Stein the same as *Taxigramma pipiens* Perris (1852), the only species.

*Syn.*: *Heteropterina* Macq. (1854), with above genotype as only species.

*Repr. habit*: Unknown, but judged to be larviposition from double-sac uterus.

This causes the abandonment of *Heteropterina* as a name.

FAMILY ŒSTRIDÆ.

SUBFAMILY ŒSTRINÆ.

TRIBE ŒSTRINI.

27. **Cephalopsis** gen. nov.

*Type*: *Œstrus maculatus* Wied., hereby designated.

*Syn.*: *Cephalomyia* Auct. (nec. Latr.).

*Repr. habit*: Larviposition in nostrils of ruminants (camels and buffalo in North Africa).

This compels the dropping of *Cephalomyia*, which has served as a generic name for nearly a century, in spite of its having had during most of that time the same genotype as *Œstrus*.

NOTE.- Latreille gave the single species *Œstrus ovis* L. with his genus *Cephalemya* in 1818. Curtis designated the same species in 1826 as the type of *Œstrus* Linné (1758), apparently after all the original Linnean species of *Œstrus* had been abstracted to serve as types of the various genera, the greater part of them having been taken by Latreille.

With these obsequies we bid adieu to the buried names, thanking Mr. Friedrich Hendel, of Vienna, for his part in the matter.

PIURA, PERU, *December 31, 1911*.

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## A NEW MEGALOPYGID FROM FRENCH GUIANA.

BY WILLIAM SCHAUS.

**Mesoscia anguilinea,** new species.

Essentially like *M. eriophora* Sepp, but the white submarginal area is straight and narrow, sending a projection along vein 2 to the cell.

*Type*: Male, No. 12530, U. S. Nat. Mus., St. Jean, Maroni River, French Guiana, April, 1904.

This should have been described in my paper on new species from the Guianas, published in Proceedings of the United States National Museum in 1905, but was omitted therefrom.

## DESCRIPTIONS OF THE LARVÆ OF SOME LEPIDOPTERA FROM MEXICO

By Harrison G. Dyar.

The following larvæ have been obtained by the Bureau of Entomology from Mr. W. Gugelmann, bred by him at Misantla, State of Vera Cruz, Mexico.

### PAPILIONIDÆ.

**Papilio belesis** Bates.

*Larva.*—Head rounded, slightly bilobed, shining black, with pale secondary hairs on the lower parts of the sides. Body subcylindrical, uniform; a subdorsal row of short papillæ. Black; a large white dorsal saddle on joints 8 and 9, incised before, the points running down to the spiracle on joint 8; two rows of round red spots, stigmatally and subventrally.

*Food plant: Anona.*

### NYMPHALIDÆ.

**Gynæcia dirce** Linnæus.

*Larva.*—Head strongly bilobed, each lobe with a long apical horn with short, irregular branches; head shining black, with several small inconspicuous horns especially laterally, all these as well at the large apical horn, pale yellow. Body cylindrical, tapering only slightly at the ends; rows of spinose processes, each process with a straight shaft and three or four branches, collected into a subapical crown; joints 2 has only a small subdorsal process; on joints 3 and 4 are two rows, subdorsal and lateral; on 5 to 12, three rows; on joint 13, a subdorsal pair only; all the processes paired. Body black, the processes contrasting light yellow; laterally on each segment anteriorly an oval dale yellow patch, small on joints 2 to 4, large on 5 to 12, none on joint 13.

**Eunica modesta** Bates.

*Larva.*—Head angularly bilobed, roughened with conical secondary tubercles bearing pale setæ; pale orange color, a broad black band across the mouth, with irregular upper border, reaching nearly to the apex of clypeus. Body cylindrical, slender, a little enlarged at joint 12 and the sides of joints 3; at the enlargements are low, degenerate processes, a dorsal cone with short branches and a subdorsal pair on joint 12, a collection of lateral tubercles on joint 3, these colored black. Elsewhere no processes are developed, but the body is roughened with scattered black secondary tubercles, bearing rather long dark setæ, and arranged in transverse lines. General color dull or-

ange with a lateral black band, which widens into a patch covering the spiracle; a large cone laterally in this patch. Feet and leg-shields black.

*Food plant: Zanthoxylum pentamon.*

## HESPERIIDÆ.

### Thymele fulgerator Watch.

*Larva.*—Head large, roundly flattened before, with a slight vertical notch; densely covered with fine secondary hairs, which become long on the vertex; dark brown, the clypeus black, the lobes with vertical pale streaks, somewhat divergent above and confluent towards the clypeal sutures. Neck very small; joint 2 small, with a shining black dorsal shield; body enlarged posteriorly, subcylindrical, stout, tapering a little at the anal end. The skin is covered with rather long white secondary hairs, somewhat sparsely placed. Color black above, with large yellow spots, two on a segment, the anterior one very large, the posterior one small, transverse and paler yellow. The spots begin on joint 3, but are small; large and of nearly equal size on the abdomen; only one on joint 13, rather small. Area below the spiracles crimson, darker on the abdominal feet. Thoracic feet black.

## SATURNIIDÆ.

### Automeris leucane Hübner.

*Larva.*—Head larger than joint 2, flat before, rounded above, not bilobed; shining black, shagreened, with a few short, inconspicuous secondary setæ. Body cylindrical, tapering before and abruptly behind; coal-black, a little wrinkly-shagreened and with a few sparse pale secondary hairs; spines light yellow. The spines are in four rows on joints 2 to 5; five rows on joint 6; three rows on joints 7 to 10; four rows on joint 12; a single dorsal and three other rows on joints 13 and 14. The spines are rather short, each with several long branches, tipped with small black points; the two upper rows of joints 2 and 3 are rather longer than the others, as are also the dorsal ones of 13 and 14; the subventral ones are small. Feet and leg-shields shining black.

*Food plant*: *Troena.*

## ARCTIIDÆ.

### Arachnis aulea Geyer.

*Larva.*—Head rounded, flat before, slightly bilobed, shining black with long black primary setæ; median suture, epistoma and bases of antennæ pale. Body cylindrical, tapering slightly anteriorly, purplish black, darker in the centers of the segments. Warts large, normal, equal, dull red, but not contrasting, bearing dense, short, stiff, spiny black hairs. Feet black; leg-shields deep brown.

## HYPSIDÆ (PERICOPIDÆ).

### **Pericopis lycaste** Klug.

*Larva.*—Head larger than joint 2, rounded, scarcely bilobed, a little wider than high, with primary setæ; shining brown, a blackish shade on each lobe below next to the clypeus; median suture, epistoma, and bases of antennæ pale. Body cylindrical, the feet large. Warts large, iv rather smaller than the others, but i about as large as ii; one large wart only on joints 3 and 4 above the stigmatal wart. Hairs dense, fine, silky brown, rather long and longer at the extremities. Dull brown, shaded with blackish, especially in obscure dorsal, lateral, and stigmatal lines, this marking largely an effect of the darker spaces between the dull pale reddish warts. Joint 4 is lighter throughout. joints 5 and 11 are dark, their warts largely black; joint 12 is a little light also, while 3, 6, and 13 are somewhat darkened, giving the dark and light banded effect usual in the pericopid larvæ, although here the contrast is not marked. Feet and leg-shields dark brown.

## NOCTUIDÆ.

### **Bolina comprehendens** Walker.

*Larva.*—Head smaller than joint 2, rounded, scarcely bilobed, the clypeus rather high; whitish with numerous small black spots; primary hairs rather long, pale. Body cylindrical, long and slender, looped up a little at joints 5 to 7, the feet of joint 7 small, unused; tubercles and setæ reduced, invisible. Coloration a general bark-like effect; dull whitish gray with a reddish brown tint, especially through the dorsum; a subdorsal black line, waved, being bent inward at the segmental incisures, somewhat broken posteriorly, forming a dot on joint 12. A geminate powdery and broken lateral band; a red-filled substigmatal band; bases of the feet mottled with white and with white patches around the spiracle of joint 12. Between these markings the skin is dotted with black and red. Feet concolorous in general effect, dotted and with a red line anteriorly.

## EUPTEROTIDÆ.

### **Zanola verago** Cramer.

*Larva.*—Head rounded, flat before, the clypeal sutures impressed; covered with rather long black secondary hair; gray-black, dull, the clypeus shining, its sutures pale; a broad pale band covering the median suture. Body cylindrical, uniform; subdorsal and lateral narrow yellow lines infiltrated with red; an irregular double wavy dorsal line; skin covered with secondary hairs, about half as long as the diameter of the body, dark colored, but not black; tufts of long black hairs subdorsally on joints 3, 4, and 12, the longest of them with their tips widened into flat triangular scales with serrated tips; other black hairs, not form-

ing tufts, along the body from the larger of the primary warts; warts low, concealed and confused in the secondary hair. Thoracic feet light red-brown; abdominal ones dull vinous.

The larva has the structure of the genus *Apatelodes* Packard, which has been placed in the Eupterotidæ The group is also relaeed to the Notodontidæ, and has been more generally included in that family.

## LIPARIDÆ.

**Turenna dirphioides** Walker.

*Larva.*—Head large, rounded, slightly bilobed; clypeus small; whitish brown, scarcely mottled, more white shaded over the clypeus; white secondary hairs are numerous on the lower part of the side. Body somewhat flattened, uniform, the feet slender and rather long; lateral wart of joint 2 large; three small warts above the stigmatal wart on joints 3 and 4; on the abdomen warts i and ii equal, rather small, tending to lie in line, iii and iv closely approximating, functionally one large wart, v and vi also somewhat approximated and nearly in line, appearing as one, leg shields densely hairy. Small whitish retractile tubercles dorsally on joints 10 and 11. Coloration whitish brown; a black line on the large wart on joint 2; a square black dorsal patch between 3 and 4; an oblique subdorsal bar on 8, somewhat powdery and broken; an oblique lateral line on 11–12; ordinary markings obsolete, the skin a little mottled and a narrow geminate blackish dorsal line. Hairs abundant, from the warts only, whitish, short dorsally, much longer laterally. Feet all pale.

The larva is flattened and with long lateral hairs and bark-like coloration, superficially much resembling a lasiocampid like *Tolype*. The structure, however, is normal for the Liparidæ.

*Food plant*: *Psidium*.

## LASIOCAMPIDÆ.

**Tachyptera psidii** Sallé.

*Larva.*—Head large, rounded, flattened before, slightly bilobed; black, brownish at the sides, the clypeus and paraclypeus as well as median suture narrowly pale; numerous dark secondary hairs throughout. Body cylindrical, tapering a little posteriorly; black, without markings; hair all secondary, dense but short, foxy red, arranged in little patches; dorsal hair mostly directed upward and slightly keeled along the dorsal line; lateral hair projecting outward or downward. Warts all obsolete, only a trace of a lateral projection on joint 2.

*Food plant*: *Psidium*.

**Claphe maria** Schaus.

*Larva.*—Head moderate, round, scarcely bilobed, black with gray pruinosity; a yellowish white line across from bases of antennæ; labrum yellowish white; median suture narrowly pale; densely covered with white secondary hairs. Body cylindrical, uniform; dorsum black; a lateral yellow line, from which transverse yellow bands traverse the dorsum, one on each segment behind the middle, some broad and distinct, some narrow or obsolete; the one on joint 7 is the most distinct; those on 3, 4, and 9 are next, the others being quite narrow or even obsolete. Lateral region dark gray, with a pale diffused substigmatal line. Warts obsolete dorsally, only the subventral lappet-warts visible, fairly prominent, two warts present on joint 2. Secondary hairs fine, short, white, with longer white ones from the lappet-warts and in small groups subdorsally; dorsal patches of short crimson hairs in which the white subdorsal clusters arise. Thoracic feet yellow-white; outer sides of the abdominal feet also of this color.

The cocoon is white, and the short crimson hairs are thrust through it in irregular patches.

*Food plant*: *Persea gratissima.*

## MEGALOPYGIDÆ.

**Megalopyge albicollis superba** Hy. Edwards.

*Larva.*—Head rounded, retracted in joint 2, which in turn is within joint 3, except for its hairy front margin. Body elliptical, somewhat flattened on the ventral part; of a dull reddish color, entirely covered by the long dense hairs; hairs foxy red, curving smoothly backward, a little keeled on the dorsal line; no special tufts or curls. Feet normal, the thoracic feet small; an extra pair of poorly developed feet on joints 6 and 11.

Before the last stage, the larva has fine white hair, higher and crested on joints 4–5 and projecting backward in a loose tuft behind; some feathered curling black hairs in little tufts subdorsally, embellishing the bases of the anterior and posterior tufts.

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*Actual date of issue, March 13, 1912.*

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# PROCEEDINGS

OF THE

# ENTOMOLOGICAL SOCIETY

OF

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Smithsonian Institution
JUN 22 1912
National Museum

Volume XIV, No. 2.

APRIL -- JUNE, 1912.

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# THE
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# OF WASHINGTON

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The regular meetings of the Society are held on the first Thursday of each month, from October to June inclusive, at 8 P. M.,

Annual dues of active members, $3.00; of corresponding members, $2.00; initiation fee (for active members only), $1.00.

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## ENTOMOLOGICAL SOCIETY OF WASHINGTON.

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PROCEEDINGS

OF THE

# ENTOMOLOGICAL SOCIETY

## OF WASHINGTON.

VOL. XVI APRIL - JUNE, 1912. No. 2

### MEETING OF JANUARY 4, 1912.

The 255th regular meeting of the Society was entertained by Mr. Crawford at the Saengerbund Hall, 314 C Street, NW. on the evening of January 4, 1912, and there were present: Messrs. Babcock, Baker, Busck, Caudell, Crawford, Cushman, Dyar, Ely, Gahan, Hall, Heidemann, Howard, Hunter, Hyslop, Jennings, Johnson, Knab, McAtee, Morgan, Meyers, Pierce, Popenoe, Quaintance, Rohwer, Runner, Russell, Sasscer, Schwarz, Scott, Vickery, Viereck, Walton, and Webb, members, and Messrs. E. B. Blakesley, Frets, Johannsen, E. H. Siegler, F. L. Simaton, and W. B. Woods, visitors. President Quaintance occupied the chair.

The minutes of the preceding meeting were read and approved.

A letter was read from Mr. Gilbert, expressing the thanks of Mrs. Gilbert, mother of the late F. C. Pratt, for the action of the Society in calling a special meeting on June 3, 1911, for the purpose of drawing up resolutions in recognition of the entomological work of her son.

Mr. Vickery proposed the name of Mr. M. M. High, and Professor Quaintance the name of Mr. E. H. Siegler, both of the Bureau of Entomology, U. S. Department of Agriculture, for active membership. Under suspension of the rules both were elected.

Mr. Schwarz, chairman of the committee of one appointed by the Executive Committee to arrange for the smoker given

in honor of the visiting Entomologists, attending the meetings of the American Association for the Advancement of Science, Friday night, December 29, 1911, reported that $61 had been collected and that the total expenses amounted to $60.10, leaving a balance of 90 cents. Mr. Schwarz moved that the excess be turned over to the Treasurer of the Society. Carried.

Dr. Howard moved that the committee be discharged with thanks. Carried.

The Recording Secretary reported that there were one hundred and four present at the smoker. Dr. Howard moved that a list of those in attendance be included in the Proceedings. Carried.

The first paper of the evening, "Some Notes on Insects Abundant in Texas in 1911" was read by Mr. Hunter.

The second paper, "On the Ants of Victoria County, Texas," by W. Dwight Pierce and J. D. Mitchell, was read by Mr. Pierce.

The third paper, "Classification of Aleyrodidæ," by A. L. Quaintance and A. S. Baker, was read by Professor Quaintance.

The fourth paper of the evening, "Some Notes upon *Ornithodores talaje*," was read by Mr. Jennings.

List of Persons Present at the Smoker December 29, 1911.

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Banks, Nathan
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Crawford, J. C.
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Dyar, H. G.
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Foster, S. W.
Gahan, A. B.
Heidemann, Otto
Hopkins, A. D.
Howard, L. O.
Hunter, W. D.
Hyslop, J. A.
Jennings, Allan H.
Johnson, F. W.
Knab, Frederick
Marlatt, C. L.
Morgan, A. C.
Morris, E. L.
Meyers, P. R.
Nelson, Jas. A.
Phillips, E. F.
Pierce, E. D.
Popenoe, C. H.
Quaintance, A. L.
Rohwer, S. A.
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Sanford, H. L.
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Bartlett, O. C.
Berger, E. W.
Blakeslee, E. B.
Bradley, J. C.
Brooks, F. E.
Calvert, Philip P.
Conradi, A. F.
Cooler, R.
Craighead, F. C.
Crosby, C. R.
Demuth, Geo.
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Emerton, J. H.
Felt, E. P.
Fisher, A. K.
Fulton, B. T.
Goodwin, W. H.
Grosvenor, G. H.
Headlee, T. J.
Hebard, Morgan
Hertzog, P. H.
Houser, J. S.
Hunter, S. J.
Illingworth, J. F.
Johnson, C. W.
King, J. L.
King, W. V.
Leonard, M. D.
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McGregor, E. A.
McLaine, L. S.
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Mason, Elmer B.
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Wood, W. B.
Worsham, E. Lee
Yothers, W. W.

## NOTE ON DEVA ORNATA OTTOLENGUI.

(Lepidoptera; Noctuidæ.)

By Harrison G. Dyar.

In volume IX of the Cat. Lep. Phal. (p. 532, 1910), Sir G. F. Hampson includes this species in his list of "species omitted" with the note "? *Chalcopasta*, sect. with long upturned palpi." The type is before me, and I am of the opinion that the above brief remark aptly describes the relationship of the species. However, the effect of the presence of long palpi covering the front has been to entirely obliterate the frontal tubercular structure, the front being gently bulging, perfectly smooth, without any trace of the usual tubercle. This prevents the inclusion of the species in *Chalcopasta*, in spite of the conformable facies and thoracic tufting, so that a new generic term must be employed. I propose Rodriguesia, for Dr. R. Ottolengui, who originally indicated that the genus was new, but did not name it. The front legs are missing in the type, but presuming that a claw is present, the genus falls in the table on page 3 of vol. IX above mentioned, where it will form a new section between *Xanthiria* and *Pseudoligia*, "Frons with rounded prominence without corneous plate below it."

## SOME NOTES ON INSECT ABUNDANCE IN TEXAS IN 1911.

By W. D. Hunter,
*Bureau of Entomology, U.S. Dept. of Agriculture.*

These notes are not presented with the idea that they are of any special importance, but it is believed that when similar notes are placed on record from different seasons that some light may possibly be thrown upon the laws which govern the sudden increase of species. In the case of injurious forms this may be of economic importance.

Fluctuations in numbers of insects from season to season are apparently brought about primarily by enemies and by climatic conditions. The conditions in Texas in 1911 were very peculiar. The most striking feature was a marked deficiency in precipitation. Early in the spring the departure from the normal began and continued until about the first of August. So great was the effect of the drought that all vegetation in the State was affected. The corn crop was practically ruined and a similar disaster would have overtaken the cotton crop if it had not been for rains which came just before they would have been too late. Drought prevailed also during the season of 1910 and again in 1909. In fact, 1911 was the culmination of three years which were marked by extreme conditions of dryness. At the same time temperatures had occurred which theoretically would seem to be decidedly adverse to insects. One of the most remarkable occurrences of this kind was the killing frost of October 29, 1910, which took place considerably in advance of the normal date. All these circumstances combined to cause a set of conditions which would have been supposed to have contributed to the scarcity of insects rather than to their abundance. On this account the notes to be presented may be of some special interest. It may be stated parenthetically that the cotton boll weevil was the only important species which seems to have behaved as would have been expected. It was properly subjugated by the drought.

The most conspicuous example of insect abundance in 1911 in Texas was that of *Alabama argillacea* Hbn. This matter has been discussed elsewhere recently and will be passed over in this connection, more especially since it concerns a species which became abundant by an invasion of the country and not by sudden increase from a local source.

Two enemies of the cotton worm assumed very large numbers. One of these was *Calosoma lugubre* Say. This is not an uncommon insect in Texas and is found at the electric lights in some abundance during practically every season.

The normal swarms at the lights, however, were exceedingly insignificant compared to the enormous numbers to be found in the fall of 1911. The abundance became most marked about October 8, but continued until the last days of that month. The maximum flight occurred on October 11. At that time, in places where strong arc lights were to be found, it would have been possible to have collected several barrels of the insects in a very short time. No other species of *Calosoma* were observed. Special observations were made to determine whether *scrutator*, *willcoxi*, or *calidum* or other more or less common species were to be found, but without result. Undoubtedly the invasion of *Calosoma* was due to the great numbers of the cotton worms to be found in the fields at that time. The flight was general, as was shown by notes made at Victoria, Texas, by Mr. J. D. Mitchell and accounts which appeared in the newspapers. By the end of October the beetles had practically disappeared.

The other enemy of the cotton worm which appeared in great numbers was *Chalcis ovata*. At the laboratory in Dallas during October and November a dozen specimens were sometimes found upon a single window at one time. This is undoubtedly another example of a rapid adjustment to an abundant host supply furnished by the increase in the numbers of the cotton worm.

*Termes flavipes* K. is not uncommon in Texas, where swarms occur ordinarily during the early part of the season. In 1911, however, the insect did not come into notice until about the middle of October. At that time much more than usual numbers were to be seen throughout the State.

*Gryllus pennsylvanicus.*—This species occurs in great numbers almost every season in Texas. The origin of the swarms is not known. In October, 1911, a very unusual flight began and the number of the insects present about the electric lights far surpassed the numbers seen at any time during the writer's more than ten years' experience in the State.

*Sphenophorus parvulus* is a rather uncommon species which feeds upon the roots of Bermuda grass. Mr. W. D. Pierce made notes on the abundance of this species. During the early part of November, in a walk of four or five blocks from the laboratory at Dallas, he would frequently see from 50 to 100 adults. Only isolated specimens had ever been observed on previous occasions. This species was not attracted to lights.

*Athysanus exitiosus* Ball.—This species was undoubtedly the most conspicuous during the season on account of its swarms about electric lights. The occurrence of this insect

in large numbers is not uncommon, but during 1911 the numbers were far in excess of those usually seen. In Dallas, Texas, the swarms were so dense that some of the arc lights were extinguished and great inconvenience was caused in shops and homes on account of the ingress of the insects. Its small size allowed it to pass through the meshes of such screens as are used to keep out mosquitoes and house flies. To say that it was found in millions upon millions around lights both within and without buildings gives but an inadequate idea of the incalculable numbers that were present. The invasion resulted in the closing of many shops as soon as darkness began. This began on September 18 and continued until the 25th. After the latter date the numbers dropped off very rapidly.

This species occurred in great numbers in many places outside of Texas. Prof. F. M. Webster informs the writer that swarms similar to those which occurred at Dallas were observed at Wellington, Kansas. At that place they appeared first on September 20.

Along with the specimens of *Athysanus exiliosus* were numerous other Hemiptera which Mr. O. Heidemann has determined as indicated below. It will be noted that a considerable number of predatory forms occurred.

*Dræcucephala reticulata* Ball.
*Xerophlea viridis* Ball.
*Pamera bilobata* Say.
*Julisus multispinosus* Ashm.
*Harmostes reflexulus* Stal.
*Mecidea longula* Stal.
*Reuteroscopus ornatus* Reut.
*Lygus approximatus* Reut.
*Pœciloscytus basalis* Reut.

This swarming attracted all the more attention by reason of the fact that it was simultaneous with the swarming of *Calosoma lugubre* and *Alabama argillacea*. In fact, there was such a conglomeration of species in such unsurpassed numbers of individuals that the incident will long be considered historic by the residents of Texas.

Records of the observation of enormous numbers of May flies are not uncommon in the literature. The only special interest of the present note is on account of the southern locality. Apparently the great flights which have been observed have taken place in much more northern localities, as along the St. Lawrence River and the Great Lakes. In May Mr. J. D. Mitchell observed remarkable multitudes of *Hexagenia bilineata* Say on the Guadalupe River below Victoria. This locality is at least a hundred miles south of the latitude of New Orleans. The occurrence is well described in Mr. Mitchell's notes, which read as follows:

We ran into a swarm of May flies about ten miles above the junction of the Guadalupe and San Antonio rivers at about 3 p. m. They were clinging to the overhanging trees and as the boat would brush against the trees, distrubing the flies, clouds of them would flutter in the air. Great patches of them would fall into the river and thousands would light on the boat. This condition continued until we reached Tivoli, on the west bank of the river, in Refugio County, where we tied up for the night. We sailed 11 or 12 miles by the river through the flies. The deck in places was slippery from stepping on their bodies and the sides and parts of the boat not swept by passing tree tops were covered with them, in places so close together as to obscure the color of the wood.

Next morning, May 25, I arose at daylight and there appeared to be a heavy fog over the river. As daylight increased I observed that the fog was May flies. The wind was very light and they were all flying upstream. The swarm filled the river space from timber to timber and from water surface to about 8 feet high. The current threw the dead ones to the center of the river, where they formed a broad gray streak of drift. By 7:30 a. m. the bulk of the swarm had lit on the overhanging trees, until they bent the limbs and obliterated the natural color of the tree trunks.

These fragmentary notes are presented merely because they may be of use when taken in connection with others that may be presented. No adequate explanation of the great abundance that has been noted occurs to the writer. All that can be said is that they show a very remarkable ability on the part of insects to survive very adverse climatic vicissitudes.

Mr. Knab stated that on a visit to South Carolina, in early August, he had observed a most remarkable abundance of the larvæ of a buprestid leaf-miner, undoubtedly *Brachys*. It was at Swansea, 20 miles south of Columbia, in the sand region of the central part of the State. The predominating trees in that region are the oaks and these all showed an abundance of the brown blotch-mines on the leaves. So abundant were they that the aspect of the landscape was transformed, many of the trees appearing as if dying. On some trees every leaf was infested, and frequently there were two or three larvæ in one leaf. He had sent a quantity of leaves containing larvæ to the Bureau of Entomology, but they were not reared.

Dr. Howard said that while the problem of the increase of the species mentioned after such remarkably dry seasons is a complicated one, it is obvious that such conditions of

drought would favor the increase of such insects as are customarily greatly reduced in numbers by fungus diseases. He mentioned a rapid assembling of *Calosoma willcoxi* at Huntsville, Alabama, in 1881, during an outbreak of the army worm, as resembling the instance mentioned by Mr. Hunter. He also said that *Chalcis ovata* is a general parasite of lepidopterous pupæ and that its appearance in Texas last summer was simply another assembling of individuals and concentration of the whole in the cotton fields so abundantly stocked with those insects.

## NOTE ON A STERICTA FROM TROPICAL AMERICA.

(Lepidoptera; Pyralidæ.)

By Harrison G. Dyar.

**Stericta albifasciata** Druce.

*Cecidiptera albifasciata* Druce, Ann. Mag. N. H., (7) IX, 325, 1902.

*Male.*—Process of antenna reaching back to middle of thorax; palpi upturned, much exceeding the vertex. Thorax dark gray, intermixed with olivaceous and purplish; abdomen pale ocherous. Fore wing purplish, intermixed with olivaceous, clouded with blackish in the end of the cell and along inner margin to base; a large round pure white patch across the center of the cell to submedian; inner line beyond the white patch, geminate, dark outer line rather near the margin, crenulate, followed by a light shade like the pale filling of the inner line, gently curved, bent in a little on submedian; a row of terminal black dashes. Hind wing whitish, the apex and fringe shaded with purplish, in which traces of a pale submarginal line are visible. Expanse, 25 mm.

*Female.*—Similar to the male, but without the white patch. Basal space darkly shaded to the inner (mesial) line, with a black streak along submedian fold and one in cell; no dark shade beyond the inner line at end of cell, but instead a small dark discal dot, followed by a median blackish line, which is angled in the center and lost below. Hind wings more yellowish and sordid than in the male, the marginal dark shading more extensive. Expanse, 30 mm.

One male, St. Jean, Maroni River, French Guiana, July, 1904 (W. Schaus); one male, one female, St. Joseph, Trinidad, December and January, 1910, larvæ in nests on avocado (F. W. Urich).

The species extends throughout tropical America, having been originally described by Druce from Ecuador and Peru. It has been taken in Costa Rica by Schaus and in Mexico (Misantla, May, August, November, 1910, June, 1911) by Müller. The identification has been made by Mr. Schaus, who compared specimens in London.

## THE ANTS OF VICTORIA COUNTY, TEXAS.

By J. D. Mitchell and W. Dwight Pierce,

*Bureau of Entomology, U. S. Dept. of Agriculture.*

The present paper is presented in pursuance of a plan to list the insects of Victoria County, which presents so many types of fauna and flora. The first paper of the series, entitled "The Weevils of Victoria County, Texas," published in volume XIII, pages 45 to 62, of these Proceedings, gives a discussion of the peculiarities of the county, and it is therefore unnecessary to mention them again. The ants listed and discussed below have almost entirely been determined by Dr. W. M. Wheeler, to whom we express our appreciation for his many kindnesses. Forty-six forms of ants are herewith listed, which gives the county one-third of the entire number of forms (140) listed for Texas by Dr. Wheeler in his recent volume on "Ants; Their Structure, Development, and Behavior." We would call especial attention to the notes on the dispersion of several species by floods.

### PONERIDÆ.

**Pachycondyla harpax** Fabricius.

This large black species nests on the ground under logs, between the bark and log, or in badly decayed logs. It has been found in this county only in the moist sections, such as river bottoms and near the margin of lakes. The colonies are comparatively small, none having been found with more than 150 adults. A colony consisting of only 1 queen, 3 males, and 16 workers was found. Colonies found in February are generally hibernating, all of the ants being closely huddled and quiet. Winged ants have been found February 2, but the first immature stages were found early in March. The pupæ are protected by a cocoon. Workers have been taken foraging under cow chips (Mitchell).

**Ponera trigona** (Mayr) **opacior** Forel.

Several workers were found in the roots of *Chenopodium* on March 29, 1909 (Mitchell). Two colonies have been taken in February on Garcitas Creek in cavities in the ground under sticks. One colony consisted of 13 workers and the other of 20 workers.

**Leptogenys (Lobopelta) elongata** Buckley.

This elongate brown species has been frequently taken in this county between February 3 and March 16, and invari-

ably under logs in the river bottoms. On February 26 ten ants were found in a bunch with a single pupa (Mitchell). Specimens have also been taken November 19 (F. C. Pratt).

**Odontomachus clarus** Roger.

This species was taken in an adjoining county on June 19, 1907, on *Anthemis arvensis* (Mitchell). The species has been found resting in the ground.

**Ectatomma tuberculatum** Olivier.

This ant was colonized in Victoria County from Guatemala in the years 1904, 1905, 1906. The colonies were of rather small size. Their foraging habits were very closely watched. They are very fond of honeydew and nectar, but also require insect food. The short-sightedness and feeble sensory powers render an abundance of insect food necessary to furnish the wants of the colony for solid food. At Victoria in July they were most active about 8 o'clock in the morning and from 3 to 7 in the afternoon. It was noticed that while considerable food was stored in food chambers, the small native ants generally made away with most of it. The distance foraged was seldom over 10 feet. The ants were observed to kill boll weevils (*Anthonomus grandis*), caterpillars, and other ants. Whenever individuals of *Pogonomyrmex barbatus* encountered one of the strangers there was a struggle and the native ant lay dead, but in the end the cooperation of *Pogonomyrmex* prevailed over the individual prowess of *Ectatomma*, which seems to have no instinct prompting mutual help. All attempts to establish this species firmly appear to have ended disastrously (Pierce).

## DORYLIDÆ.

**Eciton cœcum** Latreille.

This species was found nesting March 4, 1910, in alluvial soil. The workers were of three sizes. Males have been taken many times at lights of houses and camp fires in this and surrounding counties (Mitchell).

**Eciton (Acamatus) opacithorax** Emery.

A large aggressive colony was taken under a dead log, April 14, 1909 (Mitchell).

**Eciton (Acamatus) harrisi** Haldeman.

This species was collected at Victoria, Texas, September 18, 1904.

**Eciton (Acamatus) mexicanus** F. Smith.

This species was collected July 6, 1905, by A. McLachlan.

## MYRMICIDÆ.

**Pseudomyrma gracilis** (Emery) **mexicana** Roger.

These peculiar looking ants are always found near water courses and lakes. The colonies are usually small. They have never been seen with more than 30 in a colony. On May 25, 1909, a colony consisting of queens, males, workers, pupæ, and larvæ was found in a dead limb of a live-oak tree. On May 17, 1909, a similar colony was found with winged queen and male, workers, and male and female pupæ. On October 25, 1909, a colony consisting of only 3 workers, 4 larvæ, and 2 pupæ was found in a dead live-oak twig. On March 4, 1910, a single ant was taken on a willow tree. March 3, 1911, two colonies were found in abandoned live-oak twig galls of *Amphibolips*. Workers have been taken on grapevine December 19, 1910, and on mistletoe January 16, 1911. A colony consisting of queen, 3 pupæ, and 3 larvæ of different sizes was found in an empty blackjack acorn on the ground October 25, 1911 (Mitchell).

**Pseudomyrma pallida** F. Smith.

A colony of this yellow ant was found in a stem of *Iva ciliata* January 17, 1910 (Mitchell).

**Pseudomyrma flavidula** F. Smith.

This species is usually found in the neighborhood of water courses and lakes. The colonies are sometimes large. On December 15, 1908, a colony consisting of winged forms, workers, and larvæ was found in a stem of *Solidago*. A nest was found in the stem of a dead *Xanthium* January 16, 1909. On March 19, 1909, a colony of females, workers, larvæ, and eggs was found in a stem of *Iva ciliata*. On January 28, 1910, a colony was taken in the stem of *Ambrosia trifida*, and in another large stem of the same species several connected colonies were found—there were 3 or 4 queens. A colony was found in a stem of *Iva ciliata* February 12, 1910, and on February 19 one was found in *Ambrosia*. March 16, 1911, in a stem of *Iva ciliata*, a queen, 30 workers, and 61 immature stages were found (Mitchell).

**Psudomyrma brunnea** F. Smith.

A small colony of workers and larvæ was found in a dead twig March 6, 1909. A worker was taken on mistletoe January 16, 1911 (Mitchell).

**Monomorium pharaonis** Linnæus.

This introduced ant has not only been a bad pest in the house, but has also been found nesting in the woods under bark of pecan and elm logs and also under the bark of a live pecan tree (Mitchell). This species has been taken attacking the immature stages of the boll weevil (W. W. Yothers).

**Monomorium carbonarium** F. Smith.

Workers of this species were three times found in buds of *Callirrhoë involucrata* devouring larvæ of *Anthonomus fulvus*, May 24, 1907. They were also found in the blooms at pollen. On February 24, 1909, a colony including queens, workers, and larvæ was found under bark of a dead elm log. A small lot of ants was taken March 6, 1909, from cells of *Araeerus fasciculatus* in dried cornstalks. A nest with a few immature stages was located in a decaying ash stump, March 27, 1909 (Mitchell).

**Monomorium minimum** Buckley.

Under the bark of a willow log on March 12, 1911, an enormous colony was uncovered. This embraced practically the entire upper surface of the log for a distance of 33 feet. The entire space was connected by many galleries and every 3 to 6 inches was a queen with young. Four queens were observed in one batch of immature stages. On May 22, 1909, a colony with 7 queens was found under the bark of a dead sycamore (Mitchell).

**Solenopsis geminata** Fabricius.

The fire ant is very common in Victoria County. It nests in logs, stumps, and in the open ground and frequently invades dwellings. It has been taken as an enemy of the boll weevil by W. E. Hinds, July 22, 1907. It was taken in abundance on mistletoe (*Phoradendron flavescens*) January 16,1911 (Mitchell).

**Solenopsis geminata** (Fabricius) **diabola** Wheeler.

This is the commonest variety of this ant at Victoria.

**Solenopsis texana** Emery.

This tiny species is usually found in the wooded country, as the following records show. On February 24, 1909, a colony was found under bark of a dead elm log. It contained 2 queens, many workers, pupæ, and larvæ. On April 19 colonies were found in a rotting pecan log and in tree fungus; on April 26 in elm stumps; on May 20 and 22 under bark of pecan trees, each colony with one or more queens (Mitchell).

**Solenopsis** sp.

A very tiny species of ant has been taken quite frequently nesting in dead pecan twigs and under bark.

**Pheidole dentata** Mayr.

Colonies of this ant are very large and when disturbed they swarm out in large numbers, seeking the intruder and making it interesting for anyone desiring to make close observations. In defending their nests they are only surpassed by the giants *Neoponera villosa*. They build in dead wood, in the ground under logs, chunks, and stones, and occasionally among the roots of vegetation. In April, 1897, the senior writer observed a colony in high water floating down the Guadelupe River. They were on a chunk of dead wood, which was almost submerged. The ants were collected on the upper part in two clusters, with a string of workers connecting them. One bunch protected the queen, the other the immature stages. They fought savagely to protect both queen and young. On February 16, 1909, a colony was taken from a rotting log in the river bottoms. Other colonies were found in similar places March 20 and April 14. On May 22, 1909, a large colony was found in a pecan log. Many pupæ were in the act of molting to adults. When the nest was disturbed the workers and soldiers did not show their usual aggressiveness, but gave their attention to the unfortunate immature adults, caring for them as they would for larvæ or pupæ (Mitchell).

**Pheidole** spp.

Other species of *Pheidole* occur in the county, but have not been determined.

**Cremastogaster lineolata** Say.

A worker was collected in the cell of a beetle larva in a root of *Chenopodium*, February 20, 1909. A colony was collected in a live-oak twig gall of *Amphibolips* May 18, 1909. Workers were collected on mistletoe January 16, 1911 (Mitchell).

**Cremastogaster lineolata** (Say) **læviuscula** (Mayr) **clara** Mayr.

On March 4 and 7, 1910, colonies of this form were found nesting under bark of live and dead willow trees (Mitchell).

**Cremastogaster ashmeadi** Mayr.

Specimens were collected April 8, 1907 (Mitchell).

**Aphænogaster fulva** (Roger) **aquia** (Buckley) **texana** Emery.

A large colony of this species was found in a decaying log. They were very fierce (Mitchell).

**Pogonomyrmex barbatus** (F. Smith) **molefaciens** Buckley.

This common hillock ant occurs all over Victoria County. The majority of the colonies clear a space aroung the hole from 3 to 6 feet in diameter. Their runways are also bare of vegetation and may extend 50 feet or more; one pathway was an inch wide and extended 125 feet. The ants cut off the plants in their way and remove the débris to the side. On sunny days one can always see a steady stream of foragers on these paths, those going homeward carrying either seed or insects. Numerous large caterpillars and a cricket were seen carried into the nests. Near the hole there is usually a pile of seed hulls, which are brought out of the nest about as fast as seed are taken in. As rainy weather approaches the foragers all hurry home and no others go out. Several times remains of this ant were found in the excrement of the horned toad (*Phrynosoma cornuta*), and one colony was absolutely exterminated before the enemy left it (Pierce). The males and females swarm out of the nests in May and June, usually just after a rain, covering the ground for many feet around the nest. Here the mating takes place, after which the females fly. When they alight, they cast their wings and begin digging a cell for a new colony. The males are driven away by the workers or killed if they persist in returning. The swarming is a harvest for the birds. A colony of nesting jackdaws was observed to clean up an entire swarm in a short time. Woodpeckers destroy a great many. Doves have been credited with feeding on this ant, since they have been often seen picking on the ant hillocks. The senior writer has killed several doves on the hillocks but has found no ants in their crops. The doves were probably collecting the fine gravel brought up by the ants. The workers are fierce in defending their home, never running from an enemy. Their sting is very painful, but not dangerous.

During heavy rains or floods the ants collect on top of the hillock and await the falling of the water. They have been observed several times floating in a mass on the water anchored to weed stems, the most important observations of this kind having been made during the great storm of September 15 to 17, 1875, which drowned thousands of quail, grouse, rabbits, and skunks.

**Leptothorax** sp.

On April 17, 1908, a complete colony was found in the hollowed interior of a green fruit of *Opuntia*. Workers were found March 19, 1909, in a dead twig of *Xanthoxylum clava-herculis* (Mitchell).

**Macromischa subditiva** Wheeler.

On January 7 a colony, composed of queen, workers and eggs, was found under bark of willow (Mitchell).

**Cryptocerus angustus** Mayr.

A colony was found in an oak twig gall, January 5, 1907. On March 19, 1909, a colony, composed of 3 queens, soldiers, workers, larvæ, and eggs, was found in a dead twig of *Xanthoxylum clavaherculis*. On April 6 another colony with larvæ was found in a dead pecan twig on the tree, and on May 18 a colony with larvæ and pupæ was taken in a dead twig on a live oak tree. On October 25 a colony in live-oak twig was found with adults and pupæ only. March 16, 1911, two colonies were taken from live oak twig galls of *Amphibolips* (Mitchell).

**Strumigenys louisianæ** Roger.

On March 6, 1909, a populous colony with larvæ was found in a lepidopterous burrow in mitsletoe (*Phoradendron flavescens*). On March 19 workers were found in the roots of *Chenopodium* (Mitchell).

**Atta texana** Buckley.

On July 23, 1904, a colony of this leaf-cutter ant was visited, which was doing considerable damage to beans. They were not injuring the leaves, but were cutting portions of the bean-pod hulls. A very large caste were guarding the entrance to the holes, a slightly smaller caste were doing the cutting, the next caste were picking up the cut bits and carrying them in, and two smaller castes were carrying out dirt (Pierce). In May, 1892, a large number of winged forms passed from north to south on Main street, Victoria. The swarm was about 30 feet long and over 8 feet wide. They traveled south in a zigzag path for two blocks and then began flying away singly. On one occasion a large mass of these ants was observed floating in the Guadelupe River. The mass was about 2 feet across, and the ants were clinging to each other. They had drifted into quiet water and were held by débris (Mitchell).

## DOLICHODERIDÆ.

**Dorymyrmex pyramicus** Roger.

This species nests in hard ground on the prairie. The workers are very quick and secretive in their actions.

**Dorymyrmex pyramicus** (Roger) **flavus** Pergande.

This form also nests in the ground on the prairie. Workers have been taken on plants. On February 20, 1909, a worker was taken from the cell of a beetle larva in a root of *Chenopodium*. It has been taken on *Helenium*, October 28,1907, and on *Croton*, September 19 (Mitchell).

**Iridomyrmex analis** Ern. André.

Taken on *Acacia*, July 8, 1907 (Mitchell). The species nests in the ground.

**Forelius maccooki** Forel.

Winged forms were taken at lights, July 13, 1910. Workers were collected on *Helianthus* September 8, 1907 (Mitchell). This species nests in hard ground.

## CAMPONOTIDÆ.

**Prenolepis (Nylanderia) longicornis** Latreille.

Specimens were found in huisache (*Vachellia farnesiana*) pods, September 21, 1908 (Mitchell).

**Prenolepis (Nylanderia) vividula** Nylander.

A colony of seven queens, workers, and larvæ was found under bark of a pecan tree, one foot from the ground, January 22, 1910 (Mitchell).

**Prenolepis (Nylanderia) vividula** (Nylander) **melanderi** Wheeler.

Large numbers of winged forms were collected, flying, running, and mating, March 2, 1909. A winged male was taken on mistletoe January 16, 1911 (Mitchell). The species has been found nesting under logs.

**Formica pallidefulva** (Latreille) **schaufussi** (Mayr) **meridionalis** Wheeler.

Collected at Victoria, August, 1904 (C. M. Walker), and at Edna, May 7, 1907 (Mitchell).

**Camponotus herculeanus** (Linnæus) **pennsylvanicus** DeGeer.

This large black ant occurs in the wooded regions. On May 7, 1908, a nest was found in a post-oak tree, 8 feet from the ground. The ants on the ground were in combat with *Pogonomyrmex barbatus molefaciens*, and seemed to get the worst of the fray. On March 24, 1909, a terrific wind storm broke off the top of a cottonwood tree. A colony of this species was located in the decayed section, which had been fully 40 feet from the ground before the accident. After

sawing out the section containing the nest it was split open with an ax. There were many hundreds of ants, and from the first blow to the last they were busy, each class to its own work. The large, heavy-jawed individuals, comprising about two-thirds of the colony, came out to fight. They were active and aggressive, spreading out 3 feet from the log in every direction, seeking their enemy. In defense they were far inferior to *Neoponera villosa*. The larvæ were very few and were cared for by small, slender workers. February 15, 1910, a colony was found in the center of a decayed willow tree, clustered in several small connected cells, being packed closely for hibernation. The colony consisted of four winged forms, 45 nurses, 61 medium-sized workers, and 74 large foragers. This colony was shipped to Dallas for observation (Mitchell). The winged forms all died en route. The remainder were placed in a breeding-cage. On May 2 a cluster of eggs was noticed surrounded by workers. The eggs hatched in due time, but the larvæ developed very slowly. They were separated into groups June 3. July 9 a cocoon was observed inclosing one of the largest larvæ. July 15 two more cocoons were formed. July 29 a winged male hatched out (H. Pinkus). September 28, 1911, a colony of approximately 1,000 adults was located in a decayed willow log. The soft parts of the wood had been removed from the inside of the log, making irregular cells. The colony consisted of winged males and females, one wingless female, soldiers, workers, nurses, and pupæ. The winged forms were more numerous than the wingless. The nurses were very faithful to their charges. On February 14, 1911, a colony was found in a fallen cottonwood with 300 or 400 winged ants.

**Camponotus planatus** Roger.

A few workers were found on low ground May 8, 1909. They were shy and hid quickly.

**Camponotus fallax** (Nylander) **rasilis** Wheeler.

This species was taken November 6, 1902, on cotton, and also September 18, 1904 (W. E. Hinds).

**Camponotus fallax** (Nylander) **discolor** Buckley.

A colony of this ant was found in a stem of *Xanthium*, December 29, 1908, consisting only of queens, males, and workers. On January 16, 1909, a similar colony was found in the same species of plant. On May 18, 1909, a colony was taken from an old live-oak twig gall of *Amphibolips*. On February 25, 1910, a large colony of winged males, females, and workers was found under the bark of a dead willow tree

(Mitchell). A colony with all forms was found in a lepidopterous cavity in mistletoe, March 8, 1909.

**Camponotus (Colobopsis) abdita** (Forel) **etiolata** Wheeler.

A colony with larvæ was found in a dead live-oak twig, October 25, 1909 (Mitchell).

**Camponotus (Colobopsis) pylartes** Wheeler.

A colony composed of queen, 6 workers, and 4 larvæ was found in a dead twig on a pecan tree, April 5, 1909 (Mitchell).

**Camponotus (Colobopsis) pylartes** (Wheeler) **hunteri** Wheeler.

Colonies composed of queens, workers, and larvæ were found in hollow twigs on pecan trees, April 2 and 12, 1909 (Mitchell.)

In discussing Mr. Pierce's paper, Mr. McAtee called attention to the fact that Mr. Pierce's examinations with negative results of the stomachs of mourning doves which were supposed to be eating ants confirmed previous findings regarding this bird. Mr. Schwarz had examined about 220 stomachs without finding any insects, and the Biological Survey of the United States Department of Agriculture had examined more than 250 with almost the same result. The most interesting animal remains in dove stomachs were apparently weathered segments of millipeds, which indoubtedly were parts of long-dead animals, taken perhaps in lieu of gravel. This called to mind another observation which definitely proves that dead insects are sometimes taken, and which furthermore has bearing on the habits of ants. Two specimens of *Serica* taken from the stomach of a roadrunner (*Geococcyx californianus*) collected at Seaside, California, had the weathered appearance noted above and were in fact mere empty hulks. In the abdominal cavity of one specimen were eight *Momorum muriatum* and in the other two. These little ants were in perfect condition, which proves they were in the bodies of the beetles when swallowed by the bird.

## SOME NOTES ON THE TICK ORNITHODOROS TALAJE GUERIN.

By Allan H. Jennings.

In 1910, while connected with the laboratory of Ancon Hospital at Ancon, Panama Canal Zone, I made a series of observations upon the domestic rats of Panama and their ectoparasites, these observations being continued daily for seven months.

During that time about 2,300 rats were examined. The material was received alive, chiefly from the health officer of the city of Panama, though a small number of animals was sent from Colon, together with a few from the Canal Zone. The species received were, in the order of their abundance, *Mus norvegicus* (brown rat), *Mus rattus* (black rat), *Mus alexandrinus* (roof rat), and *Mus musculus* (house mouse).

When chloroformed and examined for parasites, many rats were found to be infested by large numbers of the larval stage of an argasid tick which was subsequently identified by Mr. Nathan Banks as *Ornithodoros talaje*.

Though taken from all three of the species of rats, the brown rat was by far the most heavily infested and of the many hundreds of the ticks examined but a small percentage was taken upon the other forms, none occurring upon the house mouse. It should be noted that the nesting habits of the brown rat are different from those of the black and roof species in that the brown rat is essentially a burrowing animal, while the nests of the other species are usually above ground, in the walls of houses and even in trees.

Brown rats from Colon were also found to harbor the ticks, though the proportion of animals infested and the degree of infestation was less than among those from the city of Panama. However, the number received from the former city was not great enough to warrant the formation of definite conclusions as to their abundance. But that *Ornithodoros talaje* occurs on the Atlantic side of the Isthmus is certain.

The larvæ were attached to almost all parts of the bodies of the animals, but showed a marked preference for the posterior portion of the dorsum. A peculiarity regarding the points of attachment was that in almost all infested animals, especially in those in which the infestation was heavy, a considerable portion of the parasites could have been easily reached by the teeth of the host, yet they were not destroyed. Thus it would seem that a cetrain toleration for them has been established in the rodent. In many cases in which gross infestation of the dorsum occurred, the irritation caused by

the parasites was so great that a pronounced dermatitis had been set up. This occurred oftenest in fully adult and old individuals in which the coat was coarse and scanty.

With the exception of two nymphs taken from one *Mus norvegicus*, all of about 3000 of the ticks examined were larvæ, it being evidently the habit of the species to drop from the rodent host before molting into the nymphal stage.

A number of full-grown larvæ which survived anæsthesia were preserved alive, and though attempts to induce them to reattach to white rats failed, they molted, and as nymphs survived without food for about five months, during which period at least one molt occurred.

The feeding habits of the nymph are not known to me, but in Panama, as is known to be the case elsewhere, the adult attacks man, adopting the habits of the bedbug. Whether the rat shares with man the attentions of the adult tick I do not know, though this is indicated.

From the abundance of the larvæ upon Panama rats, the adults should be numerous in the houses of the poorer classes in that city, but efforts to secure specimens were unavailing. It is probable that the inhabitants do not distinguish accurately between the species and *Cimex lectularius*, specimens of which latter were invariably brought when "mamones," the native name for this tick, were asked for and promised by the collectors.

They occur in villages of the interior, Dr. Darling having collected them at Chorera, where the people showed evidences of their attacks. Their abundance there is probably less than in Panama if the numbers of the larvæ observed in the latter place is a sufficient indication. This may be due to the fact that *Mus rattus* is the common house rat of the country districts, while the brown rat prevails in the urban portions of the city of Panama. This hypothesis implies that the preference manifested by the tick for the brown rat is constant and not due to local conditions, further observations being necessary to establish the fact.

I believe this to be the first record of the domestic rat serving as host for the larvæ of *Ornithodoros talaje*. The double rôle as parasite of rodent and man played by this species, suggests the possibility of disease transmission from one to the other of these hosts.

## THE CLASSIFICATION OF THE ALEYRODIDÆ.

Messrs. A. L. Quaintance and A. C. Baker presented a paper dealing with the principles of classification of the Aleyrodidæ which they had determined as a result of the study of the forms thus far known. A new subfamily was established and several new genera and species described. The paper treats of all known members of the family, except those belonging to *Aleyrodes*, which will be made the subject of a subsequent publication. The paper in full will be issued in the Technical Series of bulletins of the Bureau of Entomology, United States Department of Agriculture.

Under the heading "Notes and Exhibition of Specimens," Mr. Knab spoke of the dependence of disease transmission by blood-sucking insects upon habits. This seems to have been overlooked by investigators of this subject and many insects have been suspected which, from the present viewpoint, must be eliminated. In order to be a potential transmitter of human disease an insect must be closely associated with man and normally have opportunity to suck his blood repeatedly. It is not sufficient that occasional specimens bite man, as is the case with forest mosquitoes. Although a person may be bitten by a large number of such mosquitoes, the chances that any of these mosquitoes survive to develop the parasites in question, and then find opportunity to bite and infect another person, are altogether too remote. On this principle Simuliidæ and Tabanidæ, as well as the numerous sylvan mosquitoes, can be confidently eliminated. Moreover, most of these insects are active only during a limited season and consequently there is too great an interval during which no transmission could occur.

The truth is that all insects that have been found to be transmitters of disease are more or less closely associated with man and habitually suck his blood. This has long been recognized in the case of the two house-mosquitoes of the tropics, the one (*Aëdes calopus*) being the intermediary host of the yellow fever organism, the other (*Culex quinquefascia-*

*tus*) of those of filariasis and dengue fever. It is only through a combination of circumstances that these insects are effective transmitters. These conditions are: the association with man and a predilection for his blood, abundance, comparative longevity, and consequent repetition of blood-meals at intervals, and finally, practically continuous breeding, so that individuals are always present to act as intermediary hosts of the parasites. Thus the chain in the life-cycle of the parasite is never broken.

The relation of the different species of *Anopheles* to the transmission of malaria seems never to have been considered in this light. It was, however, brought out in an interesting manner in a paper on mosquito-control in the Panama Canal Zone, read by Mr. Jennings at the recent meeting of the Association of Economic Entomologists. Mr. Jennings pointed out that the different species of *Anopheles* of that region have widely different habits. Investigation of the rôle of these different species in the transmission of malaria, by inducing them to suck the blood of malaria-carriers, showed that the species (*Anopheles albimanus*) which throve most about settlements, and was most persistent in entering houses and obtaining blood, was the principal factor in malaria transmission, no less than 70 per cent of this species developing the parasites. Mr. Knab said that in commenting on Mr. Jennings's paper he pointed out these facts and in addition gave further evidence of the close association of *A. albimanus* with man, imparted to him by Mr. Jennings in conversation.

It appears that this species is absent from those parts of the upper Chagres River which are uninhabited and that the reason is that this mosquito not only prefers, but probably needs, human blood. Mr. Knab said that his remarks before the Economic Entomologists had been met by the assertion of Mr. Schwarz that the absence of *A. albimanus* from the upper Chagres had nothing to do with the absence of man, but was due wholly to the lack of suitable breeding-places. Mr. Knab stated that Mr. Schwarz was certainly in error and that there were plenty of suitable habitats for the larvæ of *A. albimanus*, at least in parts of the uninhabited region under consideration.

Dr. Howard called attention to the paper by Dr. Lutz of Brazil, on forest mosquitoes and forest malaria, which appeared to contradict Mr. Knab's statements.

Mr. Knab replied that he had just discussed this paper from his present viewpoint with Dr. Dyar. They had reached the conclusion that Dr. Lutz had misinterpreted the facts. Dr. Lutz's observations were made in the state of São Paulo during the construction of the railroad from the coast to the capital. The first part of the route was through the moist and heavily forested slope from the table-land to the coast, and while at work here a large part of the laborers were afflicted with malaria. Lutz searched for the transmitting *Anopheles*, but could find no breeding-places upon the steep slopes. Finally he determined that a single species of *Anopheles* (*cruzii*) was abundant in the region and that this bred in the water of epiphytic bromeliads. To this species he attributed the outbreak of malaria. It would seem now that the *Anopheles* found by Dr. Lutz probably had nothing to do with the outbreak of malaria among the construction gang. It is a well-known fact that in the tropics most persons apparently in good health have latent malaria. When such an individual comes under some physical strain, such as overexertion, fatigue, or exposure, the disease manifests itself. It therefore seems highly probable that the men observed by Lutz already harbored malaria in a latent form when they came into the region and that the exertion and exposure incident to the work caused the irruption of the disease.

Mr. Busck stated that he had investigated the mosquitoes of the upper Chagres in 1907 and could confirm Mr. Knab's statements with reference to *Anopheles albimanus*. He found that on the uninhabited parts of the Chagres *Anopheles eiseni* was the prevalent species, while *A. albimanus* was not found by him there, and this absence was not due to lack of breeding facilities. He expressed the opinion that at points still farther up on the Chagres, where there are settlements, at San Juan for example, *A. albimanus* would be found.

## Meeting of February 1, 1912.

The 256th meeting of the Society was entertained by Dr. Dyar at the Studio Hall, 1219 Connecticut avenue NW., on the evening of February 1, 1912, and there were present Messrs. Babcock, Barber, Crawford, Cushman, Dyar, Ely, Hammar, Heidemann, Howard, Hyslop, Jennings, Johnson, Knab, Morgan, Pierce, Quaintance, Rohwer, Runner, Sanford, Sasscer, Schwarz, Siegler, Snyder, and Vickery, members, and Messrs. E. B. Blakesley, W. V. King, T. E. Halloway, E. A. McGregor, W. Middleton, F. L. Simaton, and R. S. Woglum, visitors. President Quaintance occupied the chair.

The minutes of the preceding meeting were read and approved.

Mr. Rohwer stated that he had recently received a communication from the Philadelphia Academy of Natural Sciences extending a very cordial invitation to the members of the Entomological Society of Washington to attend their centennial meetings March 19, 20, and 21. Mr. Schwarz moved that Mr. Viereck be elected a delegate to represent the Entomological Society of Washington at these meetings. Carried. President Quaintance suggested that a memorial in the nature of a written communication be sent to the Philadelphia Academy of Natural Sciences. Dr. Howard moved that this matter be referred to the Executive Committee with power to act. Carried.

The names of E. B. Blakesley and H. E. Smith, of the Bureau of Entomology, were proposed for active membership and in accordance with the rules were laid over until the next meeting. The name of P. H. Timberlake, Whittier, California, was proposed for corresponding membership and referred to the Executive Committee.

Dr. Howard stated that it was customary among the affiliated Societies of the Washington Academy of Sciences to nominate their presiding officer for the ensuing year to represent the organization as Vice President, and fearing that the vote of the Society had been misplaced he begged to resign and nominated President Quaintance. On a vote President Quaintance was regularly nominated to represent the

Society as a Vice President of the Washington Academy of Sciences.

The first paper of the evening, "New Microlepidoptera from Mexico," by August Busck, was read by title.

The second paper was "Observations on the Codling Moth," by A. G. Hammar.

The last paper was "An Old Question," by S. A. Rohwer.

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## NEW MICROLEPIDOPTERA FROM MEXICO.

By August Busck.

The following new species are part of extensive collections of Lepidoptera, received from Mr. R. Müller in Mexico City. The species here described are not represented in the material treated in Lord Walsingham's part of the Biologia Centrali-Americana, now soon to be concluded, and are published now so as to be available for the final list of species in that paper.

### Genus METOPLEURA, new (Gelechiidæ)

*Type: M. potosi* Busck.

Second joint of labial palpi very long, porrected, but slightly curved upward, clothed with compressed scales, which form somewhat roughened sharp anterior and posterior edges; terminal joint one-third as long as second, compressed, pointed. Maxilary palpi rudimentary. Tongue well developed, scaled, spiraled. Antennæ simple, shorter than the fore wings. Fore wings ample, elongate; costa and dorsum straight, parallel; apex produced, pointed; termen oblique, slightly sinuate below apex. 11 veins; 7 and 8 coincident, to costa; rest separate; 2 from before apical third of the cell; 3 and 4 approximate from the end of the cell; 11 from the middle of the cell; 6, 7, 8, 9, and 10 equidistant; 1 furcate at base.

Hind wings much broader that the fore wings; costa and dorsum nearly straight; apex bluntly pointed; termen evenly rounded, with a slight sinuation below apex. 8 veins; 3 and 4 closely approximate, nearly connate; 6 and 7 approximate; 5 cubital; 8 anastomosing with radius before the middle of the cell. Posterior tibiæ nearly smooth, but somewhat rough-scaled above.

Allied to and rather similar in general habitus to *Aerotypia* Walsingham, but differing in the palpi, and in having veins 7 and 8 coincident in the fore wings.

In my synoptic generic table this genus runs to *Harpagidia* Ragenot, which is unknown to me in nature, but which would seem to agree with the present genus in venation; the very different labial palpi with the short terminal joint will sufficiently differentiate the present genus.

**Metopleura potosi,** new species.

Labial palpi light straw-colored, speckled with fuscous. Antennæ light fuscous. Face, head, and throax light ochreous. Fore wings ochreous, longitudinally streaked along the vein, with lighter whitish ochreous. From near the base of costa runs an outwardly oblique blackish fuscous streak across half the wing and at apical fourth on the dorsal side is found a poorly defined blackish streak, parallel with termen; both of these markings are easily rubbed off and the majority of the long series before me shows only traces of them. There is a series of poorly defined dark marginal dots around apical and terminal edge. Cilia ocherous mixed with dark fuscous. Hind wings shining, dark fuscous with a light ochreous marginal line on the base of the cilia. Abdomen ochreous fuscous. Legs ochreous speckled with fuscous.

Alar expanse, 30 to 36 mm.

*Habitat:* Cerritos, San Luis Potosi, Mexico, August. R. Müller, collector.

*Type:* No. 14523, U. S. National Museum.

*Cotypes* in British Museum.

**Ethmia proximella,** new species.

Labial palpi white; second joint dusted with black exteriorly. Face and head white. Thorax white with four bluish-black dashes, two anteriorly, two posteriorly. Fore wings white with a broad black costal edging, widest on the middle of the wing; the line between this black costal part and the white dorsal part of the wing is zigzagged and irregular. On the white dorsal part of the wing are a number of round bluish-black dots, of which one is near base, one on the middle of the cell and one on the fold obliquely below; then come three dots in an oblique row, the first on the middle of dorsum, the last on the lower edge of the cell; after these there is further out another oblique row of three equidistant dots and parallel with the terminal edge is an irregular double row of less clearly defined dots. The extreme terminal edge golden yellow. Cilia white with dusky tips. Hind wings smoky white, in the male with a large yellowish costal tuft. Abdomen dark fuscous with yellow tip. Legs ochreous white; tarsi with strong black annulations.

Alar expanses, 17 to 20 mm.

*Habitat:* Tehuacan, Mexico. R. Müller, collector.

*Type:* No. 14524, U. S. National Museum.

*Cotype* in British Museum.

This species was sent me by Mr. Müller as *Ethmia mülleri* Busck, which it resembles in size and ornamentation; it is, however, easily distinguished by the more numerous black dots on the fore wings (in *mülleri* there are only six in three pairs), by the lack of the well-defined terminal series of black dots, and by the presence of the golden terminal line.

The species is even more similar to *E. bittenella* Busck, which is best distinguished from it by the irregularity of the form of the black dots as well as their quite different positions.

**Ethmia abdominella,** new species.

Labial palpi white, dusted and barred with black. Face leaden-white with a large black dot on the vertex and head. Thorax dirty leaden-white, with six black dots. Forewings with costal half dark blackish brown with scattered black longitudinal streaks and with irregular black prominences into the lighter lead-colored dorsal half, which contains three independent black spots. A series of black dots along apical and terminal margin. Cilia dirty white. Hind wings whitish, semitransparent on basal half, with smoky tip and terminal edge. Abdomen golden yellow. Legs dirty white; tarsal joints with indistinct black annulations.

Alar expanse, 30 mm.

*Habitat:* Tehuacan, Mexico. R. Müller, collector.

*Type:* No. 14525, U. S. National Museum.

Nearest to *E. arctostaphylella* Walsingham, but easily differentiated by its larger size and darker head and thorax, also by its additional black spots in the light dorsal portion of the wing.

**Genus CALANTICA Zeller.**

*Type: albella* Zeller.

This genus must, I believe, be included in the family Hemerophilidæ. The type, *Calantica albella* Zeller, has the following generic characters:

Antennæ less than the length of the fore wings, simple. Labial palpi long, thin, weak, upturned, reaching vertex; terminal joint nearly as long as second, tolerably pointed. Fore wings broad, with slightly arched costa, pointed apex, well-defined tornus, and slightly sinuate termen; 12 veins, all separate; 7 to termen; one of my slides shows veins 2 and 3 stalked; in another they are closely approximate. Hind wings are broad as the fore wings; 8 veins; 3 and 4 stalked; 6 and 7 parallel.

In this connection I would call attention to the genus *Herrickia* Staudinger, which in the European check-lists has been placed in the Hyponomeutidæ close to *Calantica* Zeller; if, however, the single specimen of the type of this genus, *excelsella* Staudinger, in the U. S. National Museum is authentic, as it presumably is, determined and labeled by O. Hoffman, this genus belongs to the Œcophoridæ and agrees well with my later genus *Fabiola* in venation and oral characters. As the general habitus is rather different, I prefer not to make *Fabiola* a synonym on the evidence of a single specimen, but the genus should be kept in mind in the future study of the family Œcophoridæ.

**Calantica argentea**, new species.

Labial palpi ochreous white. Face, head, and thorax silvery white. Fore wings shiny silvery white with a single short dark-brown dash on the lower corner of the cell; in some specimens with a few single scattered brown scales on the outer part of the wing. Cilia white. Hind wings silvery white with a slight smoky tinge. Abdomen white. Legs white sparsely dusted with fuscous scales and with last tarsal joint dark fuscous.

Alar expanse, 18 to 23 mm.

*Habitat:* Orizaba, Mexico, August. R. Müller, collector.
*Type:* No. 14527, U. S. National Museum.
*Cotype* in British Museum.

**Tortrix urbana**, new species.

Labial palpi reddish brown with darker tips. Face, head, and thorax reddish brown; antennæ light brown, faintly annulated with black. Fore wings light reddish brown with numerous scattered black scales tending to arrange themselves as a transverse striation. A large oblique dark-brown transverse fascia from about the middle of costa to tornus is narrowest at the costal end and gradually broadens with bulging edges towards the dorsal side. Across the tip of the wing from apical fourth of costa to the middle of termen is another dark brown fascia, which is broadest on the costal edge. Hind wings light ochreous white. Abdomen ochreous fuscous. Legs ochreous; anterior tarsi heavily annulated with black.

Alar expanse, 16 to 19 mm.

*Habitat:* Mexico City. R. Müller, collector.
*Type:* No. 14526, U. S. National Museum.
*Cotype* in British Museum.

A common-looking species of the *triferana* Walker group, differing from this species in the more reddish ground color and the lack of light ochreous patches.

**Atteva exquisita**, new species.

Labial palpi white with a bluish-black annulation at the end of second joint and with bluish-black tip of terminal joint. Antennæ black. Face white with a black transverse line. Head also white, with a black transverse line. Collar white with black anterior edge. Thorax reddish golden-yellow with white posterior tip and four black lateral dots. Fore wings with the rich reddish golden yellow ground color apparent only in the transverse fascia between the large silvery white spots, which occupy the greater part of the wing surface; extreme base of the wing red; then follows a large transverse silvery white fascia edged with dark metallic blue and with a serpentine metallic blue transverse line through the middle; next comes a reddish-yellow fascia at basal third, which is followed by another large silvery white transverse fascia, like the foregoing, edged with metallic blue and with a blue central line; following this is again a reddish-golden fascia, somewhat bent in the middle, and this is followed by a large dorsal silvery-white spot and by an adjoining small costal

white spot, both with a crooked blue line in the center and both edged with dark metallic blue. On the apical part of the wing are two costal white spots and one white fascia, separated and surrounded by metallic blue lines. Extreme apical tip golden yellow. Hind wings semitransparent, light fuscous with dark veins. Abdomen black with a conspicuous yellowish-white spot on the underside of each segment. Legs black, with narrow yellowish-white annulation at the joints.

Alar expanse, 21 mm.

*Habitat:* Mobano, Coahuila, Mexico, August. R. Müller, collector.

*Type:* No. 14528, U. S. National Museum.

This species belongs to the *aurea* group, but differs considerably from any described species in the pattern of the fore wing as well as in the white color of the spots. One of the specimens, it should however be noted, has a straw-yellow tint over the outer white spots.

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—Mr. A. G. Hammar presented a paper on certain habits of the codling moth larva, relating to the reconstruction of the winter cocoon in the spring, the number of molts of the larvæ, cannibalism among larvæ, temperature control, an unusual occurrence of two larvæ passing the second winter in hibernation, and the ability of some larvæ to subsist upon foliage. A brief account was also given on some of the main results of the codling moth investigation in Michigan, and the practical application of these findings. The full account of this investigation will be published as Bulletin 115 of the Bureau of Entomology, U. S. Department of Agriculture.

At the conclusion of Mr. Hammar's paper Mr. Rohwer asked if, in breeding the moths, the larvæ of the sawfly which lives in apple had been noticed. Mr. Hammar stated that he had not observed them. Mr. Rohwer said that larvæ are rather common in Europe and larvæ with similar habits have been found in Washington State. In the same genus there are also larvæ which live in plums and cherries.

In Mr. Hammar's paper were several allusions to temperature control on the codling moth. These allusions led Mr. Pierce to remark on the fact that although temperature has a definite effect upon development, it will be found that for any degree of temperature the development will vary with the humidity, this variation sometimes being of considerable degree.

Commenting on the effect of humidity on the emergence from the soil of adults of grape root-worm and plum curculio Mr. Johnson stated that his observations in rearing plum curculio in 1906 showed that emergence of beetles was retarded and in some cases prevented by withholding moisture, whereas in adjacent cages where moisture was supplied a maximum number of beetles emerged several days earlier. In the case of the emergence of adults of the grape root-worm it was observed in 1907 that a period of dry weather occurred during the first two weeks in July, which is about the normal time of the emergence in maximum numbers of the beetles in vineyards. Up to July 14 but very few beetles emerged, though in digging they could be found in their cells in the dry soil. Heavy rains fell on the 14th and during the following two or three days the adults emerged in large numbers. This emergence in the field corresponds with the cage experiments in which moisture was applied and withheld.

Mr. Woglum mentioned the effect of hot dry weather on retardation in the emergence of adults of *Aleyrodes citri* in India. Practically matured pupæ remained dormant during a continued hot dry period of ten weeks (July–August, 1911, temperature 85° to 120° F.) but emerged within a week following first rain.

—Under the title "An Old Question," Mr. Rohwer discussed briefly, the matter of local lists. The following is his abstract:

Local lists may be divided into two classes: (*a*) geographical lists, or lists treating material collected within a certain definite geographical or political boundary; (*b*) biological lists, or lists treating material collected within a definite faunistic area. For the purpose of studying geographical distributions biological lists are more useful.

With the exception of Coleoptera, Neuroptera, and spiders very little has been done in the way of forming a local list of the insects of the District of Columbia and environs. The following papers are the only ones known which deal wholly with material collected in the above-mentioned locality. From time to time various new species have been described or recorded from this area, but none of these papers deal with this area alone.

A list of the beetles of the District of Columbia. Ulke, 1902. Proc. U. S. Nat. Mus., vol. 25, No. 1275.

A list of Neuropteriod insects, exclusive of Odonata, from the vicinity of Washington, D. C. Banks. Proc. Ent. Soc. Wash., vol. 6, p. 201.

A list of the Araneæ of the District of Columbia. Marx. Proc. Ent. Soc. Wash., vol. 2, p. 148.

The Psychodidæ of the vicinity of Washington. Banks. Proc. Ent. Soc. Wash., vol. 8, p. 148.

List of Conopid flies taken within a five-mile radius of Falls Church, Va. Banks. Proc. Ent. Soc. Wash., vol. 8, p. 106.

New Smynthuridæ from the District of Columbia. Banks. Proc. Ent. Soc. Wash., vol. 5, p. 154.

Notes on some interesting flies from the vicinity of Washington, D. C. Townsend. Proc. Ent. Soc. Wash., vol. 1, p. 224.

To bring the matter before the Society it was suggested that: (1) An advisory committee of three be appointed; (2) a card system should be installed so that records could be made permanent; (3) a definite boundary for the limits of the local list be established. The advisory committee would be necessary as a directing force and to establish uniformity. A 5 by 3 card, ruled so as to have a space for the determiner, locality, date, collector, number of specimens, and disposition of the same, was suggested. Maps were passed around with various radii from the Capitol building drawn so as to give an idea of the area covered by any radius. The 20-mile radius would bring in all the favorite collecting grounds and give plenty of unworked territory. It was suggested that the division of the chosen area into certain smaller faunistic areas would be useful. Thus the swampy area along the Eastern Branch (Anacostia River) might be called S4.

Part of the introduction in a "Guide to the Flora of Washington and Vicinity" (1881) was quoted. The quoted part was that dealing with the comparison of the plants listed in "Floræ Columbianæ Prodromus" (1830), where it is stated that 81 of the plants of the (1830) work, "represent bona fide discoveries of species which either do not occur or are so rare as to have escaped the investigations of the present generation of botanists." It was also stated that to the knowledge of Mr. Heidemann certain species of Hemiptera have become extinct in our local area.

Mr. Pierce remarked that while local faunal lists are of considerable interest from a purely technical standpoint they have a high economic value. In the study of the cotton boll weevil the entomological complex includes all insects acting

as hosts of boll-weevil parasites and then is complicated by the attacks of other insects on these hosts. The presence of certain weeds near cotton fields indicates the presence of typical weevils, with the probability of the usually associated parasites. The abundance of one species of insect frequently involves the reduction of another by direct or indirect means. It is imperative for economic workers to know their local fauna, because the species under investigation are certain to be affected by many other local species.

Mr. Schwarz commented on the importance of publishing, or at any rate of collecting, local lists of insects. Among the multitude of local lists that have been published in North America, many of them are of little interest for the reason that they include only species of wide geographical range. Referring to Mr. Rohwer's plan of working out a faunal list of the District of Columbia insects, Mr. Schwarz said that he was greatly in favor of it, and that if the Society should not take any action he would heartily join the individual efforts of those members who take interest in the subject. Practically all active members of the Society are in the employ of the Government and are living within the city; they are laboring therefore under the difficulty that they can do field work only on Sundays or holidays. Mr. Schwarz alluded to the work done by the "Washington Biologists Field Club," which at its home on Plummers Island, in the Potomac River (about 10 miles from Washington), has done considerable work toward preparing a local list of insects of the District of Columbia.

—Under the heading "Notes and Exhibition of Specimens," Mr. R. A. Cushman spoke on a peculiar habit of the larvæ of two parasitic Hymenoptera. He said:

On May 5, 1911, I found two hibernating larvæ of the codling moth (*Carpocapsa pomonella*) under the bark of an apple tree. In removing them from the bark both cocoons were broken and the larvæ were placed in a glass vial. When observed two days later both had spun cocoons against the glass, but without dimming the glass. This made it possible to observe the larvæ clearly. One of the larvæ was much smaller than the other and of a pasty white color, lacking

the pinkish tinge of the healthy larvæ. On May 11 a small parasitic larva appeared on the surface of this individual, having evidently emerged from its host just previously. This was at about 8 o'clock in the morning. Chancing to observe the parasite a few hours later I was amazed to find that it had in that short period at least doubled in size. By 5 o'clock the parasite larva had at least trebled in size since first observed in the morning and the host had been reduced to a pellet of skin pushed to one end of the cocoon. This rapid enlargement seems to be more in the nature of engorgement than of development. The parasite larva had begun its cocoon on May 12, at 8 a. m., about 24 hours after emerging as a small larva from its host, the adult appearing on the 24th. It was determined by Mr. Viereck as *Ascogaster carpocapsæ* Vier., a braconid of the subfamily Cheloninæ.

A similar habit was a little later observed in the larvæ of a chalcid of the genus *Crototechus*. On May 18 Dr. C. W. Hooper handed me a living, but sluggish, full-grown caterpillar of *Pyrophila pyramidoides*. This I kept in a vial on my desk for observation. On May 23 the larvæ of the parasites appeared, emerging through the skin of the host, mostly along the sides. At first the parasitic larvæ appeared like very small, shiny, green papillæ or drops, as though the host larva had been repeatedly pricked with a fine point and the juices were oozing out. This illusion was maintained if not intensified as the parasites emerged slowly, and appeared to flow down the sides of the host. From the caterpillar in question about 90 parasitic larvæ emerged. They were, however, very small, and the host remained in much the same condition as a sphinx larva which is covered with the cocoons of *Apanteles* somewhat shrunken but still retaining its form. But by the next morning, perhaps 18 hours later, the chalcid larvæ had increased several times in size and the caterpillar was a mere shriveled skin, only the head shield retaining its original form.

It will be noted that although the two species in which this peculiar habit of engorgement was observed are widely separated systematically, biologically they are alike in at least one respect—both are internal parasites which leave the body of their hosts for pupation. In this feature of their life may lie the explanation of the habit of engorging on the fluids of their hosts, the possible reason being the greater ease of escape from the host for the smaller larvæ.

Dr. Howard expressed great interest in Mr. Cushman's observations. He had often seen the characteristic groups

of pupæ of *Cratotechus* upon leaves, but had never seen any remains of the host insect. Mr. Cushman's account of the rapid external feeding of the nearly mature *Cratotechus* larvæ and the sudden diminishing of the host larva to almost nothing indicates that the remaining skin must easily be blown away, leaving nothing but the pupæ of the parasite.

—Mr. Quaintance spoke on the apparent effect of climate in restricting the western distribution of the plum curculio. An inquiry into the western limits of distribution of this insect has shown that it does not occur, except with one or two exceptions, west of about the one hundreth meridian. In other words, it is confined to the humid area of North America. It is not understood why the curculio does not occur in some of the irrigated fruit-growing regions in the West, except that it perhaps has not been there introduced. This insect, during its transformation in the ground, is very susceptible to moisture conditions. As several observers have noted, the effect of the drought is to arrest the issuance of the beetle from the ground, whereas after a soaking rain these appear often in enormous numbers.

Mr. Quaintance further remarked that it would be of much interest to follow up the effect of the very cold weather of the present winter on insect life in the environs of the District of Columbia. Collectors of insects in this territory have noted a more or less intermingling of northern and southern forms, the proportion varying, depending upon the character of the winters during the preceding two or three seasons. Some interesting comments on this point were published by Dr. Chittenden in one of the Bureau of Entomology bulletins, issued some years ago.

—Dr. Dyar exhibited two papers entitled "Contributions to the Natural History of Lepidoptera of North America, vol. 1, Nos. 1 and 2, by William Barnes, M.D., and J. H. McDunnough, Ph.D. The first paper treats of the Cossidæ of North America, the second of the lasiocampid genera *Gloveria* and its allies. Photographic figures are given of the species treated. Dr. Dyar said that the title was somewhat misleading, as there is no "natural history" as usually understood in the books, the taxonomy only being considered. However, Dr. Dyar

thought that on the whole the publication was to be commended and that the original generic work and tables would prove very useful. The studies appeared to be based on sound lines, undesirable characters in the separation of genera being carefully avoided. The work is privately printed, presumably in small edition, so that it may be liable later to become scarce and difficult of access.

—Mr. Schwarz called attention to a new entomological periodical "Entomologische Mitteilungen," just issued, the organ of the Deutsche Entomologische Museum. The first number gives an interesting account of the difficulties with which the new institution had to contend before its permanent organization was accomplished. Besides the usual number of entomological articles it gives a photographic reproduction of the Deutsche Entomological Museum, which, by the way, is the only public, exclusively entomological museum hitherto built. This museum was founded by the late Prof. Dr. Kraatz and is the property of the municipality of Berlin, Germany, but under independent administration. The leading spirit of this museum is Dr. Walther Horn, the lifelong friend of Dr. Kraatz. He is the well-known authority on the family Cicindelidæ and his visit to Washington will be pleasantly remembered by many of our Society.

—Mr. Pierce stated that he had been interested for about eight years in the subject of insect dispersion. The boll weevil is controlled by the intensity of cotton cultivation. In heavy producing regions the weevils move 5 to 10 miles in a year, but where cotton is less extensively cultivated the movement may be as high as 120 miles. The extensive defoliation of cotton in 1911 by the cotton-leaf caterpillar *Alabama argillacea* brought about a condition in heavy producing areas similar to the normal condition in sparsely cultivated country. As the consequence the weevil moved in the Delta region 50 to 60 miles. Swamp and lake regions may cause the weevils to fly 50 miles before finding cotton. In 1904 the Red River Valley limited the dispersion because of the heavy growth of cotton, which satisfied the weevils.

Mr. Pierce also spoke of barriers to dispersion. Dryness and altitude have proved effective barriers to the boll weevil.

No weevils have been found in the Carolinian Life Zone, although cotton is grown in this zone. Minimum winter temperatures of 12° F. seem to be an effective barrier. If weevils have gone into hibernation they are not affected by tempatures that would kill them if in the open. The minimum fatal temperature varies according to humidity.

Dr. Dyar, speaking of the effect of temperature, stated that it depended in many cases on a minimum rather than average temperature. In this connection he commented on the yellow-fever mosquito and the amount of area it is capable of covering.

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## Meeting of March 7, 1912.

The 257th regular meeting of the Society was entertained by Mr. Schwarz in the Saengerbund Hall, 314 C street N.W., on the evening of March 7, 1912, and there were present Messrs. Babcock, Baker, Barber, Caudell, Dyar, Ely, Foster, Gahan, Heidemann, Hyslop, Johnson, Knab, McAtee, Marlatt, Meyers, Pierce, Popenoe, Quaintance, Rohwer, Sandorf, Sasscer, Symons, Vickery, and Viereck, members, and Messrs. N. E. McIndoo, J. R. Malloch, E. Marshall, W. Middleton, W. H. Sill, J. F. Strauss, R. S. Woglum, and W. B. Wood, visitors. President Quaintance occupied the chair.

The minutes of the preceding meeting were read and approved.

Mr. Rohwer read a letter from the Danish "Naturhistoriske Forening," expressing a deep appreciation of the action of the Entomological Society of Washington in sending its Proceedings to their society, and stated that said papers would be filed in the library of the University of Copenhagen. In return, they will forward to this Society copies of their proceedings. Mr. Rohwer also read a letter written at the instance of the Executive Committee to Mr. George K. Burgess, of the Journal of the Washington Academy of Sciences, which reads as follows:

MARCH 10, 1912.

MR. GEORGE K. BURGESS,
*Bureau of Standards, Washington, D. C.*

DEAR SIR: In replying to yours of the first ultimo addressed to Prof. Quaintance, the Executive Committee of the Entomological Society of Washington request me to inform you as follows: The Entomological Society of Washington publishes a journal known as the Proceedings of the Entomological Society of Washington, in which the minutes and papers are published. In view of the fact that the Society has such ready publication for its minutes, it is not deemed advisable or necessary to submit a copy of the minutes to you for publication. A copy of our Proceedings will be mailed to you, so that you can see our minutes as published.

The matter of special papers has been brought to the attention of the members and they will act as they individually see fit.

A canvass of the Society does not bring anywheres near enough copies of your Journal to secure the offer made the societies, by subscribing to twenty-five copies.

Very truly,

S. A. ROHWER,
*Corresponding Secretary.*

Mr. Caudell moved that the letter be sent. Seconded by Mr. Knab. Carried.

Mr. E. B. Blakesley and Mr. H. E. Smith were elected active members and Mr. P. H. Timberlake corresponding member of the Society. Professor Quaintance proposed the name of W. B. Wood for active membership and in accordance with the rules it was laid over until the next meeting.

The first paper of the evening, "New American Mites," by Nathan Banks, was read by title.

The second paper, "Diptera at Home on Spider-webs," by Frederick Knab, was read by Mr. Rohwer.[1]

The last paper was "Notes on a Trip to India," by R. S. Woglum.[1]

[1]Not presented for publication.

## NEW AMERICAN MITES.

By Nathan Banks.

(Plates I and II.)

The following new species are mostly of some economic value, and will be referred to in economic literature, so I herewith present their description.

**Tarsotomus erraticus,** new species.

Red. Body two and one-half times as long as broad, in front narrowed and rather roundedly pointed; this narrowed front part bears a number of long, stout, erect bristles, a few shorter, more curved ones on the hind border of body. Palpi stout, the thumb apparently three-jointed, tip of palpus with two approximate curved claws, with crenulated margins, all joints of palpi with stiff, erect bristles. Front legs rather longer than body, third and fourth pairs much longer than body, hind tarsi very slender, all legs with stiff bristles, those on basal joints simple, those on tarsi scabrous or hairy, a pair of long bristles at tip of metatarsi; about twelve to fourteen joints in the tarsi, the basal ones longer than broad. Length, 1 mm.

From Springer, New Mexico, July 5, on ground (C. N. Ainslie).

**Erythræus arvensis,** new species.

Red. Body about two and one-fourth times as long as broad, broadly rounded behind; dorsal groove reaching as far back as eyes, and enlarged at each end; one large eye each side, about over coxæ II. Body clothed with short, slightly clavate hairs, all of one kind. Legs with larger simple bristles, but those on the basal joints often curved. Legs shorter than body, first pair about three-fourths the length of the body, patella, tibia, and metatarsus subequal, each longer than femora, and fully three times as long as broad, tarsus about as long as metatarsus, but nearly twice as broad. Hind legs with patella and tibia about equal, the metatarsus rather shorter, and the tarsus only one-half as long as the metatarsus. The third joint of the palpus has a small tooth on outer side at tip, the fourth joint is concave within, the inner tip pointed and recurved; the thumb is situated in the concavity of the fourth joint; it is about two and one-half times as long as broad, and bears about one dozen bristles near its tip, most of them longer than the joint. Length, 1 mm.

From Salt Lake City, Utah, August 2, swept from alfalfa (Ainslie).

**Tenuipalpus cardinalis,** new species.

Color, bright red. Body about two and one-half times longer than broad, tapering behind; cephalothorax occupying about one-third of the length; a transverse groove near base of abdomen not reaching across. A pair of long frontal bristles, one each side above second coxæ at the anterior

corner of the cephalothorax, another a short distance behind this, one on the humerus, three each side behind, the first the longest, and one each side at tip, and near this is a short clavate pair. Legs with wrinkled edges; leg I about one-half the length of the body, leg IV scarcely longer than width of the body. Length 0. 35 mm.

From Phoenix, Arizona, on bark of ash tree (Morrill). It is similar in appearance to *T. cuneatus*, but distinct by the large bristles.

**Tenuipalpus inornatus,** new species.

Yellowish. Body about twice as long as broad, very broad in front, the sides of the cephalothorax nearly parallel, abdomen tapering to the rounded tip; above with two or three transverse lines toward tip; no bristles noticeable on body; the cephalothorax nearly twice as broad as long, anterior margin slightly evenly convex; mandibles large and prominent, palpi short, last joint slender; legs I and II rather stout, sides crenulated, as long as width of the cephalothorax, not crowded up to the beak; hind legs more slender; leg IV reaching to tip of the abdomen; all legs without apparent hairs, except short ones at tips of the tarsi. Length, 0. 3 mm.

From Batesburg, South Carolina, on golden-rod (H. F. Wilson).

**Tetranychus longipes,** new species.

Yellowish. Body about one and a half times longer than broad; cephalothorax fully twice as broad behind as long; a pair of short bristles in front, and four rows of short bristles on dorsum of the abdomen, none as long as the patella of the hind legs. Mandibular plate rather broad, tip rounded, not emarginate; palpi stout, the thumb shows two fingers, subequal in size, and a hair at each corner. The legs are long, slender, and with few stiff bristles; leg I is longer than the others, plainly longer than the body; leg IV is a little longer than the body, the femora very slightly thickened on the basal part; claws two, simple. Each side of the mandibular plate is a slender curved process, not visible in all specimens. Length, 0.5 mm.

From Springer, New Mexico, September 29, swept from *Agropyron* (a grass) (C. N. Ainslie). Also from Holtville, California, March 25 (Wildermuth).

Evidently related to *T. latus* Can. and Fanz., which occurs on box trees in Italy; however, leg I is still longer than in that species.

**Tetranychus pratensis,** new species.

Pale greenish. Body nearly or quite twice as long as broad, rather more elongate than usual, broadly rounded behind; without humps above, with the usual four rows of rather long bristles, those above longer than the hind tarsi. Legs short, none as long as the body, with many long hairs, some extremely long, being as long as two joints together. Man-

dibular plate elongate, truncate or broadly rounded in front, but not emarginate. Palpi with short stout thumb, with one stout finger, and a hair at one corner. Tarsi end in two long, simple, and but little curved claws. Length, 0.4 mm.

From Pullman, Washington, on timothy, in June (Hyslop, coll.).

**Macrocheles canadensis,** new species.

*Female.*—Pale yellowish, seutum rather darker; dorsum of body with four rows of short, simple, curved spine-like bristles, one at humerus, and about six along the hind margin. Legs quite slender, with long simple bristles; leg I with the last joint a trifle longer than the preceding joint, the antepenultimate joint still shorter; palpi with the last joint bristly all over, other joints with few bristles only near tip, the penultimate joint longer than either the preceding or the apical joint. Second pair of legs about twice as heavy as the others; hind tarsi very long and slender. Ventro-anal plate very broad, broadest much before the middle, truncate in front, somewhat pentagonal in shape. Length, 1.8 mm.

Three from a guinea pig, Ottawa, Canada; sent by Dr. Hewitt.

**Histiogaster xylophaga,** new species.

Body elongate; in general similar to *H. corticalis*, but differing at once in the absence of long bristles on tarsi and in the smaller bristles on cephalothorax and abdomen. Tarsus I with numerous spines; tarsus II with a large spine on outer side near tip and on inner side with a bristle; tarsus III and IV with only two or three spines. Hind legs much smaller than fore pairs and widely spearated from them; two pairs of fine hairs near tip of the body, and two pairs on cephalothorax, the anterior pair on the front margin; mandibles very large and stout. Length, 0.4 mm.

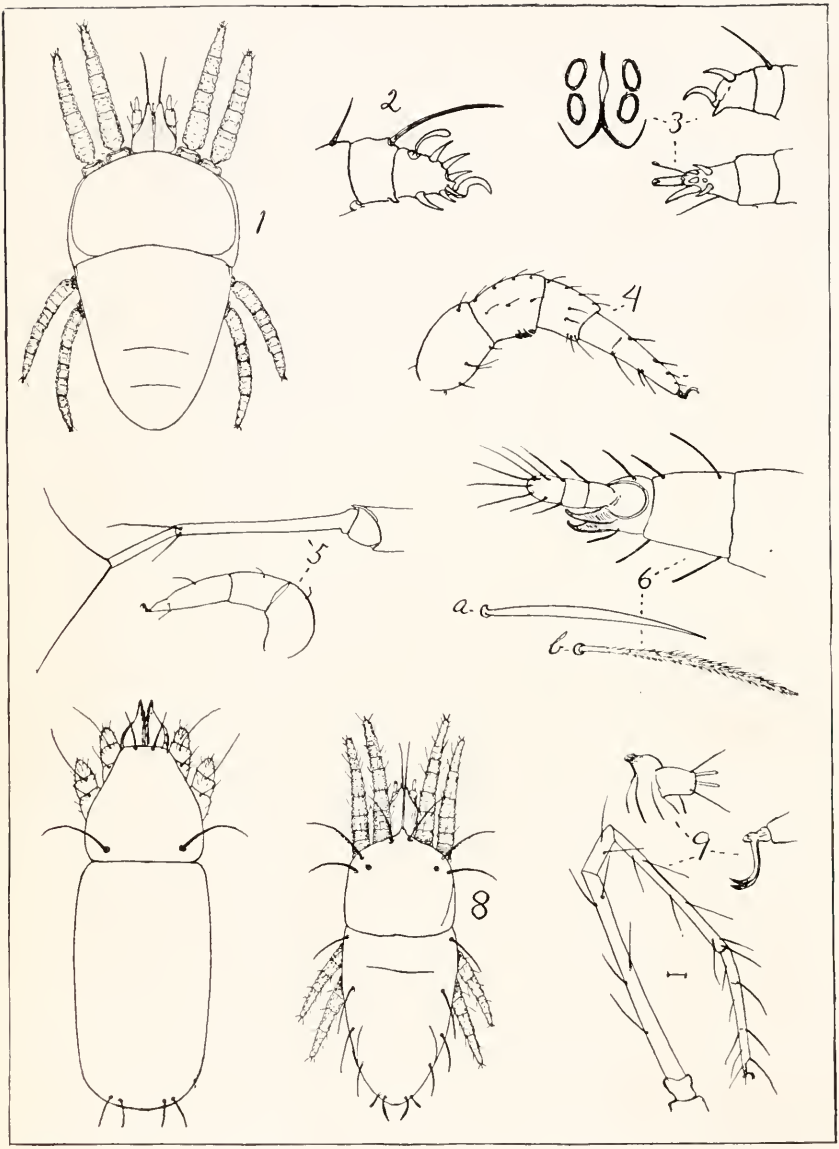
Burrowing in stems (decayed) of alfalfa at Phœnix, Arizona; sent by Dr. A. W. Morrill. The genus *Histiogaster* is distinguished from *Monieziella* by the presence of spines on the tarsi; moreover, all *Histiogasters* are wood-feeders, while *Monieziella* feeds on dead insects or on scale insects.

**Tarsonemus waitei,** new species.

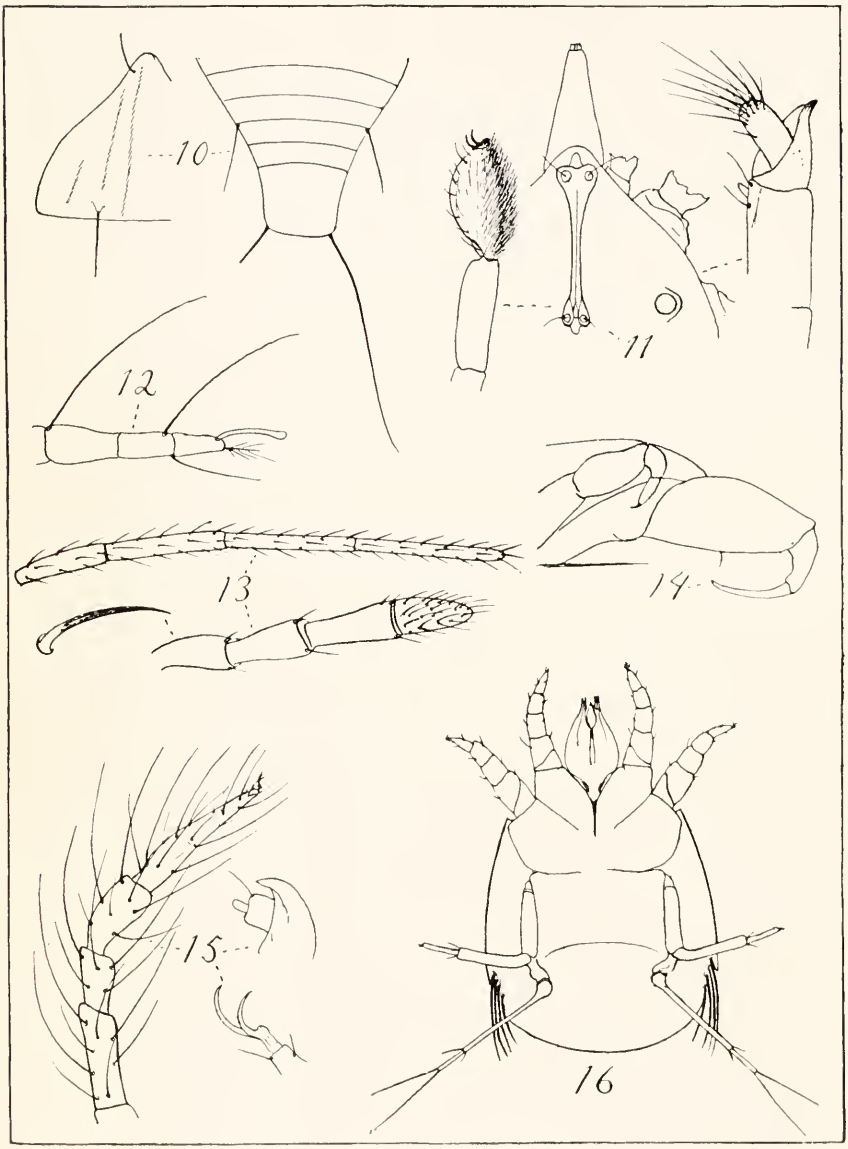
*Female.*—Body (including beak) not twice as long as broad, sides but slightly curved, narrowed behind coxæ III, where there are several long spines on each side, behind this the body is broadly rounded, and below slightly concave, being much thicker at hind coxæ than elsewhere. The beak is very large and prominent, fully one-fourth as long as the body. Legs I and II are very short and stout, leg III slender, leg IV extremely tenuous and ending in two long bristles; all legs have only a very few short, inconspicuous hairs; a long bristle above on each humerus.

*Male.*—The body is as long as in the female; the leg III enlarged, while the fourth pair are extremely large and long, and end in a very long claw.

Length, 0.2 mm.




NEW AMERICAN MITES.




NEW AMERICAN MITES.

From peach buds at West Chester, Pennsylvania. They destroy the terminal peach buds and are thus a serious menace to peach culture.

**Phyllocoptes amygdalina,** new species.

Body short and thick, about two and one-half times as long as broad, broadest at end of the cephalothorax; a hair each side on cephalothorax in front, and a bristle behind, surface with four nearly longitudinal ridges toward middle, and less distinct one on the sides; legs rather slender; leg I with two bristles on penultinate joint, leg II with but one bristle (the upper) on this joint. Venter with six broad rings before telson; a pair of bristles just behind the vulva, a pair of very long ones farther back and outward, another pair near the middle, and a pair toward tip; a pair of very long bristles from above the telson, and three short ones on each side; a long bristle on coxa of leg II, and the next joint bears a small one. The body above shows about 35 rings; below they are fine and close together; the vulva is emarginate in the middle behind. Length 0.18 mm.

Taken from the tender leaves of the ends of twigs of *Amygdalus davidiana* by Mr. E. W. Rust at Whittier, California, September 29. It distorts, discolors, and curls the leaves of this peach.

**OTOBIUS, new genus.**

I propose this new name for the *Ornithodoros megnini* Dugés. The indistinct mouthparts and bristly body distinguish it from *Ornithodoros;* its life habits are also distinct.

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Explanation of Plates I and II.

1. *Tenuipalpus inornatus.*
2. *Histiogaster xylophaga*, tarsus I,
3. *Histiogaster xylophaga*, vulva, tarsus IV.
4. *Macrocheles canadensis*, leg II.
5. *Tarsonemus waitei*, legs I and II.
6. *Tarsotomus erraticus*, palpus, and two hairs.
7. *Histiogaster xylophaga.*
8. *Tenuipalpus cardinalis.*
9. *Tetranychus longipes*, palpus, claw, leg I.
10. *Phyllocoptes amygdalina*, cephalothorax, and telson.
11. *Erythræus arvensis*, cephalothorax, tarsus I, palpus.
12. *Phyllocoptes amygdalina*, tarsus I.
13. *Macrocheles canadensis*, leg I, palpus, and hair.
14. *Tarsonemus waitei*, hind leg of male.
15. *Tetranychus pratensis*, leg I, palpus, claws.
16. *Tarsonemus waitei*, female, venter.

—At the conclusion of the regular papers on the programme, President Quaintance called on Mr. J. R. Malloch, who responded with a few general remarks on systematic entomology in Scotland. Commenting on the insects of this country, he stated that he found an unusually large number showing light colors and bright hues as compared with those of Europe.

—Under "Notes and Exhibition of Specimens," Mr. Marlatt commented on the present status of the quarantine bill and stated that it had now reached a satisfactory stage and would in all probability be made a law during the present session of Congress. He also referred to the action of the governor of California in calling a special session of the legislature for the direct purpose of placing a quarantine on Hawaiian fruits. The purpose of this legislation is to prevent the introduction of the fruit fly, which is now established in Hawaii.

—Mr. J. A. Hyslop gave the following notes from the Pacific Northwest. He said:

The food of *Laropsis*, sp. n., Rowher: While driving through a fallow field at Govan, Washington, on August 24, 1911, I noticed one of these wasps awkwardly traveling over the ground, half flying and half walking. On closer examination it was found to be carrying a locustid with which it was unable to fly. The insects were collected and when submitted, respectively, to Messrs. Rohwer and Caudell, of this Society, for determination, both proved to be new species. The locustid was a species of *Phrixocnemis* as yet undescribed.

*Brachycistis amplus* Blake: These mutillids have occured in great numbers each spring of the three years that I have spent in the semiarid Big Bend country of Washington, viz, 1909, 1910, and 1911. At Conell, on April 5, 1910, they were so numerous about lights as to remind one very forcibly of the annual flights of ephemerids in this city. At Govan they were decidedly troublesome, flying into and clogging the lamp chimneys.

*Criocephalus productus* Lec.: These cerambycids have been extremely numerous during the month of August of the past three years at Pullman, Washington, where they were very troublesome, entering houses and flying about lights in a headlong manner, as do lachnosternas in the east. As many as ten were collected in my room in one evening. These beetles are known to spend their larval stages in *Pinus ponderosa* and are probably brought to Pullman as larvæ and pupæ in cord wood, as the nearest standing timber is 12 miles away.

*Olethreutes rubipunctana* Kearfoot: The larvæ of this moth were quite numerous in the dry seed-pods of the common iris (*Iris missouriensis*) about Pullman. The larvæ feed on the seed and spin a cocoon within the seed chamber, wherein they hibernate during the winter. Larvæ were collected on March 12, 1910, from which three specimens of the parasite *Ascogaster* sp. n. emerged on May 11 and one more parasite on June 20. In 1911 iris seed-pods containing these lepidopterous larvæ were again collected and on June 15 an adult moth emerged.

*Crambus cypridalis* Hulst: A remarkable flight of these moths occured at Pullman for three nights, September 23, 24, and 25, in 1911. The moths were so numerous about arc lights that they gave the light the appearance of being enveloped in a driving snow storm.

*Aphochantus desertus* Coq.: The pupa of this fly was found in the pine-needle mold that had accumulated in a hollow on one of the large bowlders which cap the summit of Moscow Mountain, Idaho. The pupa was collected on July 24, 1910, and placed in some of the extremely dry mold in which it was found, in a box. On August 24 the fly emerged.

*Tephritis finalis:* The larvæ and puparia of these flies were found in the floral heads of the wild sunflowers (*Balsamorhiza sagittafolia*) at Pullman on May 9, 1910. They always occurred one in a seed capsule and averaged over 6 flies to the floral head, 70 flies having been reared from 11 heads. The flies started to emerge on May 24 and continued emerging until June 2. However, these floral heads were moistened and probably presented abnormal conditions that disturbed the normal appearance of the adults.

—Mr. Pierce stated that he was preparing a treatise on the biologies of North American weevils, including notes also on Central and South American forms. There are important gaps in our present knowledge of these insects and comparatively little is known of the breeding habits of our Otiorhynchidæ and Rhynchitidæ. Any help along these lines which will enable him to work out some of these difficult problems will be appreciated, and, if possible, he prefers to use published records, so that the credit may go to the original observer.

Mr. Pierce also summarized the classification of the temperatures as used in the study of the boll weevil. The various temperatures are grouped into zones in accordance with their effects on the insects, as follows:

| | ° Fahr. |
|---|---|
| Lower zone of fatal temperature | 5 to 22 |
| Zone of hibernation | 22 to 56 |
| Zone of activity | 56 to 91 |
| Zone of æstivation | 91 to 122 |
| Upper zone of fatal temperature | 122 to 140 |

—Mr. McAtee, commenting on the hibernating insects on Plummers Island, Maryland, stated that numerous specimens of *Bembidium* and *Corythuca*, taken under bark, were brought into the laboratory, but that none had shown signs of life. The following captures were recorded: 60 *Milyas cinctus* were found together under bark of tulip tree and 19 *Pyrellia cyanicolor*, including both sexes, were taken from an ant gallery in an old fallen log. The close packing of the flies and the fact that some had crowded into small parts of the gallery were of interest, as the behavior is in such marked contrast to their love of freedom during summer months.

—Mr. Quaintance commented on the economic importance of a knowledge of temperatures fatal to insects. Important use is being made at the present time in the control of insects in mills by heating the same to a temperature destructive to the common mill species. A most excellent piece of work on this subject is now under way by the Kansas Agricultural Experiment Station, under the immediate direction of Mr. Dean. Sufficient information is at hand to indicate clearly that insects infesting plants may often be destroyed by the use of water heated to a temperature fatal to the insects and not injurious to the plants. For instance, the employment of hot water in dipping nursery stock, grafts, and scions to destroy the common woolly apple-aphis, *Schizoneura lanigera*. The use of hot water in this way dates back many years as well as against the common peach borer, *Sanninoidea exitiosa*. There is need of an extended investigation of the subject, as it appears to offer important possibilities in insect control.

—Mr. A. B. Gahan gave an account of a chironomid fly breeding in well water. He said:

Last fall the writer was requested to investigate a complaint by a resident of College Park, Maryland, that his well water was being rendered unfit for use by the presence in it of numerous small red "worms." Accordingly, an investi-

gation was made, October 4, 1911. The well in question was found to be an ordinary dug well covered with a loose plank platform and containing a pump. It was about 25 feet in depth, partly bricked up and partly woodcased, and situated on a side hill, where it undoubtedly received some surface water, as was evident from the presence in the bottom of the well of a considerable quantity of very fine clay silt such as constituted the surface soil in the vicinity. The water, which was 4 or 5 feet in depth, was reasonably clear at this time, but possessed a very faint odor.

The householder stated that for several weeks he had been compelled to strain the water through a cheese cloth in order to rid it of these worms. Examination of the cloth tied over the mouth of the pump at the time of my visit showed it to contain a dozen or more that had been pumped up during the previous half day. These were readily identified as the larvæ of a chironomid fly.

A second visit to the well on November 15 showed the larvæ still present in about the same numbers, and upon lifting a board from the plank platform a number of small midges were seen to escape. A careful scrutiny of the underside of the remaining boards resulted in the discovery of numerous specimens, eight of which were captured.

On November 23 several additional adults were taken and by means of a dredge net over 50 of the larvæ were secured. Although special effort was made to secure eggs and pupæ, none were obtained, owing probably to the lateness of the season.

The captured larvæ, which were all apparently nearly full grown, were taken to the laboratory and placed in two separate beakers of the well water, about equal numbers of larvæ in each. One beaker contained only the clear water, while in the other a small amount of the fine clay silt from the bottom of the well was placed. When placed in the water they immediately began the peculiar and apparently useless operation, characteristic of chironomid larvæ, of jerking the body alternately from side to side, the tail touching the head first on one side and then on the other. So far as could be observed this movement served no useful purpose, since the insects made no progress forwards or backwards by it. On the contrary, they sank straight to the bottom of the beaker. Here their wiggling was of more avail, as in contact with the glass they were able to move awkwardly about.

Somewhat to my surprise, it was soon evident that those in the beaker containing the clay were not prospering. Their constant wriggling tended to draw them down into the mud, from which they were unable to extricate themselves. At

first it was thought that the larvæ were attempting to conceal themselves, but it soon became evident that this was not the case. The following morning all except three or four of those in this beaker were found to be dead, having apparently succumbed to suffocation.

On the other hand, those placed in the beaker of clear water soon collected a mass of fine débris which they fastened together by means of fine threads, thus constructing a shapeless case within which all concealed themselves. Here they remained alive for several weeks, never voluntarily leaving their hiding place, at least during daylight. Only two of these larvæ were induced to pupate. The first pupa was observed the morning following collection. It was lying flat on the bottom of the beaker and so remained until the emergence of the adult four days later. When disturbed it would display some feeble movement, but at no time was it active. The second pupa was formed within the above-mentioned case. In neither case was the act of emergence observed.

The principal feature of interest in connection with this species is the unusual habitat. Species of *Chironomus* are known to breed in lakes, sometimes at great depths, in stagnant pools and ponds, and even in running water, but this is the first instance known to the writer of a species being known to breed in a closed well. The larva is of the type possessing two pairs of blood gills, is blood-red in color, due according to Miall to the presence of hæmoglobin, and is thus adapted to living in deep water instead of at the surface. That the larvæ in question do in fact live at the bottom of the well is shown by their behavior in the beakers, where they were under almost constant observation for over two months, and were never seen to rise near the surface. This habit of deep living accounts for their being brought up by the pump, the screen of which is near the bottom of the well.

Specimens of the adults were sent to Prof. O. A. Johannsen, Orono, Maine, who has kindly identified them as *Chironomus dorsalis* Meig.

It is not probable that the presence of these insects in the water has any considerable deleterious effect in itself. Rather is it believed that their presence is an indication of contamination from other sources. Their presence, however, is in no way desirable in water intended for household purposes, and should the habit of breeding in wells become general, it will present a problem of some economic interest.

Dr. Dyar said that the presence of the larvæ in the well was probably induced by the wooden walls, which would furnish

food. He thought no larvæ would be found in the wells entirely lined with stone, as is ordinarily the case.

Mr. Knab stated that the idea that the red color of chironomid larvæ indicated that they inhabit deep water is erroneous. He had on several occasions found large colonies of such blood-red chironomid larvæ in very shallow water and evidently thriving.

The following papers were accepted for publication:

## THREE SPECIES OF NOCTUIDÆ NEW TO OUR LISTS.

By Harrison G. Dyar.

**Micrathetis dasarada** Druce.

*Thalpochares dasarada* Druce, Biol. Cent.-Am., Lep. Het., II, 498, 1898.
*Micrathetis dasarada* Hampson, Cat. Lep. Phal., VIII, 444, 1909.

Somerville, South Carloina, April, 1899 (R. Ottolengui).

**Gonodes liquida** Möschler.

*Ipimorha liquida* Möschler, Abh. senck. Ges., XIV, 48, 1886.
*Cyathissa violascens* Schaus, Trans. Am. Ent. Soc., XXI, 225, 1894.
*Drobeta leada* Druce, Biol. Cent.-Am., Lep. Het., II, 494, 1898.
*Gonodes liquida* Hampson, Cat. Lep. Phal., VIII, 452, 1909.

Stemper, Hillsboro County, Florida, September 19, 1911 (F. Marloff).

**Pacetes devincta** Walker.

*Abrostola devincta* Walker, Cat. Brit. Mus., XV, 1781, 1858.
*Orthoclosteria peculiaris* Butler, Trans. Ent. Soc. Lond., 70, 1878.
*Ingura murina* Druce, Biol. Cent.-Am., Lep. Het., I. 326, 1889.

"Florida" (Schaus collection); Stemper, Hillsboro County, Florida, September 15, 1911 (G. Marloff.)

## A NOTE ON COLORADIA.

By Harrison G. Dyar.

In describing *Coloradia lois* (Proc. Ent. Soc. Wash., XIII, 89, 1911) it now appears that I misidentified the form *doris* Barnes. Dr. Barnes, recently on a visit, showed me a photograph of his type *doris*, which is undoubtedly the same as *lois*. This leaves the other form unnamed. It may be called *loiperda*, n. var. Similar to *pandora* Blake, smaller, the hind wings whitish in ground and nearly without red tint; fore wing more densely irrorated with white.

Four males, one female; Colorado; the only specimen bearing exact locality is from Glenwood Springs (W. Barnes).

*Type:* No. 14500, U. S. National Museum.

## DESCRIPTION OF AN INJURIOUS OTIORHYNCHID.

By F. H. Chittenden, Sc. D.,

*Bureau of Entomology, U. S. Department of Agriculture.*

In cataloguing the Rhynchophora of the United States National Museum in a paper entitled "Studies of North American Weevils," the author, Mr. W. Dwight Pierce,[1] mentions a species of otiorhynchid weevil, under the genus *Phaccpholis*, designating it as "*Ph. viridis* Chittenden," stating that it is the most brilliant green form of the genus, mentioning the type locality (San Antonio, Texas), and date of collection (May 21, 1900), with the added statement that it was found on fruit trees, and placing it as a synonym of *Phaccpholis elegans* Horn.

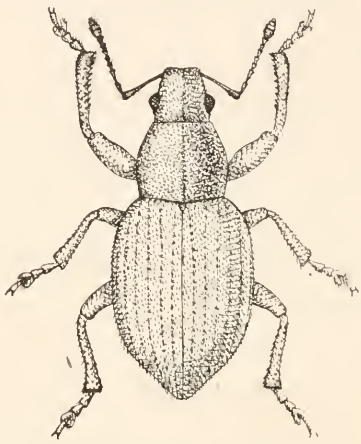

Fig. 1. — *Pantomorus viridis*. Female, much enlarged. (Original.)

In a supplement to their article on the Rhynchophora of Central America, Dr. D. G. Sharp and Mr. G. C. Champion,[2] again using the writer's name as authority for this species, mention structural characters — the much more prominent eyes and the very convex acuminate-ovate elytra, and figure the species, too lightly colored.

The danger of using manuscript names and the confusion that results as a consequence is well exemplified in the present species. It leaves a question as to who first described the species — Mr. Pierce, who attempted to sink the writer's MSS. name as a synonym, or Sharp and Champion, who point out two structural characters, and figure the female, which also indicates characters. Since the published statement has been made that the writer will shortly publish a description, the following is submitted. The species is removed to the genus *Pantomorus* Schœnh.

[1] Proc. U. S. Nat. Mus., No. 1708, vol. 37, p. 361, Dec. 11, 1909.

[2] Biologia Centrali-Americana, vol. IV, pt. 3, p. 336, pl. 15, figs. 22, 23, *a*, Dec., 1911.

**Pantomorus viridis** Sharp and Champion.

*Phacepholis viridis* Chittenden (MSS), Pierce, Proc. U. S. Nat. Mus., vol. XXXVII, p. 361, 1909.

*Pantomorus viridis* Chittenden, Sharp and Champion, Biol. Centrali-Americana, vol. IV, pt. 3, p. 336, figs. 22, 23, December, 1911.

*Female.*—Robust pyriform with elytra strongly convex; elytra and thorax densely coated with brilliant metallic green scales, the thorax more sparsely covered and with the scales mostly larger and with a bluish cast. Head broad, eyes nearly round and prominent. Thorax nearly as long as wide, sides strongly arcuate. Head, lower surface and legs coated with pale pinkish scales. First joint of funicle of antenna about half as long as second, second longer than next three together.

*Male.*—Body much narrower. First funicular joint about one-third as long as second.

Length, 5.5 to 6.5 mm.; width, 2.5 (male) to 3.4 mm.

*Habitat*: San Antonio, Texas (type locality), where it was reported injurious to peach, plum, and pear, May 21, 1900; Guanajuato and "Sierra de Durango," Mexico (Champion).

*Type*: No. 9756, U. S. National Museum.

The wider head, rounded, prominent eyes and antennal structure distinguish this species from *elegans*. A fairly large series of each shows such variability that other constant structural characters cannot be readily seen. The colors are very nearly constant in the present species and the basal margin of the thorax (which varies in length) is usually distinctly reflexed. It is larger than *elegans* and the female is much more robust than our other species. In *elegans* the second joint of the funicle is usually shorter than the next three together.

Finally, it should be added that it is *not* nearly related to *elegans*, but is similarly colored.

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## RECORD OF THE FINDING OF A TRUE QUEEN OF TERMES FLAVIPES KOL.

By Thomas E. Snyder,
*Bureau of Entomology, U. S. Department of Agriculture.*

(Plate III.)

While investigating damage by wood-boring insects to the bases of telegraph and telephone poles, a true fertilized queen of the species *Termes flavipes* Kol. was found in the butt of a chestnut telegraph pole on August 12, 1910. The pole was standing on the right of way of the Seaboard Air Line R. R. about 3½ miles southwest of Portsmouth, Virginia. The soil was sandy and dry near the surface.

The true queen (pl. III, *a*) when found was inactive in a gallery no wider than her abdomen, probably a burrow of

*Lymexylon sericeum* Harr., in the outer layers of the wood, below the surface of the ground. Injury by termites to this pole was confined to the outer layers of the wood, where there was incipient decay. Apparently she was unattended. On being exposed to the sunlight her abdomen appeared to have a greenish tinge. This queen is approximately 14 mm. in length. The queen had been fertilized, as is shown by the distended abdomen. Wing stubs were present.

On the same day a supplementary queen (pl. III, *b*) was found in the butt of another chestnut telegraph pole nearby. Termites had mined the heartwood to a depth of from 2 to 4 inches in from the exterior in this pole. This queen was active and was associated with workers; all were moving apparently to escape the light as the mines were laid open by the axe. She was in the outer layers of the wood, where there was incipient decay. This queen is approximately 12 mm. long.

The head, thorax and scutellar area of the abdominal segments of the true queen are more heavily chitinized and deeply pigmented. The supplementary queens never have developed wings and lack the deeper pigmentation (pl. III, *a*) of the chitinized parts and the ocelli are not so prominent as in the true queen—indications that the supplementary queens never leave the colony.

A small scarabæid (*Valgus canaliculatus* Fab.) was found very abundant in termite colonies in decaying oak stumps near Rock Creek Park, Maryland.

NOTE.—A study is being made of the more common American termites of the genus *Termes* with a view of determining methods of preventing injury by them to various classes of forest products. Any additional records of the conditions under which queens have been found in the past will be of value. It is believed that this is the first fertilized true queen ever found of this species.—T. E. S.

## BLOOD-SUCKING AND SUPPOSEDLY BLOOD-SUCKING LEPTIDÆ.

(Diptera.)

BY FREDERICK KNAB.

Recently Prof. C. F. Baker sent in for determination a specimen of the family Leptidæ, taken by Mr. David L. Crawford in the State of Oaxaca, Mexico, and accompanied by the statement from the collector that it "is a fierce biter and blood-sucker." The specimen proved to be a female of *Atherix longipes* Bellardi, a species not again recorded since described and not represented in the National Museum collection.

The observation is new, and with the wide attention now being given to the blood-sucking habit in insects, of considerable

*b* *a*

FIG. 1.—*a*, *Termes flavipes* Kol. True queen (fertilized). *b*, Supplementary queen. (*a* 14 mm.; *b*, 12 mm.)

*b* *a*

FIG 2.—Same, showing deeper pigmentation of the chitinized parts of the true queen.

(Photos made between glass slides under alcohol by H. S. Barber.)

interest. While a number of speeies of Leptidæ of other genera have been reported as blood-suckers, these reeords are so few and seattered, and some of them of sueh a questionable eharaeter, that it seems worth while to bring them together and review our present knowledge of the blood-sucking habit in the Leptidæ.

In Europe *Leptis scolopacea* and *L. strigosa* have been reported as attaeking man. In North Ameriea we have the reeord of Osten Saeken, who observed the habit in an undetermined speeies of *Symphoromyia* at Webber Lake, California, and made the statement that the female stings painfully and draws blood.[1] For South Ameriea we have the single reeord by Philippi of the habit in *Dasyomma obscurus* from Chili. "Frequens in prov. Valdivia, mensibus Deeembri et Januario, avide sanguinem rostro petit." [2]

Thus it will be seen that our information concerning blood-sueking Leptidæ is extremely meager, and eonfined, at least for the most part, to single records for eaeh speeies. Furthermore, the European records may be eonfidently eliminated, as they are undoubtedly erroneous. They have been diseussed by the late G. H. Verrall, an exceedingly careful worker, as follows:

> I cannot accept the records of the bites of *Leptis scolopacea* and *L. strigosa* as recorded by MM. Heim and Leprevost in Bull. Soc. Ent. France, LXI, and clv. (1892); to begin with, neither gentleman is well known in Dipterology, and in each case only one specimen was observed; M. Heim's specimen was first recorded as *L. scolopacea* but subsequently altered to *L. strigosa*, while M. Leprevost did not attempt to name his specimen but stated that it was named by M. Gazagnaire, whose name again is not known in Dipterology; I cannot help thinking that the aggressive appearance of *Leptis* led these gentlemen to believe that a species of that genus caused the bites which had been really given by *Hæmatopota*, as the bites of the latter cause in me the exact symptoms detailed; I would further remark that the status of *L. strigosa* is eminently uncertain and that it would require a very first-rate Dipterologist to identify that species or variety.[3]

Verrall's eriticism is supported by the structure of the mouthparts of *Leptis*. Becher studied the mouthparts of several Leptidæ and his investigations show that both sexes of *Leptis* and *Chrysopila* agree in structure with the male of *Chrysops* (Tabanidæ) and lack the mandibles.[4]

On the other hand, Becher shows that the females of *Atherix* and *Symphoromyia* have fully developed mandibles, like the female Tabanidæ.

Regarding our Ameriean reeords, then, the structure of the mouthparts supports the observations in the case of

[1] Bull. U. S. Geol. Survey, III, p. 224, 1877.
[2] Aufzähl. d. chilen. Dipteren, Verh. zool. bot. Ges. Wien, XV, 725, 1865.
[3] British Flies, vol. 5, p. 235, 1909.
[4] Denkschr. kais. Akad. Wiss. (Wien), Math.-Naturw. Classe, vol. 45, p. 143-144, 1882.

*Atherix* and *Symphoromyia*. It is easily conceivable, from what we know of other groups of blood-sucking Diptera, that the habit is restricted to certain species of those genera. In the case of *Symphoromyia* it appears somewhat strange that no further records have appeared, as some of the species appear to be fairly common in the far west. This, however, is probably attributable to the fact that the statement of so eminent an observer as Osten Sacken has been generally accepted. In the case of the Chilean *Dasyomma* it is not strange that, in a country so poorly known entomologically, Philippi's observation, should it be correct, has not been confirmed.

In the case of the *Atherix* from Mr. Crawford, some doubt arose in my mind from the superficial resemblance of the specimen to certain of the more slender Tabanidæ, certain *Chrysops*, and *Dichelocera*. This doubt was strengthened when I examined the South American Leptidæ in the Museum collection and found that, of two specimens sent in by E. C. Reed as *Dasyomma cinerascens*, one, and the one bearing his original label "*Trichopalpus cinerascens*," is a tabanid. On a statement of the unsatisfactory character of our records Mr. Crawford kindly sent me the following communication, which leaves no room for doubt that *Atherix longipes* is a genuine blood-sucker.

> In regard to the blood-sucking Leptid, *Atherix longipes*, I am *very sure* of my statement that it was that and not a Tabanid which I caught thus. There were a large number of the flies which attacked both me and my horse in the mountains a few miles back of Oaxaca. The bite was *exceedingly* painful and caused more alarm among the horses in my outfit than any other fly. I was so interested in a blood-sucker, which apparently was not a Tabanid, that I put a number in a separate killing-bottle, taking them all in the act of biting either me or my horse, and when I pinned them I took special pains to append a note on the pins. So you see I am positive beyond a *chance* of mistake. Moreover, there are no *Chrysops* or *Dichelocera* from Oaxaca in my collection—so I am doubly sure!

The occurrence among the Leptidæ of isolated species with the blood-sucking habit is not so surprising when one considers that the flies of this family are reported to be predaceous upon other insects. From piercing the integument of an insect to puncturing the skin of a warm-blooded animal is but a step. Besides, similarly, isolated cases occur in other families of Diptera among the species which have mouthparts fitted for piercing and sucking. Thus, in the family Blepharoceridæ, in which the females are generally so organized, the predaceous habit is general, while a single species (*Curupira torrentium* F. Müller) is an habitual blood-sucker. Again, in the family Chironomidæ, subfamily Ceratopogoninæ, there are species which attack other insects to suck their juices, while certain others are well known for their attacks on the higher animals.

*Actual date of issue, June 19, 1912.*

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# PROCEEDINGS

OF THE

# ENTOMOLOGICAL SOCIETY

OF

# WASHINGTON.

Volume XIV, No. 3.

JULY -- SEPTEMBER, 1912.

(Special Meeting of March 14, 1912.)

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# THE ENTOMOLOGICAL SOCIETY OF WASHINGTON

ORGANIZED MARCH 12, 1884.

The regular meetings of the Society are held on the first Thursday of each month, from October to June inclusive, at 8 P. M.,

Annual dues of active members, $3.00; of corresponding members, $2.00; initiation fee (for active members only), $1.00.

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## PROCEEDINGS
## ENTOMOLOGICAL SOCIETY OF WASHINGTON.

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PROCEEDINGS

OF THE

# ENTOMOLOGICAL SOCIETY

## OF WASHINGTON.

VOL. XIV JULY - SEPTEMBER, 1912. No. 3

### SPECIAL MEETING OF MARCH 14, 1912.

A special meeting of the Society was held in Room 2, Bureau of Entomology, U. S. Department of Agriculture, to take action on the death of Dr. John B. Smith.

President Quaintance occupied the chair, and there were present Messrs. Barber, Blakesley, Currie, Heidemann, Hopkins, Howard, Hyslop, Johnson, Middleton, Phillips, Popenoe, Quaintance, Rohwer, Russell, Sasscer, Seigler, Simaton, Walton, Webster, Wood, and Zimmer.

President Quanitance appointed a committee of three, consisting of Messrs. Howard, Hopkins, and Webster, to draft suitable resolutions, which were to be sent to the family of the deceased and printed in the Proceedings of the Society. The committee reported the following resolutions:

Whereas, the Entomological Society of Washington has learned with the deepest regret of the death of its former active member and most highly esteemed corresponding member, Dr. John Bernhard Smith;

And whereas, Doctor Smith had been closely connected, both personally and by correspondence with Washington entomology for a quarter of a century;

And whereas, by his admirable work and strong personality he had long since gained the respect and esteem of the members of the Society: Therefore, be it

*Resolved*, That in the death of our former member the Society has lost one of its valuable assets; American entomology has lost one of its foremost workers; the State of New

Jersey has lost an earnest, indefatigable, far-sighted, and most competent official;

*Resolved further*, That the Entomological Society of Washington extends to the widow and the family of its late member its warmest sympathy, and at the same time its appreciation of the fact that the distinguished career of the late husband and father must always be a source of satisfaction to those left behind.

L. O. Howard,
F. M. Webster,
A. D. Hopkins,
*Committee on Resolutions.*

Doctor Howard made the following remarks:

Another of the founders of the Entomological Society of Washington, Dr. John Bernhard Smith, has died, passing away yesterday morning at 3 o'clock after a long illness. His end was probably due to chronic heart trouble complicated by Bright's disease.

Our former colleague was born November 21, 1858, in New York City, and was educated in the schools of New York and Brooklyn. He was admitted to the bar in 1880 and practiced law in Brooklyn between 1880 and 1884. He became special agent of the then Division of Entomology, Department of Agriculture, in 1884, and for two years he did field work, especially upon insects affecting the hop and cranberry. In 1886, he was made aid in the Division of Insects, U. S. National Museum, holding this position for four years. In 1890, he was made entomologist of the agricultural experiment station of the State of New Jersey, and was made State Entomologist of New Jersey some years later.

I have never learned, and I don't think he ever told me, just when he began to collect insects and to become interested in entomology. I imagine that Charles Fuchs and Frank Schaupp had something to do with it. At all events, they were all together in the early days of the Brooklyn Entomological Society. Doctor Smith became the second editor of the bulletin of that society, which he afterwards developed into Entomologica Americana, and of this later well-known journal Dr. Smith was editor from 1886 to 1890, when he was succeeded by Dr. F. H. Chittenden. His interests from the start were in the Lepidoptera, and this interest continued the rest of his life, and he became, as every one knows, one of the best known workers on the great complex known as the Family Noctuidæ.

His first introduction into economic entomology came in 1884, when Dr. Riley brought him to Washington, but his work in 1886–1890 was again purely systematic. During his six years in Washington he became a well known figure among the naturalists of the city, and was at one time secretary of this Society, and later, secretary of the Biological Society of Washington.

When the agricultural experiment stations were founded, he was one of the first State workers appointed, and from the very start his energy and capacity made him one of the foremost workers in this line of research. He was interested in and active in every new development of economic entomology and was a prominent figure at every meeting of the Association of Economic Entomologists, holding the office of secretary at the first and second annual meetings of the association, in 1889 and 1890; second vice-president in 1893; first vice-president in 1894; and president in 1895.

He carried on his dual work as a systematic entomologist and as an intensely practical economic entomologist down to within a short time of his death. He was not only held in great respect among the entomologists of this country and of Europe, but he had the highest standing among the citizens of the State of New Jersey, of which he was an official. Further, he had the respect and confidence of the citizens of New Brunswick, in which city he lived, and of the faculty and student body of Rutgers College, with which he was connected and which had given him, in the early nineties, the honorary degree of doctor of science.

While practically all of Doctor Smith's work was sound and deserving of every respect, it seems to me that the triumph of his life was in the results obtained by his anti-mosquito work. I can do no better than to quote from my address before the Seventh International Zoological Congress as follows:

> The mosquito destruction measures carried on by English workers, and especially by those connected with the Liverpool School of Tropical Medicine, in different parts of the tropics controlled by England, have been large-scale work of great value. That done by the army of occupation in Cuba was of enormous value, so far as the city of Havana was concerned, and an assistant just returned from the Isthmian Canal Zone assures me that it is possible to sit now out-of-doors of an evening upon an unprotected veranda anywhere in the Zone without being annoyed by mosquitoes, and without danger of contracting malaria or yellow fever.
>
> These are all great pieces of work, but when we consider the condition that exists in the State of New Jersey, and the indefatigable and successful work of Doctor Smith in the handling of the most difficult problem of the

species that breed in the salt marshes, and of his persistent and finally successful efforts to induce the State legislature of that wealthy but extremely economical State to appropriate a large sum of money to relieve New Jersey from its characteristically traditional pest—we must hold up our hands in admiration.

One important lesson learned from Doctor Smith's successful career is that it is possible for a man of adaptability, of force of character, and of keen perception, without university training and without any training in biological research, to take up both systematic and economic entomology after reaching manhood and to become in the course of a short life one of the prominent men of the Nation.

It is a sad and curious coincidence that both Charles V. Riley and John B. Smith died at the same age.

Doctor Howard made some additional remarks and quoted a letter from Dr. Smith, dated February 23, 1912, as follows:

DEAR DOCTOR HOWARD: Yours of the 10th inst. is at hand. No, it is nothing serious. It only means the preliminary to a funeral, and that is one of the commonest things that occurs.

Professor Webster made the following remarks:

I think it must have been about 1885 that I first began cort responding with John B. Smith, and I remember well his firs letter, and remarked at the time its hearty spirit of comradeship. While I did not meet him until a number of years afterwards, that same spirit was true of him all of his life. Dr. Smith never was too busy to help anybody. You might go to him when he was in the midst of his work and he would drop everything and try and help you; I have always noticed, too, that, in all of our entomological associations and societies, Doctor Smith was always ready to take hold and work, and worked like a Trojan. It has always been a wonder to me how one man could accomplish so much; how he found time to even try to do some of the things that he did. Of course in a man so prolific, it would be almost beyond human endurance for him to be always exact. Sometimes we would get out of patience with him over his mistakes and tenacity in holding to them, yet could not stay out of patience any length of time. Of course, the work that he did will be revised, and more or less, perhaps, dropped out, which is true of all of us; but after all error is sifted out, though cut off in his prime, there will be a good life's work left. I do not believe I can say anything more than that he will be sadly and universally missed, ex-

cept to emphasize his universal good nature and his willingness to aid everybody in any way and he never seemed to be too busy to do so.

Doctor Hopkins made the following remarks:

To my personal knowledge I first had correspondence with Doctor Smith immediately after taking up work in the West Virginia Experiment Station in 1890. Directly after Doctor Smith had been appointed to New Jersey, I had been studying some insects, especially those found on hackberry, mulberry, and raspberry. I had made some drawings that I thought were very good, but after seeing some drawings made by Doctor Smith, I sent them to him for his criticisms, and he was very severe in his criticism. He said they were not worth reproduction and they were very poor, and his exceedingly frank expression attracted me, and I may say that it had some influence, because I made up my mind then that I would make as good drawings as Doctor Smith. It was my pleasure some four or five years after that, at one of the annex meetings, I think at New York, of the association in 1894, at which Doctor Smith was exhibiting some of his drawings of the clerid that I introduced from Germany, and after he had exhibited his drawings, I passed mine around, and he complimented me especially on the excellent work, and I called his attention to the fact that this was one time that he did not criticize my drawing, so that sometimes one does good by having his work criticized, and I think that his criticism did a great deal towards my attitude to do some good drawing. This is, I think, one of the instances which might be worth mentioning. At our meetings of the American Association, Drs. Smith and Fletcher and a few others were always the remaining members of the annex meeting, and will always be remembered with great pleasure.

Mr. H. S. Barber made the following remarks:

I had the great pleasure of being out in the country one full day with Dr. Smith and Mr. Schwarz, and the way they seemed to enjoy each other, after a long separation, was one of the prettiest things I ever saw in my life. Both of them were just overjoyed all the time. It was one of the pleasantest outings I ever had.

Mr. Quaintance made the following remarks:

I would merely say that I first met Doctor Smith, I think, at the Columbus meeting of the American Association, and

indorse thoroughly what Professor Webster said as to his extremely good nature, and I used to think a great deal of him, and the more I knew of him personally, the higher opinion I had of him as a man. I think I had correspondence with him first, perhaps, in 1893, in connection with the determination of some common noctuid moths from Florida. They were all very common and I should have known what they were, but I had just began the study of insects at that time and he let me down very easy. They represented the bollworm moth (*Heliothis*) and perhaps the cabbage worm and similar insects like that. I am sorry that I have not his letter to read to show you how nicely he treated me in regard to the matter, being a beginner in the subject. On another occasion, Doctor Hopkins' remarks about drawings remind me of an experience I had in that particular. I had made certain observations on a little weevil which infests seed corn, and not knowing how to make drawings, I made them very large. Dr. Smith at that time was editor of the section of entomology in Entomological News devoted to economic entomology. I sent them on to him with the manuscript and he complimented me on the paper. He said "Why did you make your drawings so large? They are enormous." He offered to redraw them and reduce them, which he did.

Mr. Currie made the following remarks:

I never was associated with Doctor Smith to any extent, but at the times when he visited Washington and the National Museum in former years I always enjoyed meeting him greatly and I admired him for his cordial personality and abounding enthusiasm. I always admired the records of the work that he left in the Division of Insects in the National Museum. In the old record book, in which the first accessions to the Division of Insects in the National Museum were made, we have the entries made in Doctor Smith's own handwriting. The amount of work that he evidently did was quite remarkable. While he was Assistant Curator of the Division of Insects he accomplished much work in arranging various groups and did considerable work on the exhibition series in various groups. I suppose that at that time he was about the only one employed at the National Museum to care for the insect collections. He was succeeded later by Mr. Martin L. Linell. Those were the days when one man had to take charge of a great variety of groups and the arrangement of them, and had many duties. Of course, his most notable systematic work was perhaps that in connection with the collection of Noctuidæ, and even after

he left Washington specimens of his new species were constantly being added to the collection. He sent the new specimens or species themselves or, if that was not possible, he saw to it that photographs or drawings were put in place in the collection, so that the series would be as complete as it was possible to make it.

After the resolutions were adopted, the meeting was adjourned at 4.30 P. M.

The following papers were accepted for publication:

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## A NOTE ON THE SOUTHERN WALKING-STICK (ANISOMORPHA BUPRESTOIDES STOLL) AND A TACHINID PARASITE.

By H. M. Russell.

*Bureau of Entomology, U. S. Department of Agriculture.*

While at Cutler, Florida, May 8, 1908, the writer captured a pair of walking-sticks in copulation belonging to this species. They were placed in a tin box and left until May 12, when upon opening the box to kill the female it was found that 10 eggs were lying loosely upon the bottom. The female when grasped expelled a milky fluid possessing a very disagreeable odor in a very fine mist from some part of the abdomen, repeating this as often as handled, although the quantity diminished each time.

The egg is 4 mm. long and 2 mm. in diameter, shaped exactly like a bean, both ends flattened and one side with a scar in the side similar to one on a bean where it is attached to a pod; anterior pole with round cap fitted so as to open when larva pushes on it; color gray, cap with blackish spot in center, scar on side black, surface with few raised wavy lines running lengthwise and between a number of very minute raised wavy lines.

Five dipterous pupæ were also found in the box, which must have come from the female, although the parasitism did not prevent her from laying the eggs.

May 29, 1908, a male fly, a tachinid, emerged from one of these pupæ, and was described as *Phasmophaga meridionalis* by Mr. C. H. T. Townsend, in the Annals of the Entomological Society of America, vol. 11, p. 224, 1909.

## A CONTRIBUTION TO NORTH AMERICAN DIPTEROLOGY.

By Harrison E. Smith,

*U. S. Bureau of Entomology, Melrose Highlands, Mass.*

In the following paper are included the descriptions of several new species of North American Tachinidæ and Syrphidæ; also a summary of the North American representatives of the genus *Hyperecteina* Schiner. I am under obligations to Mr. Frederick Knab and Mr. C. W. Johnson, each of whom very kindly offered much valuable advice and criticism; also to Dr. L. O. Howard, who made possible my opportunity to examine many of the types for comparison.

### Family SYRPHIDÆ.

**Helophilus willingii,** new species.

Eyes and arista bare; third antennal joint oval; head, thorax, abdomen and legs shining black in ground color. Length 11 to 12 mm.

*Male and Female.*—Front in the male about one-half as wide as, in the female nearly as wide as either eye; in the male pile on the upper half of the front black, on the lower half grayish white; in the female black pile on the front, descending a little below the upper half; vertex shining black, very thinly dusted gray pollinose; face on the lower half produced obtusely downward and forward into a cone, shining black, densely grayish-white pollinose on the sides and bearing pile of a similar color along the margins of the eyes; beneath the antennæ concave for a short distance and then nearly straight to the tip; in the middle of the face extending from the tip of the epistoma nearly to the base of the antennæ a moderately broad shining black stripe; epistoma on the ventrad shining black; cheeks below the eyes narrow, dull black, grayish pilose; first two joints of antennæ shining black; the third joint brownish black, dusted gray pollinose; shining brownish black just above the base of the antennæ; arista brown; thorax shining black, the usual lateral stripes rather indistinct gray; in the female two velvety black spots at the tip of each mesothoracic suture; pile of mesonotum grayish; scutellum shining black, gray pilose; pleuræ also shining black and densely grayish pilose; abdomen oval, shorter than the wings, wholly shining black, sparsely grayish pilose, except the dorsad of segment 3 and the basal margin of segment 4, which are mostly covered with very short black pile; legs shining black, the tip of femora and the base of tibiæ faintly brownish; pile in most reflections grayish and black; on the tarsi ochraceous in some reflections; pulvilli and the tarsal claws on the basal two-thirds yellowish; tips of the tarsal claws black; wings in the male subhyaline; in the female slightly smoky tinged; the veins and stigma brownish; sixth longitudinal vein gently curved; calypteres whitish.

Described from 1 male collected June 19, 1905, and 1 female collected July 8, 1906; both from Regina, in the Saskatchewan region, Canada; both specimens collected by Mr. T. N. Willing, after whom the species is named.

*Type:* No. 14695, U. S. National Museum.

**Chalcomyia cyaneus**, new species.

Dark metallic blue, shining, very sparsely clothed with short grayish pile; eyes and arista bare; dichoptic species. Length 7 to 8 mm.

*Male.*—Eyes moderately separated; front metallic bluish black, shining, sparsely grayish pilose on the vertex, a narrow obsolete cross-band near the middle; antennæ situated upon a strong conical projection, the first two joints short, the first joint blackish, the second and third light brownish; the third joint orbicular; arista basal, bare, dark brown; margin of the antennal process at base of antennæ reddish brown; face below the antennal process concave, very moderately tubercular near the middle, produced a little below the eyes; middle of the face, epistoma on the under sides, and the cheeks shining metallic blue; a grayish white pollinose stripe runs from the eyes obliquely to the oral margin; the mesonotum, scutellum, and the pleuræ shining metallic blue, very sparsely gray pilose; scutellum moderately large and projecting, the outer angles rounded, faintly shallow grooved on the disk; abdomen oval in outline, somewhat flattened, shining metallic blue, very short grayish pilose, longer on the lateral margins in front; legs rather stout, dark brownish black, shining; extreme tip of femora and base of tibiæ reddish brown; hind femora moderately thickened; pile on the under sides of hind tarsi golden in some reflections; wings subhyaline, faintly yellowish tinged, the third and sixth longitudinal veins nearly straight, anterior cross-vein oblique, situated before the middle of the discal cell; subcostal cell from slightly before the tip of the auxiliary vein to the costa yellow; calypteres white.

Described from two male specimens taken at Franconia, New Hampshire, by Mrs. A. T. Slosson.

*Type:* No. 14696, U. S. National Museum.

## Family TACHINIDÆ.

**Phorocera einaris**, new species.

Thorax, legs and abdomen black, dusted with pollen. Length, 11 to 14 mm.

Eyes densely pilose; front in the male about two-thirds, in the female about five-sixths as wide as either eye; frontalia opaque black; parafrontals densely yellowish gray pollinose; the parafacials, cheeks, and occiput densely dusted gray pollinose, sometimes nearly all the pollen of the head is faintly tinged with yellow; front in the male projecting about two-thirds, in the female about one-half the horizontal diameter of the eye as viewed from the side; frontal bristles descending to or slightly below the apex of

the second antennal joint, the 3 uppermost frontal bristles in the male stout, recurved, and of equal length, in the female the penultimate bristle is only two-thirds the length of the other two; frontal bristles below the base of the antennæ curving upwardly; parafrontals outside of the frontal row covered with many black hairs, 2 pairs of strong proclinate orbital bristles present in the female; ocellar bristles long, proclinate; vibrissæ on a level with the front edge of the oral margin; facial ridges ciliate on the lowest two-thirds to four-fifths, the bristles long, reclinate; antennæ black, dusted grayish white pollinose; the third joint in both sexes at least four times as long as the second, its greatest width equal to the length of the second antennal joint; arista one and one-half times as long as the third antennal joint, thickened on the basal one-fifth to one-fourth, the penultimate joint longer than broad; cheeks caudad of the vibrissæ each bearing a row of black macrochaetæ near the oral margin, the remainder covered with many black hairs, about one-fifth as broad as the eye height; sides of face each one-fifth as wide as the median depression; palpi reddish yellow, robust, and slightly spatulate.

Mesonotum black, appearing when viewed from behind densely yellowish-gray pollinose, the pollen appearing at its greatest density along the anterior margin and upon the humeri, distinctly vittate; four pairs of postsutural and three pairs of postacrostichal bristles; pleura dusted gray pollinose; two sternopleural bristles; scutellum brownish on the apical half, dusted with pollen, bearing a strong pair of discal macrochaetæ and four pairs of long marginals, the apical pair cruciate; legs shining black, gray pollinose; the middle tibiæ each bearing two macrochaetæ on the front side near the middle; hind tibiæ ciliate or subciliate; tarsal claws and pulvill-elongate in the male, short in the female.

First abdominal segment black; the second and third segments grayish-white pollinose on the anterior two-thirds, the posterior third shining black; the fourth segment shining black except on the sides, which are densely gray pollinose; first and second segments each bearing a pair of marginal macrochaetæ; the third a marginal row and the fourth a discal and marginal row and many shorter bristles intermingled on the apical two-thirds; along the ventral median of the female a row of black macrochaetæ.

Wings hyaline, faintly tinged with yellow at the base and along the costa; the third vein usually bristly one-half to two-thirds the distance from the base to the small cross-vein; the fourth vein beyond the bend concave; the small cross-vein distinctly before the middle of the discal cell; posterior cross-vein sinuous; calypteres whitish, faintly bordered with yellow.

This species differs from *Phorocera tortricis* Coq. as follows: *P. tortricis* is a smaller species, the hairs of the abdomen are suberect, and the third vein bears only two bristles at its base; none of these characters are true of *P. cinaris*. *P. cinaris*

differs from *Phorocera claripennis* Macq., which it closely resembles in appearance, as follows:

| *P. einaris.* | *P. claripennis.* |
|---|---|
| Bend of fourth vein not distinctly long appendiculate. Scutellum bearing a strong pair of discal macrochaetæ. | Bend of fourth vein distinctly long appendiculate. Scutellum usually not bearing a pair of discal macrochaetæ. |
| Middle tibiæ each bearing two macrochaetæ on the front side near the middle. | Middle tibiæ each usually bearing three macrochaetæ on the front side near the middle. |
| Two sternopleural macrochaetæ. Arista thickened on the basal fifth to one-fourth. | Three sternopleural macrochaetæ. Artista usually thickened on the basal half. |

Described from 5 males and 4 females collected at Melrose Highlands, Massachusetts, August 1 to September 20, 1911, by the author and F. H. Mosher; 1 female from Lynn, Massachusetts, August 29, collected by F. W. Lowe; 1 female from New Haven, Connecticut, collected by W. E. Britton, August 14, 1906; and 1 female from Tampico, Mexico, taken by E. A. Schwarz.

*Type:* No. 14697, U. S. National Museum.

**Phorcera incrassatus,** new species.

Thorax and abdomen black, polished; scutellum brownish yellow on the apical two-thirds; legs brownish black, all thinly dusted gray pollinose; palpi yellow.

Length, 7 mm.

Head nearly one and one-half times as broad as long; front as wide as either eye; parafrontals, parafacials, and the cheeks yellowish-gray pollinose; frontal bristles descending to a point opposite the arista; outside of the frontal row a pair of proclinate orbital bristles and a number of black bristles and bristly hairs; frontalia opaque brown; antennæ black, dusted with whitish pollen, descending nearly to the oral margin, the third joint at least three and one-half times as long as the second; arista one and one-fourth times as long as the third antennal joint, thickened on the basal half, the penultimate joint only slightly longer than broad; vibrissæ on a level with the front edge of the oral margin; facial ridges ciliate on the lower half; sides of face each one-fifth as wide as the median depression; width of cheeks equal to about one-fifth the eye height; cheeks caudad of the vibrissæ, each bearing a row of strong bristles near the oral margin, the remainder bearing many black bristly hairs; palpi about as long as the proboscis.

Mesonotum black, polished, dusted yellowish-gray pollinose, distinctly vittate; four pairs of postsutural and three pairs of postacrostichal

bristles; pleuræ dusted grayish; three sternopleural bristles; scutellum pollinose, bearing three pairs of long marginal and a short apical pair of macrochaetæ; bristles and bristly hairs of scutellum erect; legs brownish black, thinly dusted grayish; front tarsi moderately dilated; middle tibiæ each bearing two macrochaetæ on the front side near the middle; hind tibiæ subciliate; calypteres tinged with yellow; wings hyaline, faintly tinged with yellow at the base and along the costa; the third vein bearing two or three bristles at its base; the small cross-vein distinctly before the middle of the discal cell; posterior cross-vein sinuous; bend of fourth vein not appendiculate; apical cell open.

Abdomen shining metallic black; dorsally, the first segment black; the remaining segments dusted yellowish-gray pollinose, the pollen appearing more dense on the sides and the basal margins of the segments; first segment bearing a pair of marginal macrochaetæ, the second two pairs of discals and one pair of marginals; the third two pairs of discals and a marginal row and the fourth segment bearing macrochaetæ on its apical two-thirds; hairs of abdomen depressed.

This species is very distinct from the other species of *Phorocera*; the general shape of the abdomen superficially resembles that of typical *Carcelia blanda* O. S.

Described from one female specimen taken at Moscow, Idaho.

*Type:* No. 14698, U. S. National Museum.

### HYPERECTEINA Schiner.

The writer having experienced considerable difficulty in satisfactorily determining several specimens of this genus by the aid of Coquillett's "Revision of the Tachinidæ North of Mexico," and his later descriptions of members of this genus, recently had the good fortune to examine in the U. S. National Museum all of the representatives, including many of the types of this genus, described from America north of Mexico. As a result of this study it was possible to arrange what is hoped will serve as a satisfactory key to the described representatives of this genus in America north of Mexico.

Bezzi and Stein, in their "Katalog der Paläarktischen Dipteren," recognize the genus *Admontia*, described by Brauer and Bergenstamm in 1889 with *Degeeria amica* Meig. (as *podomyia*, new species) as the type of the genus. They have placed *Hyperecteina* Schiner in the synonymy. The genus *Hyperecteina* was described by Schiner in 1861; as it is not preoccupied, just how they arrived at this conclusion is somewhat of a mystery, as they include in the genus *Admontia* the species *metopina*, the type species of *Hyperecteina*, so designated by Schiner himself. In other words, they have entirely overlooked the fact that Schiner described the genus *Hyperecteina* with

*metopina*, a new species described by himself as the type some twenty-eight years before Brauer and Bergenstamm designated *Degeeria amica* Meigen as the type of their genus *Admontia*. *Degeeria amica* Meigen, therefore, becomes merely *Hyperecteina amica* Meigen. Mr. Coquillett has pointed out this fact in his paper, "The Type-species of the North American Genera of Diptera."

The representatives of the genus in America north of Mexico may be separated as follows:

1. The third abdominal segment in the female at most only normally carinate on the venter ..... 2

   The third abdominal segment in the female abnormally carinate on the venter, the carina forming a wide lateral ridge and thickly beset with short black spines; front in the male two-thirds as wide as, in the female as wide as either eye; bristly hairs on the sides of the face not arranged in a single row; the third antennal joint in both sexes nearly twice as long as the second; arista thickened on the basal third, the penultimate joint broader than long; sides of face each nearly one-half as wide as the median depression; cheeks one-fourth as broad as the eye-height; facial ridges bristly on the lowest one-fourth to two-thirds; abdomen gray pruinose on the basal margins of the last three segments; bearing both discal and marginal macrochaetæ; three sternopleural macrochaetæ; the third vein bearing two or three bristles at its base. Length, 6 to 9 mm. 3 males and 5 females bred from *Hylotoma humeralis* Beauv. Type 4061, U. S. Nat. Mus. (Can. Ent. Vol. xxx, p. 233.) *hylotomæ* Coq.

2. Third vein bristly less than one-half the distance from base to the small cross-vein ..... 3

   Third vein bristly at least two-thirds the distance from base to the small cross-vein; front in the female four-fifths as wide as either eye; parafrontals and the parafacials grayish white pollinose; sides of face each one-fifth as wide as the median depression; frontal bristles descending to the lower end of the eye; one bristle on the facial ridge above each vibrissa; first two joints of antennæ and the palpi yellow; arista thickened on the basal third; penultimate joint as broad as long; thorax thinly dusted grayish-white pollinose; scutellum bearing three pairs of long marginal macrochaetæ; three strenoplcural macrochaetæ; middle tibiæ each bearing a single macrochaeta on the front side near the middle. One female from San Mateo County, California. Type, 7671 U. S. National Museum. (Invertebrata Pacifica, I, Feb. 10, 1904.) ..... *setigera* Coq.

3. Palpi yellow ..... 5
Palpi black; three sternopleural macrochaetæ; bristly hairs or macrochaetæ on sides of face not arranged in a single row 4

4. Front in the male one and one-third times as wide as, in the female one and three-fourths to two times as wide as either eye; parafacials yellowish-gray pollinose; sides of face each one-third as wide as the median depression; usually three pairs of frontal bristles descending below base of the antennæ; the third antennal joint six to seven times as long as the second; arista thickened on basal three-fifths, penultimate joint at least twice as long as broad; facial ridges bristly on lowest two-thirds; thorax thinly dusted gray pollinose; scutellum bearing three pairs of long marginal macrochaetæ and a short apical pair; middle tibiæ each bearing a single macrochaeta on the front side near the middle; abdomen with thinly dusted grayish-white pruinose bands on the basal margins of the last three segments; first segment bearing a pair of marginal macrochaetæ; the others bearing both discal and marginal macrochaetæ; wings hyaline; third vein bearing two to four bristles at its base. Length, 5 to 8 mm. 4 females from Washington, D. C., and Beverly, Massachusetts. (Journ. N. Y. Ent. Soc., vol. III, p. 58; June, 1895.) . *pergandei* Coq.
Front in the male four-fifths as wide as either eye; parafacials grayish-white pollinose; parafrontals shining black; cheeks nearly one-third as broad as the eye-height; third antennal joint three and one-half times as long as the second; arista slightly pubescent at the base, thickened on the basal two-fifths; penultimate joint longer than broad; thorax grayish-white pollinose; scutellum bearing three pairs of long marginal macrochaetæ; the middle tibiæ each bearing two macrochaetæ on the front side near the middle; the first abdominal segment black; the remaining segments with grayish-white pruinose bands on the basal margins; abdomen bearing both discal and marginal macrochaetæ; wings smoky tinged except along the hind margins; third vein bearing from one to three bristles at its base; apical cell closed in the margin of the wing, sometimes short petiolate. Length, 5 to 7 mm. 6 males from Moscow and Juliaetta, Idaho. Type: 6202 U. S. National Museum. (Proc. U. S. N. M., XXV, p. 105.) ..... *limata* Coq.

5. With three sternopleural macrochaetæ ..... 9
With two sternopleural macrochaetæ, middle tibiæ each bearing a single macrochaeta on the front side near the middle; scutellum bearing a weak apical pair of macrochaetæ; abdominal segments except the first gray pruinose on the basal margins ..... 6

6. Wings hyaline, or sometimes smoky costally ..... 7

Wings subhyaline to small cross-vein, the remainder brown except the hind margin; front in the female one and one-fourth times as wide as either eye; parafrontals, parafacials, and the cheeks yellowish-gray pollinose; sides of face each one-third as wide as the median depression; bristly hairs on the sides of face not arranged in a single row; facial ridges bristly on the lowest two-fifths to three-fifths, third antennal joint in the female five to seven times as long as the second; arista thickened on the basal half, the penultimate joint twice as long as broad; thorax dusted yellowish-gray pollinose; the first abdominal segment bearing a pair of marginal macrochaetæ; the others bearing both discal and marginal macrochaetæ; hairs of abdomen long and depressed; the third vein bearing a single bristle at its base. Length, 7 mm. 2 females from Algonquin, Illinois, and National Park, New Jersey. Type: 3538, U. S. National Museum. (Journ. N. Y. Ent. Soc., vol. III, p. 55, June, 1895) ..... *nasoni* Coq.

7. Abdomen bearing discal macrochaetæ; the third vein bearing more than one bristle at its base ..... 8

Abdomen not bearing discal macrochaetæ; the third vein bearing a single bristle at its base; front in both sexes slightly wider than either eye; frontal bristles descending scarcely below base of second antennal joint; sides of face each one-fifth as wide as the median depression; facial ridges bristly on the lowest fourth; parafrontals and the parafacials grayish-white pollinose; the first two antennal joints yellow; the third joint three to four times as long as the second; thorax grayish-white pollinose; apical cell usually closed in the margin of the wing. Length 7 mm. One male and 5 females from Opelousas, Louisiana. Type, 4062 U. S. National Museum. (Can. Ent., vol. XXX, p. 234.) ..... *unispinosa* Coq.

8. Antennæ black; front in the male as wide as, in the female one and one-fourth times as wide as either eye; parafrontals and the parafacials grayish white pollinose; cheeks nearly one-half as wide as the eye height; facial ridges bristly on the lowest one-third; the third antennal joint at least four times as long as the second; arista thickened on the basal two-fifths; penultimate joint usually twice as long as broad; orbital bristles present in both sexes; thorax gray pollinose. Length, 5 to 6 mm. 2 males and 2 females from District of Columbia and Beverly and Dorchester, Massachusetts. (Jour. N. Y. Ent. Soc., vol. III, p. 58, June, 1895. *Hypostena*) ..... *degeerioides* Coq

Antennæ yellow, except at tip of the third antennal joint; front in the female as wide or slightly wider than either eye; one or two pairs of frontal bristles descending below the base of antennæ; sides of face each one-fifth as wide as the median depression; the facial ridges bristly on the lowest half; the third antennal joint five times as long as the second; arista thickened at least on the basal two-fifths; penultimate joint usually longer than broad; thorax dusted yellowish-gray pollinose; wings subhyaline, slightly smoky tinged costally; apical cell open, the third vein bearing two or three bristles at its base. Length, 6 to 9 mm. Four females from Opelousas, Louisiana, May, 1897, and Germantown, Pennsylvania. Type, 4063, U. S. National Museum. (Can. Ent., vol. XXX, p. 234.) ..... *tarsalis* Coq.

9. Legs black; bristly hairs or macrochaetæ on the sides of the face arranged in a single row ..... 10

Legs yellow; bristly hairs or macrochaetæ on the sides of the face not arranged in a single row; the tip of proboscis, the sides of the first two abdominal segments, and usually the apex of the abdomen yellow; front in the male one-third to one-half as wide as, in the female as wide as either eye; parafrontals, parafacials, and the cheeks yellowish-gray pollinose; three or four pairs of frontal bristles descending below the base of the antennæ; facial ridges bristly on the lowest third; third antennal joint in both sexes two to two and one-half times as long as the second; arista thickened on the basal two-fifths, the penultimate joint as broad as long; thorax gray pollinose; scutellum bearing three pairs of long marginal and a short apical pair of macrochaetæ; middle tibiæ each bearing a single macrochaeta on the front side near the middle; abdomen grayish pollinose; moderately carinate on the venter; bearing both discal and marginal macrochaetæ; wings hyaline; apical cell open; the third vein bearing two bristles at its base. Length, 8 to 10 mm. 3 males and 1 female from Washington, D. C. (List Dipt. Insects, part IV, p. 779, 1849, *Tachina*) ..... : *demylus* Walk.

10. Middle tibiæ each bearing a single macrochaeta on the front side near the middle; front in the male as wide as, in the female one and one-fifth times as wide as either eye; cheeks one-third as broad as the eye height; sides of face each one-fifth as wide as the median depression; facial ridges bristly on the lowest fourth; parafrontals and parafacials grayish-white pollinose; the third antennal joint four times as long as the second; arista thickened on the basal third, penultimate joint as broad as long; thorax gray

pollinose; scutellum bearing a short apical pair of macrochaetæ besides the long marginals; abdomen grayish pollinose; first segment bearing a pair of marginal macrochaetæ; the others bearing both marginal and discal macrochaetæ. 1 male and 1 female specimen bred from chrysalids of *Retinia* sp. Type, 3532, U. S. National Museum. (Revis. Tachin., p. 54.) ..... *retinæ* Coq.

Middle tibiæ each bearing two macrochaetæ on the front side near the middle; front in both sexes about two-thirds as wide as either eye; cheeks one-half as broad as the eye height; facial ridges at most bearing one or two bristles above the vibrissæ; parafontals shining black, thinly dusted gray pollinose near the base of the antennæ; the third antennal joint in both sexes at least four times as long as the second; first two joints of the antennæ and the tip of the proboscis yellow; arista somewhat pubescent on the basal half, thickened on the basal fourth, penultimate joint longer than broad; orbital bristles present in both sexes; thorax gray pollinose; scutellum bearing three pairs of long marginal macrochaetæ; abdomen with grayish white pruinose bands on the basal margins of segments two and three; sometimes carinate on the venter; usually no discal macrochaetæ present; (2 females have a weak pair of discals on segments 2 and 3); wings slightly smoky tinged costally; third vein bearing two to four bristles at its base; apical cell closed or open in the margin of the wing. Length, 5 to 7 mm. 1 male and 5 females from Oswego, New York. Type, 4064, U. S. National Museum. (Can. Ent., vol. XXX, p. 234) ... *polita* Coq.

## NOTES ON THYSANOPTERA.

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The writer presents these short notes at the present time as two of the species treated, *Heliothrips rubrocinctus* Giard and *Euthrips insularis* Franklin, have not been recorded from the United States, and the third, *Æolothrips bicolor* Hinds has heretofore only been recorded from Amherst, Massachusetts.

**Heliothrips rubrocinctus** Giard.

This species was observed by the writer to be seriously affecting the mango and avocado trees at Miami, Florida, during the months of January to May, 1909. It was found feeding in colonies on the foliage in all of its stages and mingling in with *Heliothrips hæmorrhoidalis* Bouché. In habits it was almost identical with the latter, but the younger stages were readily distinguished by a bright red band crossing the base of the abdomen, and the adult by its habit when disturbed of curling the abdomen entirely over the body and then moving away in that posture.

**Euthrips insularis** Franklin.

On January 5, 1909, Messrs. H. O. Marsh and D. K. McMillan collected this thrips in large numbers at Brownsville, Texas, in the blossoms of the velvet bean (*Dolichus atropurpureus*). Franklin described this species from the Barbados Islands, and Mr. David L. Crawford collected it at Guadalajara, Mexico, where, he stated, it was the commonest thrips present. On the velvet bean, this insect was causing considerable injury by feeding on the flowers. This was indicated by a brown spotting of the petals, many blossoms dropping off, so that there were few pods maturing.

**Æolothrips bicolor** Hinds.

While Mr. M. M. High was engaged in work on the onion thrips (*Thrips tabaci* Lind.), at Knox, Indiana, during August, 1911, he collected a number of specimens of this thrips. They were taken in company with *Æolothrips fasciatus* Fab. on the onion, where they were observed to be feeding on the onion thrips.

# DESCRIPTIONS OF NEW NORTH AMERICAN THYSANOPTERA.

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The classification of the order Thysanoptera is admittedly much in need of attention, and reliable synopses of genera and species are conspicuously wanting. A proposed treatise for the Genera Insectorum, now in preparation by Richard S. Bagnall, will do much to supply these long-felt wants; and in advance of its publication it seems desirable to make known a maximum number of so-called species, for the value of such a work of reference depends largely upon its exhaustiveness. In this paper I have thus attempted nothing more profound than the mere description of certain forms and groups of forms which appear after a morphological study to require new names for their proper designation.

## Suborder TEREBRANTIA Haliday.

### Family ÆOLOTHRIPIDÆ Haliday.

**Æolothrips vittipennis**, new species. (Pl. iv, figs. 1, 2.)

*Female.*—Length about 1.5 mm. Color dark blackish brown with a reddish cast, due to dense crimson hypodermal pigmentation in the thorax, abdomen, femora, tibiæ, and the two basal antennal segments; antennæ with segment 3 and basal half of segment 4 yellowish white.

Head about as wide as long, longer than prothorax, deeply and closely transversely striate, and with numerous minute spines on occiput and cheeks; anterior border deeply emarginate by the forward production of the eyes, and with a median tubercle; cheeks strongly arcuate. Eyes moderate, prolonged on ventral surface of head, and with the more dorsal facets separated by a distance about equal to their own diameter. Ocelli equidistant, the posterior nearly contiguous to eyes. Antennæ about 2.2 times as long as head, the last four segments subequal and together shorter than the preceding; sensory area on ventral surface of segment 5 elongate, the sense cone arising from basal end; segment 3 yellowish white, becoming dark blackish brown at extreme apex; 4 yellowish white in basal half or third, excepting for the dark pedicel; remainder of antenna blackish brown. Maxillary palpi three-segmented; labial palpi four-segmented.

Prothorax subrectangular, slightly shorter than head, and nearly one and one-half times as wide as long, widest near middle; surface with numerous minute spines. Mesothorax about 1.5 times as broad as prothorax, anterior angles broadly rounded; mesoscutum very closely transversely striate. Metathorax with sides roundly converging posteriorly; metascutum subreticulate. Wings of fore pair slender, about 8.5 times as long as width at middle, of nearly equal breadth throughout; venation normal; anal half occupied by a longitudinal black band which extends from the

extreme base, across the scale, and to the tip of the wing, sometimes showing a tendency to form a transverse band just beyond the basal third;[1] hind wings white or grayish. Legs normal to genus, the fore femora slender.

Abdomen slender, normal to the genus.

*Male.*—Length about 1.1 mm. Fore wings with a transverse black band just beyond the basal third, in addition to the longitudinal band on posterior half. Abdomen very slender; ninth segment nearly as long as wide, narrowed toward apex, and without clasping organs.

Measurements of holotype: Length 1.48 mm.; head, length 0.180 mm., width 0.197 mm.; prothorax, length 0.148 mm., width 0.218 mm.; mesothorax, width 0.320 mm; abdomen, width 0.342 mm. Antennal segments: 1, 36 $\mu$; 2, 50 $\mu$; 3, 114 $\mu$; 4, 87 $\mu$; 5, 58 $\mu$; 6, 12 $\mu$; 7, 13 $\mu$; 8, 13 $\mu$; 9, 11 $\mu$; total length of antenna, 0.39 mm.; width at segment 4, 0.026 mm.

Described from 10 females and 8 males, taken on honey locust (*Gleditsia triacanthos* L.), at Topeka, Illinois, May 23, 1909, and August 7, 1908, by Mr. Charles A. Hart, and one living female from Washington, D. C., July 28, 1912, J. D. H., on yellow locust (*Robinia pseudacacia* L.).

*Type locality:* Topeka, Illinois.

In the coloration of the wings, this species resembles *Æ. vittatus* Haliday and *Æ. kuwanaii* (sic!) Moulton, which occur, respectively, in Europe and the Pacific coast region of North America. From both it may be known by the longer head, shorter prothorax, and the details of wing coloration. In addition to these characters, it is also to be noted that in *kuwanaii* only the third antennal segment is white, the spine-bearing sense area on the ventral surface of the fifth antennal segment is circular in form, the head is not emarginate in front, and, most important of all, the ninth abdominal segment of the male is provided with lateral claspers.

**Æolothrips crassus,** new species. (Pl. IV, figs. 5, 6.)

*Female.*—Length about 1.5 mm. Color dark blackish brown, with a reddish cast, due to crimson hypodermal pigmentation in the thorax abdomen, and femora; antennæ with segments 3 and 4 pale yellowish white, the latter blackish at extreme apex.

Head about 1.3 times as wide as long, about as long as prothorax, not transversely striate, and with minute spines on occiput and cheeks; anterior border not deeply emarginate by a forward prolongation of the eyes, and without median tubercle; cheeks slightly swollen. Eyes moderate in size, prolonged as usual on ventral surface of head, and with the more dorsal facets separated by a distance much less than their own diameter. Ocelli equidistant. Antennæ nearly 2.5 times as long as head, unusually stout; segment 3 about equal to 1+2 and only about three times as long as

[1] This band always finds its complete development in the male.

wide; 4 subequal to 3; 5–9 together nearly 1.3 times as long as 3, the last four segments subequal and together about equal to the one preceding; sensory area on ventral surface of segment 5 circular. Maxillary palpi three-segmented; labial palpi four-segmented.

Prothorax about two-thirds as long as greatest width, distinctly broadened behind. Mesothorax a little less than 1.4 times as broad as prothorax, anterior angles broadly rounded; mesoscutum very closely transversely striate. Metathorax with sides roundly converging posteriorly; metascutum subreticulate. Wings of fore pair moderately slender (about seven times as long as width at middle), slightly narrower in basal third; venation normal, or with the lower subapical cross-vein wanting; anal half of wing traversed by a longitudinal black band which extends from the basal fifth to the tip of the wing, becoming paler and narrower at apex, and, in the second fifth, broadened to nearly the costal margin; hind wings grayish. Legs short and stout, the fore femora only about one and one-half times as long as wide.

Abdomen stout, of normal structure.

Measurements of holotype: Length 1.55 mm.; head, length 0.162 mm., width 0.209 mm.; prothorax, length 0.168 mm., width 0.264 mm.; mesothorax, width 0.360 mm.; abdomen, width 0.432 mm. Antennal segments: 1, 36 $\mu$; 2, 54 $\mu$; 3, 92 $\mu$; 4, 90 $\mu$; 5, 57 $\mu$; 6, 14 $\mu$; 7, 14 $\mu$; 8, 14 $\mu$; 9, 14 $\mu$; total length of antenna, 0.39 mm., width at segment 4, 0.030 mm.

Described from one female, taken on Plummer's Island, Maryland (in the Potomac River near Washington, D. C.), May 19, by W. L. McAtee and the writer. It was found in a flower of *Hydrophyllum virginicum* L.

This species, like the preceding, is related to *kuwanaii* and *vittatus*. From the former it may be known by the white fourth antennal segment and the stouter facies; from the latter its separation is more difficult, judging from the brief published descriptions, but should be distinct by the longer segments 5–9, which together are fully a fifth longer than segment 3, instead of subequal to it as in *vittatus*. The latter is known only from England, Finland, Sweden, and Austria-Hungary (Dalmatia).

With the specimen above described, I have doubtfully associated another female, taken on a conifer at Urbana, Illinois, May 21, 1908, by J. V. Bopp, then a student in the University of Illinois. It agrees with the type in most respects, but the third antennal segment is slenderer and darkened at tip, the basal transverse band on the wing is complete, and a second band shows a tendency to appear near the apex of the wing, just basal to the apical seventh.

FAMILY THRIPIDÆ HALIDAY.

**Genus MEROTHRIPS nov.**

(μηρὸς, the femur; θριψ, a wood worm.)

Head rather elongate, anteriorly obtusely angulate, with a pair of long bristles on dorsum between eyes and antennæ. Eyes (in the type species) greatly reduced; ocelli wanting. Antennæ long, approximate, eight-segmented, moniliform, inserted on ventral surface of head; segments 3 and 4 with sense areas (instead of sense cones) at apex; segment 8 elongate, fusiform. Mouth cone equal in length to face, semicircularly rounded at apex; maxillary palpi three-segmented; labial palpi two-segmented. Prothorax trapezoidal, broader than long and somewhat longer than head, with a pair of subparallel longitudinal sutures separating the notum from pleuron and coxa; posterior angles with a single long bristle. Legs very stout; metacoxæ separated by less than their own diameters; mesocoxæ separated by an interval thrice as great; fore and hind femora greatly enlarged; male with a broad subbasal tooth on inner margin of fore femur and with a long, stout tooth on inner margin of fore tibia at tip. Abdomen moderately slender, exceedingly blunt at tip, the apical segments very transverse and with long, weak spines; ovipositor greatly reduced, certainly functionless; abdomen of male without ventral sensory areas and without strong, chitinous projections on apical segments.

*Type: Merothrips morgani*, new species.

In the weakened, pale cuticula, reduced organs of vision, enlarged femora, and functionless ovipositor, the whole insect shows a remarkable adaptation to life under bark and in other similarly secluded places—a habit until now wholly unknown among the Thripidæ. The affinities of such an anomalous genus may be thought open to speculation, but, in our present arrangement of the genera of this family, it seems to take a natural position just after *Chirothrips*. The ancestors of this form were almost certainly *Chirothrips*-like Thripidæ which, originally passing only the winter under bark, became gradually adapted to that method of life as a fixed habit, through finding there suitable food and adequate protection, both from enemies and unfavorable climatic conditions. The loss of the ovipositor is easily explained, for, as in the Tubulifera, there is no need to hide the eggs in plant parenchyma to avoid their being injured, because under bark may be found safe hiding places in plenty.

**Merothrips morgani**, new species. (Pl. V, figs. 1–3.)

*Female.*—Length about 0.8 mm. Color pale grayish yellow, gray, or brown, with head, legs (especially the anterior pair), and first two antennal segments suffused with yellow.

Head smooth, about 1.25 times as long as wide, broadest at basal third, cheeks evenly arcuate to eyes and base of head; vertex flattened, angulate in front, the sides forming an angle of 125°, and with a pair of prominent, post-antennal bristles equal in length to segments 1+2 of antennæ; frontal costa notched at 90°; two pairs of bristles behind eyes, the inner pair shorter and subequal to, or rather longer than, a third pair between eyes. Eyes rudimentary, only about three facets visible in lateral profile. Ocelli and ocellar pigment entirely wanting. Antennæ long and slender, about 2.7 times as long as head; base of segment 1 hidden by vertex; form and structure well shown in figure (Pl. v, fig. 1).

Prothorax trapezoidal, about 1.2 times as long as head and (inclusive of coxæ) about 1.4 times as broad as long and 1.8 times as broad at base as at apex, with faint anastomosing lines of sculpture; notum not attaining lateral margins, separated from the pleural plate and the coxa by a longitudinal, sinuate suture extending from the anterior angle to the base; mediad to this suture often a longitudinal carina attaining about middle of prothorax; several short bristles present in addition to the long pair at the posterior angles (Pl. v, fig. 2). Pterothorax reduced, subequal in width to prothorax; mesonotum with a pair of prominent bristles on each side near anterior angles; mesosternum with two prominent bristles at extreme lateral margin, metasternum with one. Legs exceedingly stout, fore and hind femora greatly enlarged, the former nearly as wide as head, and the latter two-thirds as wide as long. Wings lacking.

Abdomen about 2.66 times as long as wide, broadest at about segment 6, weak and very blunt at apex; terminal bristles long, slender, and transparent, a lateral pair on segment 9 about five-sixths as long as greatest width of abdomen.

Measurements of holotype: Length 0.823 mm.; head, length 0.089 mm., width 0.071 mm.; prothorax, length 0.105 mm., width 0.147 mm.; pterothorax, width 0.144 mm.; abdomen, width 0.176 mm. Antennal segments: 1, 23 μ; 2, 27 μ; 3, 38 μ; 4, 35 μ; 5, 26 μ; 6, 28 μ; 7, 26 μ; 8, 36 μ; total length of antenna, 0.24 mm.; width at segment 4, 0.016 mm.

*Male.*—Length about 0.75 mm. Last two abdominal segments distinctly yellowish. General structure as in female. Fore femur toothed on inner margin near base; inner side of fore tibia produced at apex in a stout, acute tooth. Dorsum of head apparently minutely granulate, certain of these granules darker and arranged in anastomosing lines. Apex of abdomen suggestive of that of *Chirothrips*, all bristles slender. Accessory sexual organs heavily chitinized; testes not visible.

Described from 3 females and 1 male, as follows: Homer, Illinois, October 3, 1908, under loose bark on shellbark hickory tree, J. D. H., 1 female; Olney, Illinois, November 19, 1908, from branch of post oak (*Quercus stellata* Wang.), L. M. Smith, 1 female; Illinois, July, 1909, in burrows of freshly-hatched larvæ of *Oncideres cingulata* Say in dead hickory twig,

probably from the southern part of the State, J. D. H., 1 male; "Corbin, Ky., Sept. 26, 1911, in mushroom, A. C. Morgan, collector," 1 female (coll. A. C. Morgan).

*Type locality:* Homer, Illinois.

The name is proposed as a compliment to Mr. Morgan, who had recognized the form as generically and specifically distinct and had drawn up a description, previous to learning that my manuscript on the same species was ready for the press.

**Frankliniella stylosa,** new species. (Pl. v, fig. 7.)

*Female.*—Length about 1.3 mm. General color dark; abdomen blackish brown, slightly paler at base; ptero- and pro-thorax bright cinnamon-brown, the former with sides and notum tinged with gray, the latter distinctly darker with blackish; head yellowish gray, darkened with blackish at base, and (by reflected light) with vertex and inner and posterior margins of eyes almost white; antennæ grayish brown, segment 2 darkest, bases of 3, 4, and 5 pale; fore wings washed with blackish, slightly paler in basal fourth; legs yellowish gray, all femora darker and shaded on outer surface with brown.

Head fully 1.5 times as wide as long, conspicuously narrowed posteriorly, the breadth of its hind margin about 0.9 the greatest width of the head; occiput with a few transverse lines; interocellar and one pair of post-ocular bristles alone prominent, stout, black, the former longer; other bristles slender, pale, inconspicuous. Eyes moderate in size, normal to the genus, about three-fifths as wide as their interval. Ocelli present, posterior pair nearly opposite middle of eyes. Antennæ moderately stout, three times as long as dorsum of head, all spines long, stout, prominent; form of segments normal to genus (Pl. v, fig. 7); segment 3 subequal to or longer than 6; 8 about 1.75 times as long as 7; segment 1 gray; 2 usually decidedly darker (amost black as seen by aid of hand lens), gray-brown in color; 3 and 5 gray, paler in basal half, the latter with pedicel dark at extreme base; 4 slightly darker, less pale in basal half; 6–8 uniform gray.

Prothorax about 1.4 times as wide as long and 1.4 times as long as head, the two prominent bristles at each angle all equal in length, nearly black in color, about three-fifths as long as prothorax; posterior margin with the pair of bristles near middle similar in form and color, and two-thirds as long. Pterothorax normal to genus; a pair of dark bristles on anterior margin of metascutum nearly equal to that plate in length, the pair external to these short, slender, colorless. Legs of medium length and moderate size. Wings of fore pair only slightly paler at base; anterior margin with about 25 bristles, anterior vein with about 19, and posterior vein with about 15.

Abdomen of normal form; all bristles stout and dark in color; posterior margin of segment 8 with a series of about 15 equidistant spine-like projections on dorsum; tenth segment with longitudinal dorsal suture.

Measurements of holotype: Length 1.26 mm.; head, length 0.102 mm., width 0.167 mm.; prothorax, length 0.143 mm., width 0.208 mm.; mesothorax, width 0.288 mm.; abdomen, width 0.300 mm. Antennal segments: 1, 30 $\mu$; 2, 44 $\mu$; 3, 58 $\mu$; 4, 48 $\mu$; 5, 40 $\mu$; 6, 56 $\mu$; 7, 9 $\mu$; 8, 16 $\mu$; total length of antenna, 0.30 mm.; width at segment 4, 0.023 mm.

Described from 8 females, taken in flowers of *Viburnum acerifolium* L. and *Chionanthus virginica* L., on Plummer's Island, Maryland (in the Potomac River near Washington, D. C.), May 19, 1912, by W. L. McAtee and the writer.

This pretty species seems to be more closely allied to the African *F. schultzei* (Trybom) than to any other, resembling it in that the head is narrowed behind and the eighth antennal segment conspicuously longer than the seventh. The coloration of the body and antennæ, however, will readily distinguish the two. In North America it finds its closest relative in *F. insularis* (Franklin), but the antennal structure, as well as the coloration of body, legs, wings, and antennæ, is decidedly different in that species.

**Heliothrips punctipennis,** new species.

*Female.*—Length about 0.97 mm. General color dark blackish brown to nearly black, with head and thorax distinctly paler and of a brownish yellow color, abdomen with last three segments pale; legs clear lemon yellow; antennæ grayish white, 1, 2, and 6–8 darker.

Head about 1.2 times as wide as long and slightly longer than prothorax; cheeks slightly arcuate; dorsal surface rather conspicuously reticulate, roughened between the lines of reticulation; frontal costa distinctly narrower than first antennal segment; vertex subcarinate in front of ocelli. Eyes about 1.5 times as long as their distance from posterior margin of head, scarcely protruding, setose. Ocelli of normal form and position. Antennæ twice as long as head; segment 1 subquadrate; 2 broadest in entire antenna, a little longer than wide; 3 and 4 urn-shaped, the former little less than twice as long as wide; 5 egg-shaped, pedicellate; 6 and 7 together of same form as 5, but inverted; 8 very long and slender. Segments 1, 2, and 6–8, brown, the first paler; intermediate segments nearly clear white, slightly clouded with brownish toward apex. Maxillary palpi two-segmented.

Prothorax about 1.7 times as wide as long, slightly shorter than head, and with similar reticulation; bristles few, short and well distributed, a more prominent pair near middle of anterior margin. Pterothorax somewhat broader than prothorax; membrane yellow, plates brown. Wings long, very slender, overreaching the abdomen; fore wings about eighteen times as long as width at middle, of normal venation; costal margin with about 19 bristles; principal vein with four colorless bristles, of which two are near base and two near fork; anterior vein with one bristle near base and two

near apex, all short, slender, the last brownish; posterior vein with five or six usually equidistant bristles, all slender and colorless; fore wings nearly white, with apex dark brown and with a light cloud of brown at the fork of the veins; hind wings brownish, with darker median vein.

Abdomen slender, ovate, pointed at tip; notum subreticulate, more faintly at middle; segment 10 with longitudinal dorsal suture.

Measurements of holotype: Length 0.972 mm.; head, length 0.114 mm., width 0.142 mm.; prothorax, length 0.102 mm., width 0.178 mm.; mesothorax, width 0.216 mm.; metathorax, width 0.197 mm.; abdomen, width 0.246 mm. Antennal segments: 1, 18 $\mu$; 2, 36 $\mu$; 3, 41 $\mu$; 4, 34 $\mu$; 5, 30 $\mu$; 6, 24 $\mu$; 7, 12 $\mu$; 8, 29 $\mu$; total length of antenna, 0.22 mm., width at segment 4, 0.021 mm.

Described from 5 females, 2 of which were taken in sweepings at Matamoros, Mexico, June 30, 1908, and 3 from Brownsville, Texas, December 8, 1910, in sweepings from Bermuda grass (*Cynodon dactylon* (L.) Pers.). All were collected by Mr. Hart.

*Type locality:* Matamoros, Mexico.

The small size of this species and the peculiar coloration of the legs and wings should make it easy of recognition. It belongs in the vicinity of *fasciatus*, *fasciapennis*, and *phaseoli*.

**Heliothrips marginipennis,** new species.

*Female.*—Length about 1.1 mm. Color dark blackish brown to nearly black, very slightly, if any, paler anteriorly; legs brown, the femora and tibiæ yellow at extremities; tarsi yellow; antennal segments 1, 2, and 6–8 nearly concolorous with body, intermediate segments brownish yellow and more or less clouded with brown.

Head about 1.2 times as wide as long, equal in length to prothorax; cheeks nearly straight and parallel; dorsal surface conspicuously reticulate, more particularly so behind an irregular transverse line at basal fourth; frontal costa distinctly narrower than first antennal segment. Eyes very slightly longer than their distance from posterior margin of head, slightly prominent, setose. Ocelli of normal form and postion. Antennæ twice as long as head; segment 1 subquadrate; 2 broadest in entire antenna, a little longer than wide; 3 and 4 urn-shaped, the former slightly more than twice as long as wide; 5 almost perfectly egg-shaped, pedicellate; 6 and 7 together of same form as 5, but inverted; 8 very long and slender. Segments 1, 2, and 6–8 blackish brown, the first paler; intermediate segments pale brownish yellow, 3 and 4 darkly clouded with brown just beyond middle, 5 dark brown in apical two-thirds. Maxillary palpi two-segmented.

Prothorax about 1.7 times as wide as long, equal in length to head and with similar reticulation; bristles few, short, well distributed, a more prominent pair near middle of anterior margin. Pterothorax somewhat broader than prothorax; membrane yellowish, plates brown. Wings long, very slen-

der, overreaching the abdomen; fore wings about eighteen times as long as width at middle, of normal venation; costal margin with about 20 bristles; principal vein with four colorless bristles, of which two are near base and two near fork; anterior vein with one bristle near base and two near apex, all slender, the last brownish; posterior vein with six or seven usually equidistant bristles, all long and slender, colorless; fore wings nearly white, with a short, dark band at fork of veins connected with one at apex by a narrow line of brown extending along the extreme posterior margin and hooked foward in apical twelfth (where it is darkest) along anterior margin; hind wings brownish, with darker median vein.

Abdomen moderately slender, ovate, pointed at tip; notum subreticulate, more faintly at middle; segment 10 with longitudinal dorsal suture.

Measurements of holotype: Length 1.08 mm.; head, length 0.126 mm., width 0.156 mm.; prothorax, length 0.120 mm., width 0.206 mm.; mesothorax, width 0.259 mm.; metathorax, width 0.240 mm.; abdomen, width 0.300 mm. Antennal segments: 1, 18 $\mu$; 2, 39 $\mu$; 3, 48 $\mu$; 4, 44 $\mu$; 5, 34 $\mu$; 6, 27 $\mu$; 7, 18 $\mu$; 8, 33 $\mu$; total length of antenna, 0.26 mm.; width at segment 4, 0.023 mm.

Described from three females taken by Mr. Hart in sweepings, at Monterey, Mexico, July 5, 1908.

This species, also, is related to the group of which *fasciatus* is typical. The wing coloration is distinctive.

**Heliothrips cinctipennis,** new species.

*Female.*—Length about 1.2 mm. General color yellowish brown to nearly black, with head and thorax much paler than abdomen, the latter with last three segments distinctly paler; legs yellow, with the fore femora at base, and the middle and posterior femora and all tibiæ, at middle, shaded with brownish; antennæ pale, segments 1, 2, and 6–8, nearly concolorous with body, intermediate segments nearly white, slightly clouded with brown toward apex.

Head about 1.2 times as wide as long, distinctly longer than prothorax; cheeks subparallel, arcuate; dorsal surface conspicuously reticulate, more coarsely toward base; frontal costa nearly as wide as first antennal segment. Eyes distinctly longer than their distance from posterior margin of head, slightly prominent, setose. Ocelli of normal form and position. Antennæ usually a little less than twice as long as head; segment 1 subquadrate; 2 broadest in entire antenna, a little longer than wide; 3 and 4 urn-shaped, the former slightly more than twice as long as wide; 5 egg-shaped, pedicellate; 6 and 7 together of same form as 5, but inverted; 8 very long and slender; segments 1, 2, and 6–8, brown, the first paler; intermediate segments pale brownish yellow, slightly clouded with gray in apical portion. Maxillary palpi two-segmented.

Prothorax about 1.9 times as wide as long, distinctly shorter than head and with similar reticulation; bristles few, short, well distributed, a more prominent pair near middle of anterior margin. Pterothorax somewhat

broader than prothorax; membrane yellowish, plates brown. Wings long, very slender, overreaching abdomen; fore wings about eighteen times as long as width at middle, of normal venation; costal margin with about 18 bristles; principal vein with four short colorless bristles, of which two are near base and two near fork; anterior vein with one bristle at base and two near apex, all slender, the last longer and brownish; posterior vein with four or five nearly equidistant bristles, these usually rather short, colorless; fore wings white, with a dark brown or black band occupying the second and third fourths, margined with darker brown in apical eighth, extreme base lightly washed with brown; hind wings brownish, with darker median vein.

Abdomen moderately slender, ovate, pointed at tip; notum subreticulate, more faintly at middle; segment 10 with longitudinal dorsal suture.

Measurements of holotype: Length 1.16 mm.; head, length 0.133 mm., width 0.161 mm.; prothorax, length 0.109 mm., width 0.212 mm.; mesothorax, width 0.248 mm.; metathorax, width 0.224 mm.; abdomen, width 0.300 mm. Antennal segments: 1, 18 $\mu$; 2, 37 $\mu$; 3, 45 $\mu$; 4, 40 $\mu$; 5, 38 $\mu$; 6, 33 $\mu$; 7, 14 $\mu$; 8, 33 $\mu$; total length of antenna, 0.26 mm., width at segment 4, 0.021 mm.

*Male.*—Length about 0.8 mm. Sternum of abdominal segments 3–7 each with a nearly circular pale area. Segment 9 with two pairs of dorsal spines, the basal pair much shorter and stouter than the apical.

Described from 25 females and 4 males, from Anna, Clay City, Grand Tower, Havana, Hillery, and Makanda, Illinois, all taken by Mr. Hart in sweepings from grass and weeds, during June, July, August, and September.

In the specimens at hand the coloration of the body, wings, and antennæ is remarkably constant, and serves to distinguish the species from the allied *H. fasciapennis* (sic!) Hinds. In the latter species, furthermore, the pale areas on the ventral surface of the male abdomen are fully five times as wide as long, instead of transversely oval or nearly circular.

**Thrips pallicornis,** new species. (Pl. v, figs. 5, 6.)

*Female.*—Length about 1.2 mm. Color dark blackish brown or black, with bright crimson hypodermal pigmentation, more brilliant in pterothorax and second antennal segment; segments 3–7 pale lemon-yellow, slightly shaded with gray; wings of fore pair white in basal fourth, remainder blackish brown.

Head 1.4 times as wide as median dorsal length, somewhat longer than prothorax, as broad across eyes as midway between eyes and base; cheeks arcuate to eyes and base of head; vertex rather depressed, frontal costa notched at about 60°; four pairs of very distinct bristles behind eyes, and another similar pair between anterior and posterior ocelli; a small pair lateral to and in front of the anterior ocellus. Eyes rather less than half

as long as head, prominent, protruding, noticeably pilose. Ocelli normal, opposite about middle of eyes. Antennæ long, more than twice the length of head, unusually slender, form and structure well shown in figure (Pl. v, fig. 6); segments 1 and 2 concolorous with head, the latter segment, however, with dense crimson pigment; remainder of antenna yellow, with base of third and, to a less degree, of fourth to sixth and all of seventh, usually shaded with gray. Maxillary palpi three-segmented.

Prothorax about 1.5 times as wide as long, without evident sculpture, sides gently rounded; two pairs of long, slender bristles at posterior angles. Wings of fore pair about fourteen times as long as wide, white in basal fourth, remainder blackish brown; costal margin with about 25 spines; anterior vein with 10 spines, of which seven are nearly confined to the white band (not passing basal 4/11 of wing), the remaining three at 7/11, 9/11, and a little more than 10/11 beyond base of wing, respectively; posterior vein also with about 10 spines, the first of which is usually exactly behind the last spine in the basal series of the anterior vein, and the last of which is opposite a point nearly midway between the last two on the anterior vein. Legs concolorous with body, rather conspicuously set with stout, dark bristles.

Abdomen of normal form, with tenth segment longitudinally sulcate above in at least apical half; bristles on segments 9 and 10 long, stout, nearly black.

Measurements of holotype: Length 1.24 mm.; head, length 0.144 mm., width 0.163 mm.; prothorax, length 0.132 mm., width 0.193 mm.; mesothorax, width 0.276 mm.; metathorax, width 0.246 mm.; abdomen, width 0.282 mm. Antennal segments: 1, 30 $\mu$; 2, 42 $\mu$; 3, 64 $\mu$; 4, 54 $\mu$; 5, 48 $\mu$; 6, 58 $\mu$; 7, 22 $\mu$; total length of antenna, 0.32 mm., width at segment 4, 0.019 mm.

*Male.*—Length about 1 mm. Similar in color and general structure to female. Segment 9 above with a pair of short, slender bristles at apical third near lateral margin, and with four larger bristles—apical, equidistant, and subparallel—lying closely above suranal plate; the latter with four slender bristles at apical third, the median pair longer; lateral, subapical bristles of segments 9 and 10 long, dark, moderately conspicuous.

Measurements of allotype: Length 0.98 mm.; head, length 0.127 mm., width 0.144 mm.; prothorax, length 0.102 mm., width 0.167 mm.; mesothorax, width 0.223 mm.; metathorax, width 0.192 mm.; abdomen, width 0.164 mm. Antennal segments: 1, 29 $\mu$; 2, 38 $\mu$; 3, 60 $\mu$; 4, 51 $\mu$; 5, 41 $\mu$; 6, 58 $\mu$; 7, 20 $\mu$; total length of antenna, 0.30 mm., width at segment 4, 0.018 mm.

Described from 17 females and 4 males, all from Illinois, as follows: Carbondale, September 19, 1908, L. M. Smith, 1 male; Clay City, September 2, 1909, C. A. Hart, 2 females; Dubois, April 28 and September 17, 1908, July 3, 1909, C. A. H., L. M. S., 12 females, 3 males; Herrin, May 12, 1909, L. M. S., 1 female; Olney, May 4, 1909, L. M. S., 1 female;

Parker, July 14, 1909, C. A. H., 1 female. All specimens, with the exception of the single female from Olney, which was taken on an apple leaf, were found on the under surface of hickory leaves, sometimes in abundance.

*Type locality;* Parker, Illinois.

The antennal coloration is distinctive. Superficially the species bears a close resemblance to *Baliothrips basalis* Shull.

## Suborder TUBULIFERA Haliday.

### Family PHLŒOTHRIPIDÆ Uzel.

**Zygothrips pallidus,** new species. (Pl. VI, figs. 1, 2.)

*Female* (*forma brachyptera*).—Length about 1.6 mm. Color clear, bright lemon-yellow, with antennal segments 7 and 8 shaded with brown, and apical three-fourths of tube abruptly nearly black. (By reflected light the legs and antennæ appear darker, due to the absence therefrom of the yellow hypodermal pigment, which is very dense in the other regions of the body.)

Head about 1.4 times as long as wide, very slightly broadest at basal fourth, thence evenly narrowing to eyes and base; vertex elevated, almost overhanging, evenly declivous; dorsal and lateral surfaces without sculpture, the spines few and very inconspicuous; postocular bristles short, two-thirds as long as eyes, blunt but not capitate. Eyes about one-third as long as head, slightly protruding, nearly prominent. Anterior ocellus scarcely overhanging, the posterior pair opposite anterior third of eyes. Antennæ slightly more than one and one-half times as long as head, rather stout; segment 1 nearly as broad at base as long; 2 stout, globose; 3 much narrower than 2, stout, swollen just beyond the abrupt pedicel; 4 clavate, longest in entire antenna, nearly as stout as 2; 5–7 clavate, sucessively decreasing in length and breath; 8 conical, twice as long as wide, more than two-thirds as wide at base as apex of 7; sense cones short, weak, transparent, barely visible. Mouth cone blunt, much shorter than width of head, reaching about to middle of prosternum; labrum not attaining labium.

Prothorax about as long as width of head and (inclusive of coxæ) about one and two-thirds times as wide as long; surface smooth; anterior marginal and midlateral bristles wanting, others short and blunt (scarcely capitate), the two pairs near the posterior angles subequal in length and longest; coxal bristle similar to and nearly as long as the latter. Pterothorax slightly wider than prothorax, sides nearly straight and parallel. Legs rather stout, of moderate length; fore tarsi armed with a very small, acute tooth; color lemon-yellow, without shading even on femora.

Abdomen (greatly distended in the type) of apparently normal form. Tube about half as long as head, less than twice as long as basal width, and about half as wide at apex as at base; terminal bristles brown, very slightly longer than tube; all other abdominal bristles clear yellow.

Measurements of holotype: Length 1.56 mm.; head, length 0.252 mm., width 0.180 mm.; prothorax, length 0.180 mm., width (inclusive of coxæ) 0.300 mm.; pterothorax, width 0.312 mm,; abdomen, width 0.360 mm.; tube, length 0.120 mm., width at base 0.073 mm., at apex 0.038 mm. Antennal segments: 1, 44 $\mu$ by 41 $\mu$; 2, 53 $\mu$ by 35 $\mu$; 3, 51 $\mu$ by 31 $\mu$; 4, 62 $\mu$ by 35 $\mu$; 5, 57 $\mu$ by 30 $\mu$; 6, 53 $\mu$ by 27 $\mu$; 7, 48 $\mu$ by 24 $\mu$; 8, 27 $\mu$ by 13 $\mu$; total length of antenna, 0.39 mm.

*Male.*— Much smaller than female; length about 1 mm. Color luteous, shaded with gray on femora, tibiæ, segments 4–8 of antennæ, and apical three-fourths of tube. Ocelli apparently wanting. Prothoracic bristles rather more capitate than blunt. Abdomen slender. Otherwise similar to female.

Described from 1 female (holotype) from Brownsville, Texas, taken December 8, 1910, in sweepings from Bermuda grass; and 1 male (allotype) from Padre Island, Texas (opposite Point Isabel), taken June 28, 1908, "in sweepings from grass, etc." Both specimens were taken by Mr. Hart.

The coloration of this species is remarkable, as is also the structure of the third antennal segment.

It will be noticed that the two illustrations given herewith are unfortunately of the male, for the reason that the female was not known until two years after the execution of the drawings.

### Genus RHYNCHOTHRIPS nov.

(ῥύγχος, beak; θριψ, a wood worm.)

Head little, if any, longer than broad, about equal in length to prothorax; cheeks finely roughened, without spiniferous tubercles. Antennæ eight-segmented, the last two segments closely united. Eyes one-third or one-fourth as long as head. Ocelli placed far forward, the median one overhanging, sometimes borne at tip of slightly produced vertex. Mouth cone unusually long and slender, fully as long as dorsum of head, attaining or surpassing front margin of mesosternum; labrum very acute, elongate, sometimes one and one-third times as long as width of head. Prothorax large, heavy, nearly or quite as long as head, with median dorsal thickening; anterior and posterior margins concentric. Fore tarsi usually unarmed. Wings, when present, of nearly equal width throughout. Abdomen broad and heavy, with short bristles.

*Type: Rhynchothrips pruni*, new species.

This genus will also embrace *Trichothrips tridentatus* Shull and *T. buffæ* Hood. The very long mouth cone and the large, heavy prothorax are distinctive. Though two of its species were described in *Trichothrips*, it appears to be much more closely related to *Liothrips*. All the known species occur under

the loose scales of bark on living trees, and the peculiar mouth-parts appear to be an adaptation to such a life.

**Rhynchothrips pruni,** new species. (Pl. VI, fig. 4.)

*Female* (*forma brachyptera*).—Length about 1.5 mm. Color nearly black, thorax paler; tarsi, articulations of legs, and at least the basal portions of antennal segments 1–6, ochreous.

Head as wide as long, broadest somewhat behind eyes; cheeks slightly converging posteriorly, rounded rather abruptly to eyes and gently to base of head; lateral and dorsal surfaces noticeably transversely striate, sparsely, briefly, and scarcely visibly spinose; vertex slightly rounded in front; postocular bristles pointed, equal in length to eyes. Eyes one-fourth as long as head, subcircular as seen from above. Ocelli small, situated far forward; anterior ocellus well down on vertex, overhanging; posterior ocelli situated near anterior angles of eyes. Antennæ stout, slightly more than twice as long as head, faintly subreticulate; segment 1 slightly broader than long; 2 swollen, 1.5 times as long as wide; 3 swollen, clavate, scarcely twice as long as wide, pedicel one-fourth of greatest width; 4–6 subglobose, pedicellate, less than 1.5 times as long as wide, 4 broadest, 6 with sides less rounded apically; 7 oblong, pedicellate, truncate at apex and broadly united to 8, which is conical, not narrowed at base, and twice as long as wide; antennæ bright ochre in first two segments, becoming gradually darker toward apex, 7 and 8 being concolorous with body. Sense cones of moderate length, slender; formula: 3, 0–1; 4, 1–1; 5, $1–1^{+1}$; 6, $1–1^{+1}$; 7 with one on dorsum near apex. Mouth cone very long, slender, fully as long as dorsum of head, surpassing base of prosternum; labrum surpassing labium.

Prothorax slightly longer than head and (inclusive of coxæ) only 1.7 times as wide as long; pronotum with short, median thickening; all spines present, pointed, only the pair at posterior angles long. Pterothorax slightly wider than prothorax, sides straight, slightly diverging posteriorly. Legs short and stout, the fore femora shorter than head; fore tarsi unarmed.

Abdomen large, broad, about 1.4 times as wide as prothorax, narrowing roundly from about segment 4 to base of tube. Tube about 0.9 as long as head, less than twice as long as basal width, and fully twice as wide at base as at apex, sides straight. Bristles pointed, brown; lateral bristles on segment 9 subequal to terminal bristles, equal in length to tube.

Measurements of holotype: Length 1.55 mm.; head, length 0.162 mm., width 0.163 mm.; prothorax, length 0.175 mm., width (inclusive of coxæ) 0.296 mm.; pterothorax, width 0.318 mm.; abdomen, width 0.426 mm.; tube, length 0.148 mm., width at base 0.081 mm., at apex 0.035 mm. Antennal segments: 1, 27 $\mu$; 2, 50 $\mu$; 3, 54 $\mu$; 4, 46 $\mu$; 5, 48 $\mu$; 6, 48 $\mu$; 7, 49 $\mu$; 8, 32 $\mu$; total length of antenna, 0.36 mm., width at segment 4, 0.033 mm.

*Male.*—Slightly smaller than female, with more slender abdomen; fore tarsi unarmed.

Described from 4 females and 9 males, from Carbondale, Pulaski, Riverside, and Urbana, Illinois, taken in May, June, July, September, and October, by L. M. Smith, C. A. Hart, and the writer. It occurs commonly under the loose scales of the bark on wild cherry, though taken occasionally from peach and sycamore.

It is closely related to the species described by me as *Trichothrips buffæ*, but the smaller size, longer, stouter prothorax, wider head, and stouter, differently colored antennæ, should distinguish it at once. Franklin's record[1] of the latter insect for St. Anthony Park, Minnesota, may possibly refer to the present species.

**Rhynchothrips dentifer,** new species. (Pl. VI, fig. 3.)

*Female* (*forma macroptera*).—Length about 1.5 mm. Color dark blackish brown, nearly black; tarsi and intermediate antennal segments paler.

Head slightly longer than wide, narrowest across eyes; cheeks subparallel, roundly converging to eyes from middle, base with an abrupt but slight collar-like widening; lateral and dorsal surfaces noticeably transversely striate, sparsely, briefly, and scarcely visibly spinose; vertex slightly rounded in front; postocular bristles truncate and slightly dilated at tip, equal in length to eyes. Eyes one-third as long as head, slightly longitudinally elongate as seen from above. Ocelli moderately small, situated far forward; anterior ocellus overhanging; posterior ocelli opposite anterior third of eyes. Antennæ stout, slightly more than twice as long as head, scarcely subreticulate; segment 1 scarcely broader than long; 2 rather stout, about 1.5 times as long as wide; 3 stout, clavate, about twice as long as wide; 4–6 oval, pedicellate, 1.66 times as long as wide, 4 broadest; 7 narrowed apically, pedicellate, about twice as long as wide, truncate at apex and broadly united to 8, which is sharply conical, not narrowed at base, and twice as long as wide; segments 1 and 2 nearly concolorous with body, 2 paler toward apex; 3 brownish yellow, shaded with brown at sides and in apical two-thirds; 4, 5, and 6 successively darker, with pale pedicels; 7 and 8 concolorous with body. Sense cones of moderate length, slender; segment 3 with one on outer surface; 4 with one on inner surface, two on outer, and a rudimentary one on dorsum near apex; 5 and 6 with one fully developed cone on each side and an additional rudimentary subapical one; 7 with the usual long, dorsal cone near apex. Mouth cone very slender, excessively long, fully a fifth longer than dorsum of head, reaching half across mesosternum; labrum greatly surpassing labium.

Prothorax very slightly shorter than head and (inclusive of coxæ) about 1.8 times as wide as median length of pronotum, the latter with short median thickening; all spines present, dilated and truncate at tip, the two pairs along posterior margin subequal and somewhat the longest. Ptero-

[1] Ent. News, Vol. XX, No. 5, p. 231.

thorax broader than prothorax, sides nearly straight and converging posteriorly. Wings apparently broad, of equal width throughout, slightly clouded with brownish at middle. Legs of medium length, the fore femora equal in length to head; fore tarsi armed with a short, stout tooth placed at right angles to the tarsus.

Abdomen large, broad, nearly 1.4 times as wide as prothorax, narrowing roundly from about segment 4 to base of tube. Tube nearly as long as head, slightly more than twice as long as basal width, and fully twice as wide at base as at apex, slightly contracted at both base and apex. Lateral bristles dilated and rather short, excepting for one pair each on segments 7 and 9 which are pointed and nearly as long as tube; terminal bristles about equal in length to tube, brown.

Measurements of holotype: Length 1.45 mm.; head, length 0.185 mm., width 0.172 mm.; prothorax, length 0.168 mm., width (inclusive of coxæ) 0.311 mm.; pterothorax, width 0.360 mm.; abdomen, width 0.420 mm.; tube, length 0.172 mm., width at base 0.075 mm., at apex 0.035 mm. Antennal segments: 1, 30 $\mu$; 2, 52 $\mu$; 3, 54 $\mu$; 4, 57 $\mu$; 5, 55 $\mu$; 6, 52 $\mu$; 7, 51 $\mu$; 8, 30 $\mu$; total length of antenna, 0.38 mm.; width at segment 4, 0.034 mm.

*Female* (*forma brachyptera*).—Apparently identical with the long winged form, with the exception of the narrower pterothorax, which is equal in width to prothorax. Abdominal segments 7 and 9 each with a pair of long, pointed, lateral bristles, as described for the macropterous form.

Described from two females taken by the writer near Baldwin, Michigan, under loose bark on a freshly-cut poplar stump, August 16 and 17, 1908.

The remarkably long mouth cone and the armed fore tarsi render this species very distinct.

### Genus PHLŒOTHRIPS Haliday.

1836. *Phlæothrips* (sic!) Haliday, Ent. Mag., vol. III, p. 441.
1895. *Phloeothrips* Uzel, Monogr. d. Ordn. Thys., p. 254.
1899. *Phloeothrips* Reuter, Acta Soc. pro Fauna et Flora Fennica, vol. XVII, No. 2, p. 18.
1902. *Phlœothrips* Hinds, Proc. U. S. Nat. Mus., vol. XXVI, p. 195.
1912. *Phlœothrips* Jones, Tech. Ser. 23, pt. I, Bur. Ent., U. S. Dept. Agr., p. 21. (Gives key to North American species.)

The species *coriaceus* of Haliday must be considered the type of this genus, for it is the only recognizable one known to Haliday which has not been removed or reduced to synonomy. Its North American components—with the exception of *viltatus* and *maculatus*—form a homogeneous group remarkable for the structure of the fore leg of the male, the femur having two acute teeth on the inner side near the apex, between which when the leg is flexed, fits a similar tibial tooth. This structure is constant in more than a dozen species known to me,

and entitles them to rank as a distinct subgenus, which may be distinguished from *Phlœothrips* spp. as follows:

**Subgenus HOPLANDROTHRIPS nov.**

Dorsal surface, at least of pronotum, not deeply roughened. Vertex subconical, more or less produced. Genal spines not directed anteriorly from the apices of prominent tubercles. Prothorax evenly trapezoidal, with straight sides; bristles long, normal in position. Femur of male with two subapical teeth on inner side; tibia of male with a similar tooth near base.

*Type: Phlœothrips* (*Hoplandrothrips*) *xanthopus*, new species.

Bagnall's *Acanthothrips bidens* almost certainly belongs here, if it is not the original *Hoplothrips corticis* Amyot and Serville. In the latter event *Hoplothrips* will, of course, have priority over *Hoplandrothrips*.

**Phlœothrips** (**Hoplandrothrips**) **xanthopus**, new species. (Pl. VI, figs. 6, 7a, b.)

*Female* (*macropterous*).—Length about 1.7 mm. General color light blackish brown, with scattered maroon hypodermal pigmentation in head, thorax, and abdomen, exclusive of tube; tibiæ, tarsi, bases of intermediate antennal segments, and middle of abdomen, lemon-yellow.

Head 1.3 times as long as wide, broadest at middle; cheeks rounded abruptly to eyes and gently to near base, thence slightly diverging, forming a neck-like constriction, which is equal in width to greatest distance across eyes, or to about 0.9 greatest width of head; lateral surfaces roughened with rather deep, anastomosing lines, each cheek with about three rather stout, dark bristles arising from short tubercles; vertex subconical, produced, overhanging; postocular bristles alone prominent, equal in length to eyes, dilated and truncate at tip. Eyes about one-third as long as head, their axis of greatest dorsal length nearly coinciding with a line drawn from base of first antennal segment to anterior end of gena. Ocelli of moderate size, equidistant; anterior ocellus borne at apex of produced vertex, posterior ocelli distinctly in advance of middle of eyes. Antennæ 1.6 times as long as head, slender; segment 1 trapezoidal, broader than long; 2 about 1.75 times as long as broad; 3 clavate, twice as long as wide, deeply sinuate on inner side, pedicel curved outward; 4 clavate, narrowed at apex, equal in width to 3, broadest slightly in advance of middle, twice as long as wide; 5–7 truncate-fusiform, little wider at apex than at base, successively decreasing in length and width, 7 about 2.5 times as long as wide; 8 subconical, truncate and slightly narrowed at base; segments 1 and 2 concolorous with body; 3 yellow, clouded with brown at middle; 4–6 yellow, indefinitely shaded with brown in apical half or two-thirds; 7 and 8 brown, the pedicel of former pale. Sense cones large, fully a third as long as segment 3; formula: 3, 1–2; 4, 2–2; 5, 1–$1^{+1}$; 6, 1–$1^{+1}$; 7 with one on dorsum

near apex. Mouth cone slender, nearly attaining mesosternum; labium broadly rounded at tip, slightly surpassed by labrum.

Prothorax somewhat more than half as long as head and (inclusive of coxæ) about 2.2 times as wide as long; pronotum non-sculptured, anterior and posterior margins concentric; all usual bristles present, subequal, dilated at tip, and about as long as postoculars. Pterothorax slightly wider than prothorax, sides straight and converging posteriorly. Wings present. Legs moderately slender; fore tarsus with a short, stout, acute tooth.

Abdomen little, if any, broader than pterothorax, broadest toward base, thence rounded gradually to base of tube. Tube about 0.6 as long as head, about 2.3 times as long as basal width, and twice as wide at base as at apex, sides straight. Lateral bristles of moderate length, knobbed, yellowish, two pointed pairs at apex of segment 9 longer; terminal bristles about 1.5 times as long as tube, brown.

Measurements of holotype: Length 1.68 mm.; head, length 0.276 mm., width 0.212 mm.; prothorax, length 0.154 mm., width (inclusive of coxæ) 0.341 mm.; mesothorax, width across fore margin 0.360 mm.; metathorax, width across hind margin 0.312 mm.; abdomen, width 0.360 mm.; tube, length 0.172 mm., width at base 0.075 mm., at apex 0.039 mm. Antennal segments: 1, 30 $\mu$; 2, 54 $\mu$; 3, 76 $\mu$; 4, 70 $\mu$; 5, 63 $\mu$; 6, 57 $\mu$; 7, 52 $\mu$; 8, 34 $\mu$; total length of antenna, 0.44 mm.; width at segment 4, 0.033 mm.

Described from 5 females, as follows: Pulaski, Illinois, C. A. Hart, May 28, 1909, in sweepings from grass; Pulaski, Illinois, July 24, 1909, C. A. H., in woodland sweepings; St. Joseph, Illinois, May 4, 1907, C. A. H. and J. D. H., at base of mullein leaves; Urbana, Illinois, January 26, 1908, J. D. H., under bark of soft maple tree; "Millerstown, Pa., Sept. 6, on fox grape." (Pa. State Dept. Agr., Div. Zool., No. 3668).

Two males, both from Illinois, appear to belong with this species, but show so much mutual variation in the form of the fore legs that I have hesitated to include either in this preliminary description. The species bears a resemblance to Hinds's *uzeli*, but is easily separable by the much shorter tube (which is not more than 0.6 as long as the head, instead of nearly 0.8) and the longer, slenderer, and less abruptly sinuate, third segment of the antenna, which in *uzeli* is not more than 1.7 times as long as wide. This latter difference is illustrated in the accompanying figures (Pl. VI, figs. 5 and 6).

**Phlœothrips (Hoplandrothrips) juniperinus**, new species. (Pl. VII, figs. 5, 6.)

*Female* (*macropterous*).—Length about 1.5 mm. General color dark blackish brown, with a rather dense, nearly continuous layer of maroon hypodermal pigmentation in head, thorax, and abdomen, inclusive of tube; antennæ with basal two-thirds of segment 3, basal third of segment 4, and pedicel of 5, yellow.

Head not more than 1.2 (1.14 to 1.20) times as long as wide, broadest at middle; cheeks rounded abruptly to eyes and gently to near base, thence slightly diverging, forming a neck-like constriction which is about equal in width to greatest distance across eyes, or to about 0.9 the greatest width of head; lateral and dorsal surfaces very slightly roughened with shallow, anastomosing lines, each cheek with about three rather stout, dark bristles arising from short tubercles; vertex subconical, produced, overhanging; postocular bristles alone prominent, shorter than eyes, very slightly dilated and truncate at tip. Eyes about one-third as long as head, their axis of greatest dorsal length nearly coinciding with a line drawn from base of first antennal segment to anterior end of gena. Ocelli of moderate size, equidistant; anterior ocellus borne at apex of produced vertex, posterior ocelli distinctly in advance of middle of eyes. Antennæ 1.6 times as long as head, moderately slender; segment 1 trapezoidal, broader than long; 2 about 1,5 times as long as broad; 3 clavate, twice as long as wide, deeply sinuate on inner side, pedicel curved outward; 4 clavate, narrowed at apex, equal in width to 3, broadest slightly in advance of middle, twice as long as wide; 5 shorter and narrower than 4, of similar form but with straighter sides, pedicel three-fifths of apical width; 6 and 7 oblong, pedicellate, truncate at apex, apical breadth fully twice that of pedicel, 7 about one and one-half times as long as wide; 8 subconical, truncate and slightly narrowed at base. Sense cones of medium size, those on segment 3 about one-third the length of segment; formula: 3, 1–2; 4, 2–2; 5, $1–1^{+1}$; 6, $1–1^{+1}$; 7 with one on dorsum near apex. Mouth cone slender, nearly attaining mesosternum; labium broadly rounded at tip, slightly surpassed by labrum.

Prothorax somewhat more than half as long as head and (inclusive of coxæ) about 2.41 times as wide as long; pronotum non-sculptured, anterior and posterior margins concentric; all usual bristles present, short, dilated and truncate at tip, those on anterior margin about half as long as postoculars, distinctly shorter than the pair at the posterior angles, often pointed. Pterothorax slightly wider than prothorax, sides straight and converging posteriorly. Wings of fore pair colorless, distinctly broader in basal than in apical half, slightly narrowed at middle, not closely fringed (the posterior margin with only about 52 hairs), subapical fringe double for about nine hairs. Legs rather stout; fore tarsus with a short, stout, acute tooth.

Abdomen little, if any, broader than pterothorax, broadest toward base, thence rounded gradually to base of tube. Tube about 0.6 as long as head, about twice as long as basal width, and twice as wide at base as at apex, sides straight. Lateral bristles of moderate length, knobbed, yellowish, two pointed pairs at apex of segment 9 longer; terminal bristles about as long as tube, brown.

Measurements of holotype: Length 1.50 mm.; head, length 0.252 mm., width 0.215 mm.; prothorax, length 0.128 mm., width (inclusive of coxæ) 0.310 mm.; mesothroax, width across fore margin 0.342 mm.; metathorax, width across hind margin 0.280 mm.; abdomen, width 0.350 mm.; tube,

length 0.150 mm., width at base 0.072 mm., at apex 0.036 mm. Antennal segments: 1, 30 μ; 2, 51 μ; 3, 72 μ; 4, 66 μ; 5, 61 μ; 6 51 μ; 7, 40 μ; 8, 29 μ; total length of antenna, 0.40 mm., width at segment 4, 0.035 mm.

*Male*.—Length about 1.3 mm. Head longer than in female, about 1.3 times as long as wide. Fore femora and tibiæ swollen; tarsal tooth stronger. Prothoracic and postocular bristles much longer than in female, the pair at the anterior angles subequal in length to postoculars, which are fully as long as eyes.

Described from 4 females and 2 males, taken by the writer from branches of red cedar (*Juniperus virginiana* L.), on Plummer's Island, Maryland (in the Potomac River near Washington, D. C.), May 19, 1912.

The coloration of the antennæ, taken in conjunction with their structure and the form of the head, would seem to indicate a very distinct species. It belongs, however, to a group in which specific separation is largely opinionative.

**Phlœothrips (Hoplandrothrips) funebris**, new species. (Pl. VII, figs. 1-4.)

*Female* (*macropterous*).—Length about 1.4 mm. Color uniform dark-blackish brown, tarsi and apices of fore tibiæ yellowish; maroon hypodermal pigmentation nearly continuous in head, thorax, and abdomen, inclusive of tube.

Head about 1.2 times as long as wide, broadest at middle; cheeks rounded abruptly to eyes and gently to near base, thence slightly diverging, forming a neck-like constriction which is equal in width to greatest distance across eyes, or to about 0.9 greatest width of head; lateral surfaces very slightly roughened with shallow, anastomosing lines, each cheek with about three rather stout, dark bristles arising from short tubercles; vertex subconical, produced, overhanging; postocular bristles alone prominent, equal in length to eyes, dilated and truncate at tip. Eyes about one-third as long as head, their axis of greatest dorsal length nearly coinciding with a line drawn from base of first antennal segment to anterior end of gena. Ocelli of moderate size, equidistant; anterior ocellus borne at apex of produced vertex, posterior ocelli distinctly in advance of middle of eyes. Antennæ 1.6 times as long as head, moderately slender; segment 1 trapezoidal, broader than long; 2 about 1.7 times as long as broad; 3 clavate, swollen apically, scarcely more than 1.7 times as long as wide, not deeply sinuate on inner side, pedicel not curved outward; 4 clavate, swollen, narrowed at apex, often narrower than 3, broadest slightly in advance of middle, 1.7 times as long as wide; 5 not swollen, rather abruptly narrower than 4, broadest at middle; 6 and 7 oblong, pedicellate, truncate at apex, apical breadth about twice that of pedicel, 6 broadest at middle, 7 broadest behind middle and about twice as long as wide; 8 subconical, truncate and slightly narrowed at base. Sense cones large, those on segment 3 one-half the length of segment; formula: 3, 1–2; 4, 2–2; 5, 1–$1^{+1}$; 6, 1–$1^{+1}$;

7 with one on dorsum near apex. Mouth cone slender, nearly attaining mesosternum; labium broadly rounded at tip, slightly surpassed by labrum.

Prothorax somewhat more than half as long as head and (inclusive of coxæ) about 2.4 times as wide as long; pronotum non-sculptured, anterior and posterior margins concentric; all usual bristles present, subequal and dilated at tip, about as long as postoculars. Pterothorax usually slightly wider than prothorax, sides straight and converging posteriorly. Wings more or less clouded with brown, distinctly broader in basal than in apical half, slightly narrowed at middle, not closely fringed (the posterior margin with only about 52 hairs), subapical fringe double for about nine hairs. Legs rather stout; fore tarsus with a short, stout, acute tooth.

Abdomen little, if any, broader than pterothorax, broadest toward base, thence rounded gradually to base of tube. Tube about half as long as head, about twice as long as basal width, and slightly less than twice as wide at base as at apex, sides straight. Lateral bristles long, three-fifths the length of tube, knobbed, yellowish, two pointed pairs at apex of segment 9 longer; terminal bristles about 1.5 times as long as tube, brown.

Measurements of holotype: Length 1.38 mm.; head, length 0.228 mm., width 0.197 mm.; prothorax, length 0.124 mm., width (inclusive of coxæ) 0.292 mm.; mesothorax, width at anterior margin 0.292 mm.; metathorax, width at posterior margin 0.246 mm.; abdomen, width 0.300 mm.; tube, length 0.120 mm., width at base 0.056 mm., at apex 0.036 mm. Antennal segments: 1, 24 $\mu$; 2, 48 $\mu$; 3, 54 $\mu$; 4, 57 $\mu$; 5, 51 $\mu$; 6, 47 $\mu$; 7, 42 $\mu$; 8, 29 $\mu$; total length of antenna, 0.35 mm., width at segment 4, 0.033 mm.

*Male.*—Length about 1.3 mm. Head very slightly, if any, longer than in female. Fore femora and tibiæ swollen; tarsal tooth stronger. Prothoracic and postocular bristles longer than in female, the pair at the anterior angles unusually long, much longer than the eyes.

Described from 14 females and 1 male, as follows:—Illinois: Carbondale, October 12 and 15, 1908, L. M. Smith, on branches of sycamore and post oak (*Quercus stellata* Wang.); Anna, October 26, 1908, L. M. S., on branch of sycamore; Monticello, August 1, 1908, C. A. Hart, on branch of willow birch; Pulaski, October 27 and 28, 1908, L. M. S., on branch of white oak (*Quercus alba* L.) and swamp oak (*Q. palustris* Muench.). Missouri: Wittenberg, July 12, 1909, C. A. H., on branch of walnut. Maryland: Plummer's Island (in the Potomac River near Washington, D. C.), May 19, 1912, W. L. McAtee and J. D. H., on branch of *Quercus* sp. District of Columbia: Washington, July 28, 1912, J. D. H., on branch of yellow locust (*Robinia pseudacacia* L.).

*Type locality:* Carbondale, Illinois.

This species is one of the commonest and most widely distributed ones of the genus. Mr. A. C. Morgan has shown me a specimen from Florida, in the collection of the Bureau of

Entomology. The coloration of the antennæ is very constant and characteristic, as is also the form of the third antennal segment. Rarely the lower and outer margins of all the intermediate segments are slightly paler and of a yellowish brown color.

**Phlœothrips (Hoplandrothrips) microps,** new species. (Pl. VII, figs. 7, 8.)

*Female* (*forma macroptera*).—Length about 1.6 mm. General color dark blackish brown, with a rather dense, nearly continuous layer of maroon hypodermal pigmentation in head, thorax, and abdomen, inclusive of tube; antennæ with basal half of segment 3 yellow, and pedicels of 4–6 yellow or gray.

Head about 1.2 times as long as wide, fully twice as long as prothorax; cheeks very slightly arched, subparallel, converging roundly and rather abruptly to eyes and rather slightly to base, which is about a tenth broader than greatest distance across eyes and without evident neck-like constriction; lateral surfaces very slightly roughened with shallow, anastomosing lines, each cheek with about six rather stout, dark bristles arising from short tubercles; vertex rounded, scarcely conical, produced, overhanging; postocular bristles distinctly longer than eyes, dilated and truncate at tip; dorsum with a pair of long accessory bristles nearly equal in length to postoculars and of similar form, situated midway between posterior margin of eyes and base of head. Eyes very slightly less than one-fourth as long as head, subcircular as seen from above. Ocelli of moderate size, equidistant, anterior ocellus borne at tip of vertex, posterior ocelli opposite or behind centers of eyes. Antennæ nearly 1.6 times as long as head, slender; segment 1 trapezoidal, broader than long; 2 nearly twice as long as broad; 3 clavate, 2.4 times as long as greatest width, deeply sinuate on inner side, pedicel curved outward; 4 clavate, slightly wider than 3, fully twice as long as broad, widest at apical third; 5 shorter and narrower than 4, of nearly similar form, but with shorter pedicel and straighter sides, pedicel four-fifths of apical width; 6 and 7 oblong, pedicellate, truncate at apex, apical breadth fully twice that of pedicels, 6 broadest toward apex, 7 broadest toward base and about twice as long as wide; 8 conical, truncate, not narrowed at base, broadly united to 7. Sense cones short, those on segment 3 about one-fourth the length of segment; formula: 3, 1–1; 4, 1–2; 5, $1\text{–}1^{+1}$; 6, $1\text{–}1^{+1}$; 7 with one on dorsum near apex. Mouth cone slender, nearly attaining mesosternum; labium broadly rounded at tip, slightly surpassed by labrum.

Prothorax not more than half as long as head and (inclusive of coxæ) about 2.5 times as wide as long; pronotum non-sculptured, anterior margin roundly subangulate at middle; all usual bristles present, slightly dilated and truncate at tip, anterior marginals short, half as long as postoculars; other bristles subequal in length to postoculars or with the pair at the anterior angles slightly shorter. Pterothorax slightly wider than prothorax,

sides straight and converging posteriorly. Wings colorless, distinctly broader in basal than in apical half, slightly narrowed at middle, not closely fringed (the posterior margin with only about 52 hairs), subapical fringe double for about nine hairs. Legs rather stout, fore tarsus with a short, stout, acute tooth.

Abdomen little, if any, broader than pterothorax, broadest toward base, thence rounded gradually to base of tube. Tube about 0.6 as long as head, 2.3 times as long as basal width, about 1.8 times as wide at base as at apex, sides straight. Lateral bristles of moderate length, knobbed, yellowish, two pointed pairs at apex of segment 9 longer; terminal bristles about as long as tube, brown.

Measurements of holotype: Length 1.64 mm.; head, length 0.288 mm., width 0.234 mm.; prothorax, length 0.139 mm., width (inclusive of coxæ) 0.352 mm.; mesothorax, width across fore margin 0.396 mm.; metathorax, width across hind margin 0.354 mm.; abdomen, width 0.414 mm.; tube, length 0.174 mm., width at base 0.075 mm., at apex 0.042 mm. Antennal segments: 1, 33 $\mu$; 2, 54 $\mu$; 3, 78 $\mu$; 4, 75 $\mu$; 5, 69 $\mu$; 6, 54 $\mu$; 7, 48 $\mu$; 8, 31 $\mu$; total length of antenna, 0.44 mm., width at segment 4, 0.035 mm.

*Female* (*forma brachyptera*).—Apparently identical with the winged form in all points of structure; pterothorax perhaps slightly smaller and weaker.

*Male* (*forma brachyptera*).—Length about 1.3 mm. Head very slightly longer than in female, about 1.3 times as long as wide; postocular bristles nearly half as long as head, invariably bent at middle and curving forward. Femora and tibiæ swollen; tarsal tooth large, nearly straight, about two-thirds as long as eye. Prothoracic bristles scarcely longer than in female.

Described from 13 females (of which four are brachypterous) and 8 males, all from Illinois, as follows: Cherry Valley, August 14, 1909, Hugh Glasgow, 2 brachypterous females, "in old mines of Scolytids"; Desplaines, September 5, 1908, J. J. Davis, 1 male under bark on apple tree; Dubois, October 1, 1908, L. M. Smith, 1 brachypterous female on hickory branch; Dubois, July 13, 1909, C. A. Hart, 1 male on hackberry; Grand Tower, June 30, 1909, C. A. H., 1 macropterous female on locust; Odin, September 29, 1908, L. M. S., 1 brachypterous female on hackberry; Parker, July 14, 1909, C. A. H., 1 macropterous female on willow; "Marion, 1909, reared from galls on twigs of pin oak (*Quercus palustris* Muench.), taken July 18 by W. P. Flint, adults found August 18 in breeding cage by James Zetek, Exp. 4499 Ill. State Lab. Nat. Hist.", 6 macropterous females and 5 males; Southern Illinois, C. A. H., from elm covered with trumpet creeper (*Tecoma radicans* (L.) Juss.).

*Type locality*: Marion, Illinois.

This is an anomalous member of its genus, and may easily be known by the rounded vertex, the peculiarly shaped head

with a pair of long, knobbed bristles on dorsum, and by the number and disposition of the sense cones. It approaches the genus *Cryptothrips* in several points of structure. The male is of special interest in that the postocular bristles, instead of those at the anterior prothoracic angles, are increased in length, which is in marked contrast to a reverse tendency shown in the other species.

**Phlœothrips (Hoplandrothrips) insolens,** new species. (Pl. v, fig. 4; viii, figs. 1-3.

*Female* (*macropterous*).—Length about 1.7 mm. General color dark blackish brown, with sparse, irregular, maroon pigmentation in head, thorax, and abdomen, exclusive of tube; antennæ with basal half of segment 3 yellow, and pedicels of 4–6 yellow or gray; tibiæ and tarsi pale lemon-yellow.

Head about 1.5 times as long as wide, fully 2.6 times as long as prothorax; sides subparallel, converging roundly to eyes, slightly diverging at base, which is noticeably wider than greatest distance across eyes and without evident neck-like constriction; lateral surfaces noticeably subreticulate, each cheek with about four rather stout, dark bristles arising from short tubercles; vertex subconical, produced and overhanging; postocular bristles equal in length to eyes, dilated and truncate at tip; middle of dorsum with a pair of pointed accessory bristles half as long as postoculars. Eyes about one-fifth as long as head, subcircular as seen from above. Ocelli of moderate size, equidistant; anterior ocellus borne at tip of vertex, posterior ocelli opposite or in front of centers of eyes. Antennæ about 1.3 times as long as head, slender; segment 1 trapezoidal, broader than long; 2 scarcely twice as long as broad; 3 clavate, about twice as long as its greatest width, distinctly sinuate on inner side, pedicel curved slightly outward; 4 clavate, subequal in width to 3, fully twice as long as wide, broadest beyond middle; 5 slightly shorter and narrower than 4, of nearly similar form; 6 and 7 oblong, pedicellate, truncate at apex, broadest about middle, 7 twice as long as wide; 8 sublanceolate, briefly and very distinctly pedicellate. Sense cones short, those on segment 3 less than one-third the length of the segment; formula: 3, 1–2; 4, 1–2; 5, $1–1^{+1}$; 6, $1–1^{+1}$; 7 with one of dorsum near apex. Mouth cone slender, nearly attaining mesosternum, labium broadly rounded at tip, slightly surpassed by labrum.

Prothorax a little less than 0.4 as long as head and (inclusive of coxæ) fully two and one-half times as wide as long; pronotum non-sculptured, anterior and posterior margins nearly concentric; all usual bristles present, slightly dilated and truncate at tip, anterior marginals short, half as long as postoculars, other bristles subequal in length to postoculars, or the pair at the anterior angles slightly shorter. Pterothorax slightly wider than prothorax, sides straight and converging posteriorly. Wings uniform brownish yellow, probably of normal structure, subapical fringe double for about eight hairs. Legs rather stout, fore tarsi without trace of tooth.

Abdomen little, if any, broader than pterothorax, broadest toward base, thence rounded gradually to base of tube; tube 0.6 as long as head, 2.8 times as long as basal width, slightly less than twice as wide at base as at apex, sides straight except for a slight constriction at basal fourth. Lateral bristles of moderate length, knobbed, yellowish, two pointed pairs at apex of segment 9 longer; terminal bristles about equal in length to tube, brown.

Measurements of holotype: Length 1.68 mm.; head, length; 0.318 mm., width across middle 0.216 mm.; prothorax, length 0.120 mm., width (inclusive of coxæ) 0.307 mm.; mesothorax, width across fore margin 0.338 mm.; metathorax, width across hind margin 0.300 mm.; abdomen, width 0.348 mm; tube, length 0.192 mm., width at base 0.069 mm., at apex 0.038 mm. Antennal segments: 1, 30 $\mu$; 2, 54 $\mu$; 3, 70 $\mu$; 4, 65 $\mu$; 5, 63 $\mu$; 6, 54 $\mu$; 7, 47 $\mu$; 8, 39 $\mu$; total length of antenna, 0.42 mm.; width at segment 4, 0.031 mm.

Described from one female taken on elm at Dubois, Illinois, July 3, 1909, by Mr. Charles A. Hart.

The unarmed fore tarsus, if constant, is a remarkable character, occurring nowhere else in the genus. The sculpture of the head, the pedicellate last segment of the antenna, the slender tube, and the coloration of the legs, all tend to make this a very isolated species.

### Genus CRYPTOTHRIPS Uzel.

**Cryptothrips longiceps,** new species. (Pl. VIII, fig. 5.)

*Female* (*forma brachyptera*).—Length about 2.2 mm. Color dark blackish brown or black, with pedicel of third antennal segment yellow.

Head rectangular, about 1.65 times as long as wide, sides perfectly parallel; lateral and dorsal surfaces subreticulate toward base, set with several short spines and a longer pair at middle of dorsum; vertex truncate; postocular and postocellar bristles long, pointed, subequal; a minute bristle each side of median ocellus and a much longer pair external to these. Eyes moderate in size, not protruding, occupying the anterior angles of the head, and, seen from above, quadrangular in form, their caudad and mediad margins forming nearly a right angle. Ocelli small, about equal in size to facets of eyes; anterior ocellus nearly overhanging; posterior ocelli opposite center of eyes and almost touching their inner margins. Antennæ 1.5 times as long as head, of normal form and structure (Pl. VIII, fig. 5). Mouth cone slightly wider than long, reaching nearly to posterior margin of prosternum; tip of labrum just attaining tip of broadly rounded labium.

Prothorax about two-thirds as long as width of head, and (inclusive of coxæ) about 2.5 times as wide as long, without median thickening; usual spines all present, nearly pointed, the two pairs near the posterior angles much the longest, all others moderately short. Pterothorax slightly wider than prothorax; sides subparallel. Legs concolorous with body; fore tarsus unarmed.

Abdomen stout, heavy, about 1.4 times as broad as pterothorax, widest at about segment 3, thence tapering roundly to base of tube. Tube slightly more than 0.6 as long as head, slightly constricted just before apex, which is about half as wide as base. Lateral bristles on segment 9 as long as tube; terminal bristles about three-fourths as long as tube.

Measurements of holotype: Length 2.17 mm.; head, length 0.396 mm., width 0.240 mm.; prothorax, length along median dorsal line 0.156 mm., width (inclusive of coxæ) 0.396 mm.; pterothorax, width 0.420 mm.; abdomen, width 0.600 mm.; tube, length 0.248 mm., width at base 0.099 mm., at apex 0.051 mm. Antennal segments: 1, 48 $\mu$; 2, 75 $\mu$; 3, 102 $\mu$; 4, 97 $\mu$; 5, 88 $\mu$; 6, 78 $\mu$; 7, 55 $\mu$; 8, 48 $\mu$; total length of antenna, 0.59 mm., width at segment 4, 0.042 mm.

*Male* (*forma brachyptera*).—Length about 1.68 mm. Color and general structure nearly as in female. Head distinctly shorter than combined lengths of segments 1–5 of antennæ. Pronotum with front margin evenly rounded, no median chitinous thickening; fore femora slightly less than 0.6 as long as head; fore tarsi armed with a large, stout tooth.

Measurements of allotype: Length 1.68 mm.; head, length 0.328 mm., width 0.200 mm.; prothorax, length along median dorsal line 0.150 mm., width (inclusive of coxæ) 0.352 mm.; pterothorax, width 0.384 mm.; abdomen, width 0.504 mm; tube, length 0.210 mm., width at base 0.084 mm., at apex 0.045 mm. Antennal segments: 1, 39 $\mu$; 2, 63 $\mu$; 3, 85 $\mu$; 4, 82 $\mu$; 5, 79 $\mu$; 6, 65 $\mu$; 7, 48 $\mu$; 8, 44 $\mu$; total length of antenna, 0.51 mm., width at segment 4, 0.038.

Described from 2 females and 1 male, all from Illinois, as follows: Carbondale, September 21, 1908, 1 female and 1 male, on peach branch, L. M. Smith; Parker, July 14, 1909, 1 female, on hickory branch, C. A. Hart.

Though resembling *C. carbonarius* in the elongate head and the arrangement of the cephalic and prothoracic bristles, this species is of quite different appearance and much smaller size. In *carbonarius*, of which the female is unknown, the fore femora of the winged male are about 0.8 as long as the head, which is about equal to the length of the first five antennal segments; in the present species the femora of the male are less than 0.6 as long as the head, and the latter is distinctly shorter than the first five antennal segments.

**Cryptothrips exiguus**, new species. (Pl. VIII, fig. 4.)

*Female* (*forma macroptera*).—Length about 1 mm. General color dark luteous, with abdomen blackish brown; internal pigment irregular, maroon in color; head and thorax darkened at sides with blackish; legs concolorous with lighter portions of body, tarsi and apical portion of tibiæ dull yellow; antennæ nearly uniform gray.

Head about 1.25 times as long as wide, sides straight and nearly parallel; vertex produced, slightly overhanging, bluntly conical; lateral and dorsal

surfaces almost without sculpture, set with a few short, weak spines arising from barely perceptible elevations; postocular bristles alone prominent, about one and one-third times as long as eyes, dilated at tip; postocellar bristles minute. Eyes small, retracted, but little more than one-fifth as long as head, nearly circular as seen from above. Ocelli of moderate size; median ocellus situated on dorsum of apex of produced vertex, slightly in advance of anterior margin of eyes; posterior ocelli opposite anterior third of eyes, nearly touching their inner margins, and slightly more distant from each other than from the anterior ocellus. Antennæ just one and two-thirds times as long as head, more slender than usual; segment 1 slightly broader than long; 2 about 1.6 times as long as wide; 3 clavate, twice as long as wide, broader at apical third, pedicel narrow, not more than one-fifth greatest width of segment; 4–7 slightly more than twice as long as wide, truncate-fusiform, with short pedicels; 8 three times as long as wide, oblong-conical, slightly narrowed at base; antennæ nearly uniform blackish gray, segments 1 and 2 darker; 3 paler in basal two-thirds. Mouth cone wider than long, reaching posterior margin of prosternum; tip of labrum just attaining tip of broadly rounded labium.

Prothorax about half as long as head and (inclusive of coxæ) about two and one-third times as wide as long; pronotum non-sculptured, without median thickening; anterior and posterior margins concentric; usual bristles all present, very slender, subequal in length to postoculars, slightly dilated at tip. Pterothorax slightly wider than prothorax, sides straight, converging posteriorly. Wings present (not spread in the single example), sparsely fringed. Legs rather slender; fore tarsi unarmed.

Abdomen moderately slender, only slightly broader than pterothorax, broadest at about segment 3, thence tapering roundly to base of tube; tube evenly tapering, slightly more than half as long as head and less than twice as long as basal width, which is more than twice the apical. Lateral bristles on segment 9 fully as long as tube, slightly longer than terminal bristles.

Measurements of holotype: Length 1.03 mm.; head, length 0.192 mm., width 0.156 mm.; prothorax, length 0.100 mm., width (inclusive of coxæ) 0.238 mm.; pterothorax, width 0.264 mm.; abdomen, width 0.282 mm.; tube, length 0.108 mm., width at base 0.062 mm., at apex 0.027 mm. Antennal segments: 1, 27 $\mu$; 2, 42 $\mu$; 3, 48 $\mu$; 4, 45 $\mu$; 5, 47 $\mu$; 6, 44 $\mu$; 7, 41 $\mu$; 8, 27 $\mu$; total length of antenna, 0.32 mm., width at segment 4, 0.023 mm.

Described from 1 female taken in sweepings at Grand Tower Illinois, July 12, 1909, by Mr. Charles A. Hart.

This species is abundantly distinguished by its small size, the form of the antennal segments, and the long, blunt, postocular and prothoracic bristles. In several respects it shows an interesting approach to the genus *Phlœothrips*.

### Genus GASTROTHRIPS nov.

(γαστήρ, the abdomen; θριψ, a wood worm.)

Head little, if any, longer than wide, rounded in front, vertex evenly declivous; cheeks rounded, with a few short spines, which are sometimes stout and raised upon barely visible tubercles. Eyes small or moderate, subquadrangular, their caudad and mediad margins forming a more or less evident right angle; interval between eyes much more than their own dorsal width. Ocelli of posterior pair widely separated, nearly contiguous to inner margins of eyes. Antennæ eight-segmented; intermediate segments produced beneath in a subtriangular process; last segment slender, subpedicellate. Mouth cone broad, nearly attaining posterior margin of prosternum; labium semicircularly rounded at apex, subequal in length to labrum. Pronotum shorter than head, trapezoidal, twice as broad across posterior angles (inclusive of coxæ) as median dorsal length; posterior and anterior margins concentric. Legs moderate; fore tarsi sometimes armed. Wings, when present, slender, not closely fringed, without double subapical fringe on posterior margin. Abdomen moderate or heavy; tube short to medium, more or less abruptly constricted at apex.

*Type: Gastrothrips ruficauda*, new species.

As above defined, this genus will prove a moderately large one, comprising species which for the most part live under bark—principally, it seems, in the southern States. In addition to the two species herein described as new, two or three others are known to me from uniques. All resemble the species of *Cryptothrips* in no slight degree, especially in the form and structure of the mouth cone, antennæ, and eyes. They constitute, however, a distinct type of radically different facies, recognized at once by the shorter head and the abruptly constricted tube.

**Gastrothrips ruficauda**, new species. (Pl. VIII, figs. 6, 7.)

*Female* (*forma brachyptera*).—Length about 1.4 mm. General color dark blackish brown or black, thorax slightly paler; antennal segments 1 and 2 blackish brown, the latter paler apically, where it is concolorous with pedicel of 3, the remainder of antenna almost jet black, even in balsam mounts; apical half of all femora and middle portion of fore tibiæ pale yellowish, sometimes nearly white, the remainder of legs dark blackish brown, tarsi paler; tube abruptly bright brown-red, with apex black.

Head slightly wider than long, rounded in front, broadest midway between eyes and base, vertex evenly declivous; lateral and dorsal surfaces without sculpture, set with a few short, rather stout spines; postocular bristles alone prominent, sometimes half as long as head, pointed; postocellar bristles minute. Eyes small, not protruding, subquadrangular, their caudad and mediad margins forming a more or less evident right angle,

on ventral surface of head angulate posteriorly and slightly prolonged; interval between eyes about twice their own dorsal width. Ocelli small; anterior ocellus scarcely overhanging; posterior ocelli much more distant from each other than from the anterior ocellus, nearly contiguous to eyes and slightly posterior to their anterior third. Antennæ about twice as long as head, formed much as in *Cryptothrips;* segment 1 trapezoidal, fully as broad as long; 2 about two-thirds as wide as long; 3 clavate, twice as long as greatest width, thrice as wide as pedicel at base, sides almost straight; 4 distinctly shorter and stouter, two-thirds as wide as long; 5 slightly longer than 4, of similar form and equal width; 6 equal and similar to 5 but slightly narrower; 7 distinctly shorter, 0.7 as broad as 4, broadest near base, truncate at apex, pedicellate; 8 slender, only slightly shorter than 7, broadest at basal two-fifths, ventral surface with about six comb-like bristles. Mouth cone broad, nearly attaining posterior margin of prosternum; labium semicircularly rounded at apex, subequal in length to labrum.

Prothorax about 0.7 as long as head and (inclusive of coxæ) about 2.3 times as wide as long; pronotum non-sculptured, without median thickening; anterior and posterior margins concentric; all usual bristles present, pointed, the anterior marginals greatly reduced and scarcely visible, the two pairs at the posterior angles much the longest, about four times as long as midlaterals and the pair at the anterior angles. Pterothorax reduced, about as long as prothorax, sides nearly parallel. Legs short, rather stout; fore tarsi unarmed.

Abdomen stout, nearly 1.5 times as wide as prothorax, broadest at about segment 5, thence rounded evenly to base of tube. Tube about 0.8 as long as broad, twice as long as basal width, very abruptly constricted at apex, where it is half as wide as at base, intermediate portion slightly tapering. Lateral bristles on segments 6–9 fully as long as tube, nearly black; terminal bristles two-thirds as long as tube.

Measurements: Length 1.36 mm.; head, length 0.184 mm., width 0.208 mm.; prothorax, length 0.136 mm., width (inclusive of coxæ) 0.316 mm.; pterothorax, width 0.336 mm.; abdomen, width 0.452 mm.; tube, length 0.152 mm., width at base 0.079 mm., at apex 0.036 mm. Antennal segments: 1, 33 $\mu$; 2, 54 $\mu$; 3, 60 $\mu$; 4, 50 $\mu$; 5, 54 $\mu$; 6, 54 $\mu$; 7, 41 $\mu$; 8, 38 $\mu$; total length of antenna, 0.384 mm., width at segment 4, 0.033 mm.

Described from 3 females taken from branches of grape, sycamore, and overcup oak (*Quercus lyrata* Walt.), respectively, at Grand Tower and Pulaski, Illinois, by C. A. Hart and L. M. Smith, in October and July.

The broad head, unarmed fore tarsi, and the short, red tube should serve to distinguish this species from the following.

**Gastrothrips texanus,** new species. (Pl. IV, fig. 7.)

*Female* (*forma macroptera*).—Length about 1.4 mm. General color dark blackish brown, nearly black posteriorly; antennal segments 1 and 2

blackish brown, the latter paler apically, where it is concolorous with pedicel of 3, the remainder of antenna almost black; extreme apex of all femora, middle portion of fore tibiæ, and the fore tarsi pale yellowish, the remainder of legs concolorous with body; tube jet black, opaque.

Head about as broad as long, rounded in front, broadest midway between eyes and base, vertex evenly declivous; lateral and dorsal surfaces without sculpture, set with a few short, stout, brown spines, which are raised upon barely visible tubercles; postocular bristles alone prominent, a little more than one-third as long as head, nearly pointed, postocellar bristles minute. Eyes small, not protruding, subquadrangular, on ventral surface of head rounded posteriorly and not prolonged; interval between eyes about twice their own dorsal width. Ocelli moderate in size; anterior ocellus scarcely overhanging; posterior ocelli much more distant from each other than from the anterior ocellus, nearly contiguous to eyes and slightly posterior to their anterior third. Antennæ about twice as long as head, of nearly identical structure with those of the preceding species. Mouth cone broad, nearly attaining posterior margin of prosternum; labium semicircularly rounded at apex, subequal in length to labrum.

Prothorax about 0.64 as long as head and (inclusive of coxæ) about 2.4 times as wide as long; pronotum non-sculptured, with slight median thickening; anterior and posterior margins concentric; all usual bristles present, all except the two pairs near the posterior angles greatly reduced in size, midlaterals longer, inner posterior pair half as long as the nearly pointed outer pair. Pterothorax with sides nearly straight, converging posteriorly. Fore wings of nearly equal width throughout, about ten times as long as wide, without double, subapical fringe on posterior margin, lightly washed with brown, darker at base. Legs of medium length, moderately stout; fore tarsi armed with a long, slightly curved, acute tooth.

Abdomen moderately slender, about 1.3 times as broad as prothorax, broadest at about segment 5, thence rounded evenly to base of tube. Tube fully as long as head, about 2.5 times as long as basal width, abruptly constricted at apex, where it is half as wide as at base; intermediate portion tapering only slightly. Lateral bristles on segments 7 and 9 nearly as long as tube, brownish yellow in color; terminal bristles about half as long as tube.

Measurements of holotype: Length 1.40 mm.; head, length 0.198 mm., width 0.196 mm.; prothorax, length 0.127 mm., width (inclusive of coxæ) 0.308 mm.; pterothorax, width 0.348 mm.; abdomen, width 0.396 mm.; tube, length 0.204 mm., width at base 0.081 mm., at apex 0.041 mm. Antennal segments: 1, 33 $\mu$; 2, 57 $\mu$; 3, 60 $\mu$; 4, 53 $\mu$; 5, 54 $\mu$; 6, 54 $\mu$; 7, 42 $\mu$; 8, 36 $\mu$; total length of antenna, 0.38 mm.; width at segment 4, 0.031 mm.

Described from 1 female taken by Mr. Hart on huisache (*Acacia farnesiana* Willd.), at Brownsville, Texas, June 29, 1908.

This species should easily be known from the preceding by the longer, narrower head, the armed fore tarsus, and the long, black tube, which is fully as long as the head.

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## EXPLANATION OF PLATES.

### PLATE IV.

FIG. 1. *Æolothrips vittipennis* sp. nov. Head and prothorax, female, showing sculpture of portion of occiput; ×93,

2. *Æolothrips vittipennis*. Left antenna, female; ×231.

3. *Æolothrips fasciatus* Linné. Left antenna, female; ×231.

4. *Æolothrips bicolor* Hinds. Left antenna, female; ×231.

5. *Æolothrips crassus* sp. nov. Right antenna, female; ×206. (Sense areas not shown on segments 3 and 4,)

6. *Æolothrips crassus*. Head and prothorax, female; ×93.

7. *Gastrothrips texanus* sp. nov. Tip of abdomen, female; ×94.

### PLATE V.

FIG. 1. *Merothrips morgani* gen. et sp. nov. Right antenna, female; ×402.

2. *Merothrips morgani*. Portion of head and prothorax, male; ×352.

3. *Merothrips morgani*. Right hind leg, female; ×352.

4. *Phlœothrips* (*Hoplandrothrips*) *insolens* sp. nov. Portion of occiput, showing sculpture; ×352. (See also Pl. VIII, figs. 1–3.)

5. *Thrips pallicornis* sp. nov. Head and prothorax, female; × 93.

6. *Thrips pallicornis*. Right antenna, female; ×206.

7. *Frankliniella stylosa* sp. nov. Right antenna, female; ×206.

### PLATE VI.

FIG. 1. *Zygothrips pallidus* sp. nov. Head and prothorax, male; × 120.

2. *Zygothrips pallidus*. Left antenna, male; ×352.

3. *Rhynchothrips dentifer* sp. nov. Head and prothorax, macropterous female; ×74.

4. *Rhynchothrips pruni* gen. et sp. nov. Head and prothorax, female; ×74.

5. *Phlœothrips* (*Hoplandrothrips*) *uzeli* Hinds. Segment 3 of right antenna, female; ×352.

6. *Phlœothrips* (*Hoplandrothrips*) *xanthopus* subgen. et sp. nov. Segment 3 of right antenna, female; ×352.

7*a*. *Phlœothrips* (*Hoplandrothrips*) *xanthopus*. Head and prothorax, female; ×74.

7*b*. *Phlœothrips* (*Hoplandrothrips*) *xanthopus*. Left fore tarsus, female; ×74.

## Plate VII.

Fig. 1. *Phlœothrips* (*Hoplandrothrips*) *funebris* sp. nov. Head and prothorax, female; ×81.

2. *Phlœothrips* (*Hoplandrothrips*) *funebris*. Right antenna, female; ×248.

3. *Phlœothrips* (*Hoplandrothrips*) *funebris*. Right fore leg, male; ×248.

4. *Phlœothrips* (*Hoplandrothrips*) *funebris*. Segment 3 of right antenna, female; ×352.

5. *Phlœothrips* (*Hoplandrothrips*) *juniperinus* sp. nov. Segment 3 of right antenna, female; ×352.

6. *Phlœothrips* (*Hoplandrothrips*) *juniperinus*. Head and prothorax, female; ×74.

7. *Phlœothrips* (*Hoplandrothrips*) *microps* sp. nov. Segment 3 of right antenna, female; ×352.

8. *Phlœothrips* (*Hoplandrothrips*) *microps*. Head and prothorax, female; ×74.

## Plate VIII.

Fig. 1. *Phlœothrips* (*Hoplandrothrips*) *insolens* sp. nov. Head and prothorax, female; ×74.

2. *Phlœothrips* (*Hoplandrothrips*) *insolens*. Segment 3 of right antenna, female; ×352.

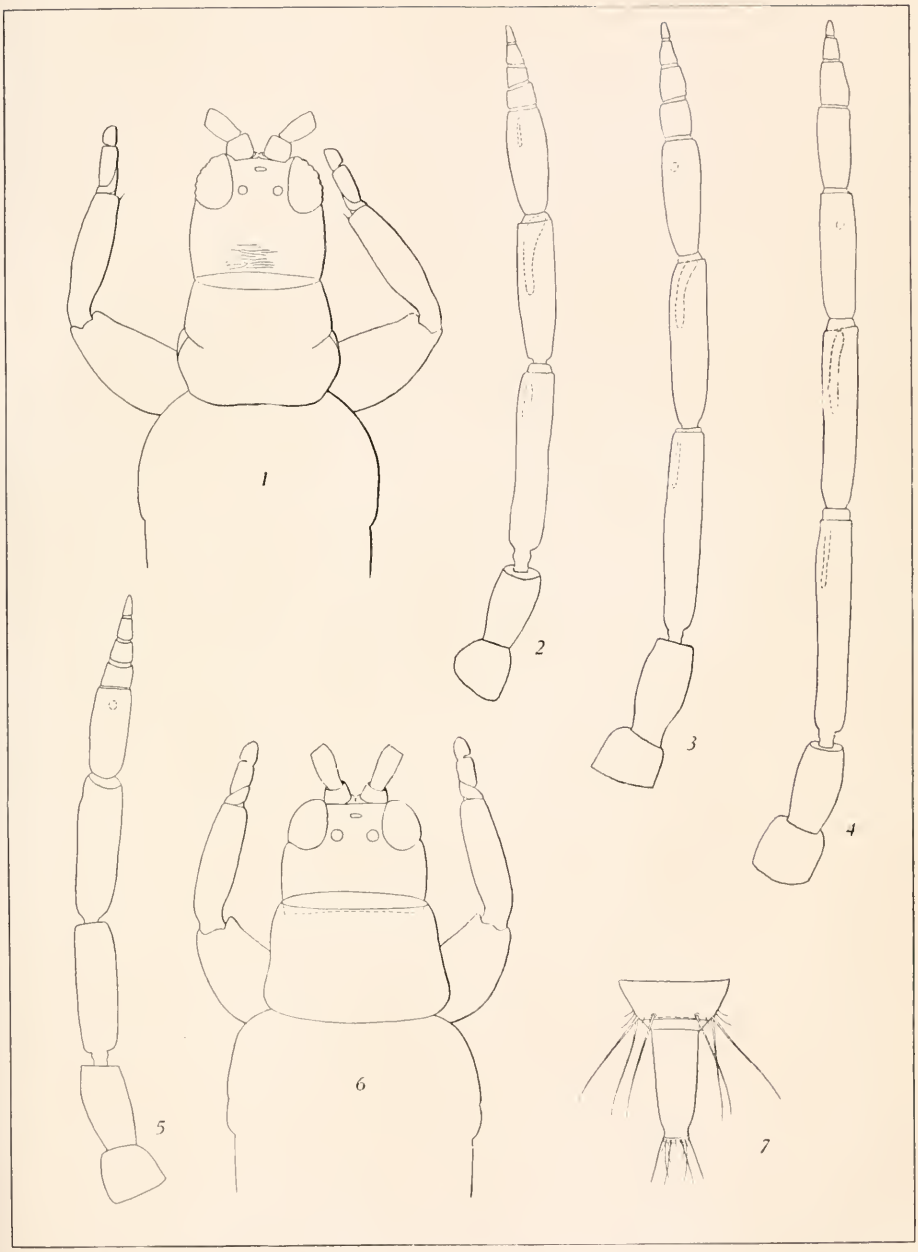
3. *Phlœothrips* (*Hoplandrothrips*) *insolens*. Segments 7 and 8 of right antenna, female; ×352.

4. *Cryptothrips exiguus* sp. nov. Head and prothorax, female; ×95.

5. *Cryptothrips longiceps* sp. nov. Head and prothorax, female; ×74.

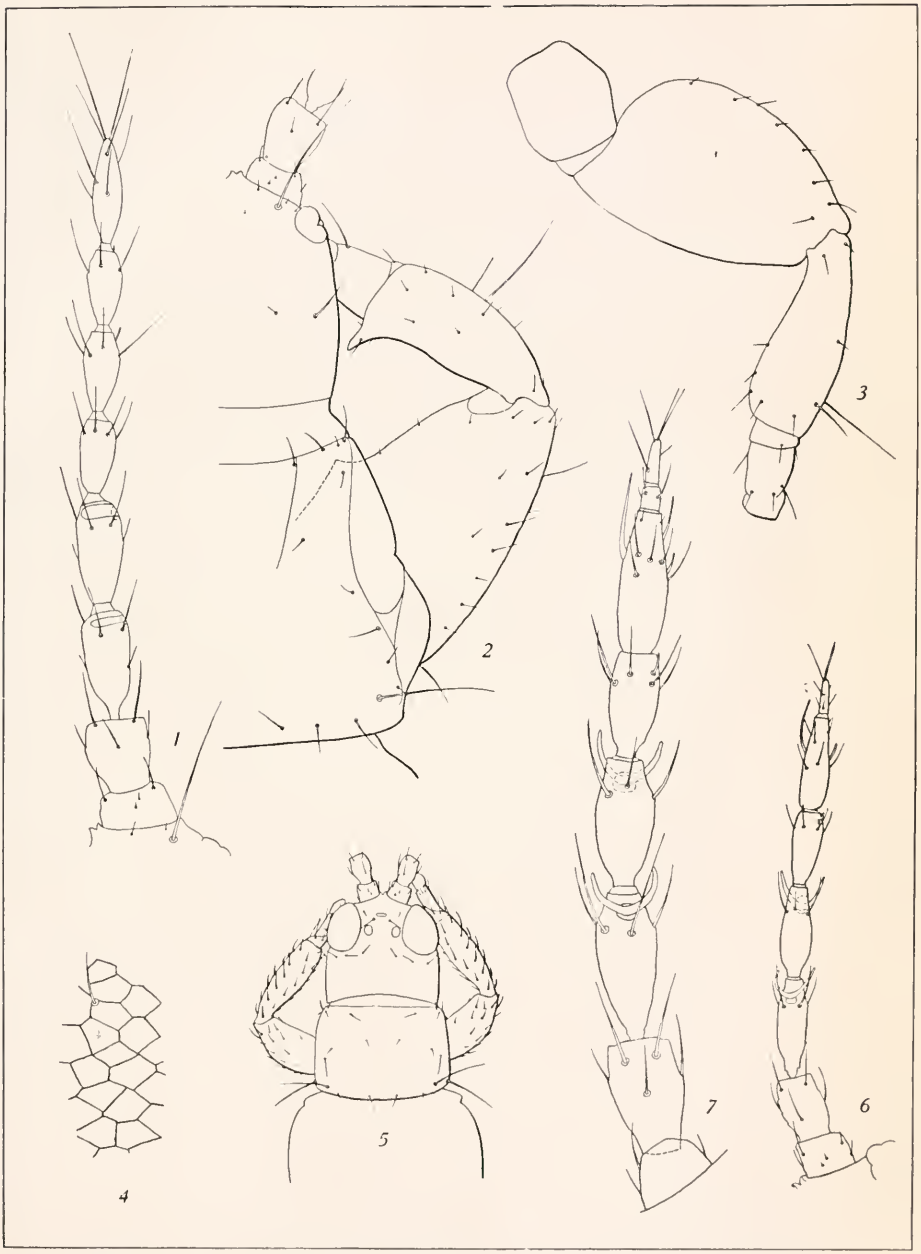
6. *Gastrothrips ruficauda* gen. et sp. nov. Head and prothorax, female; ×74.

7. *Gastrothrips ruficauda*. Tip of abdomen, female; ×74.



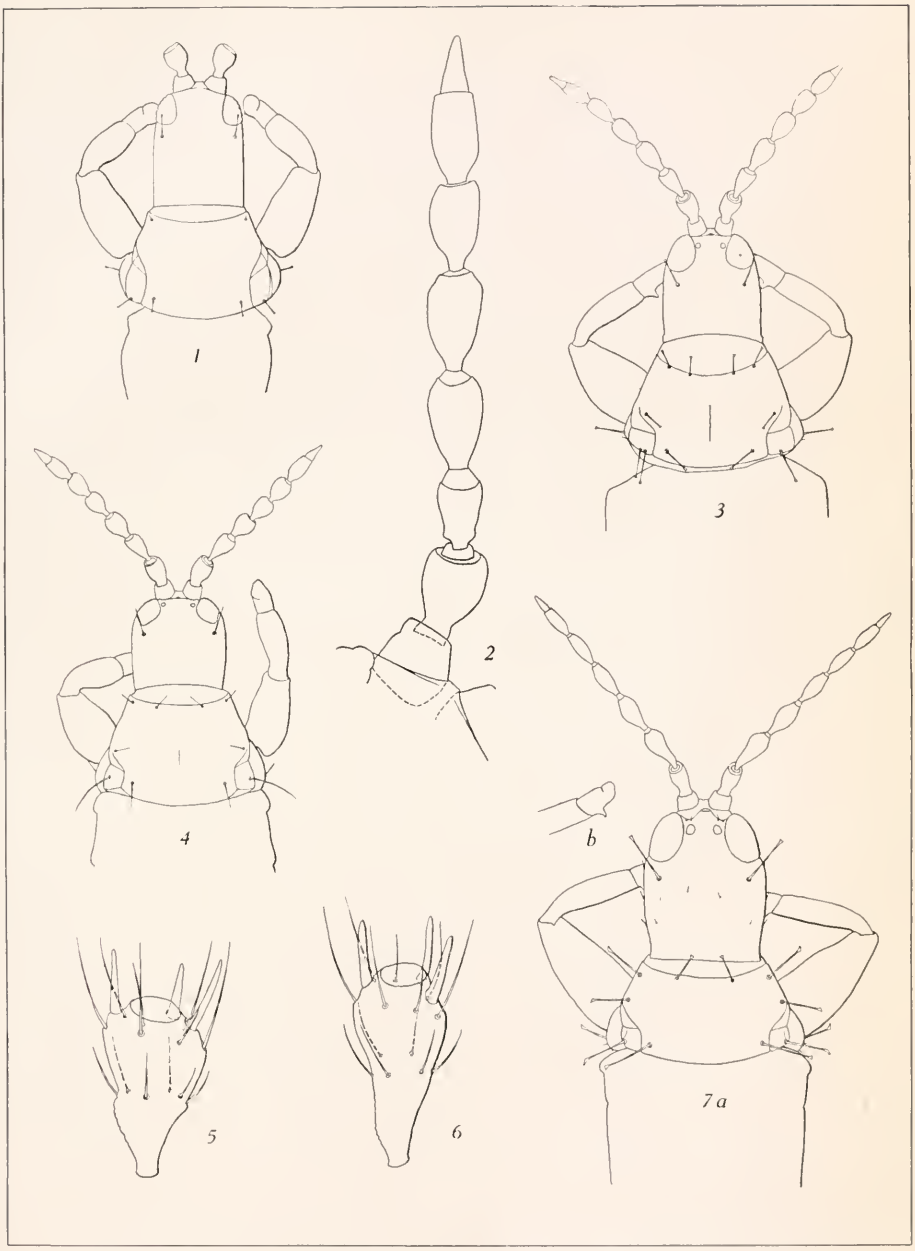

J. D. H., del.

NORTH AMERICAN THYSANOPTERA




J. D. H., del.

NORTH AMERICAN THYSANOPTERA.

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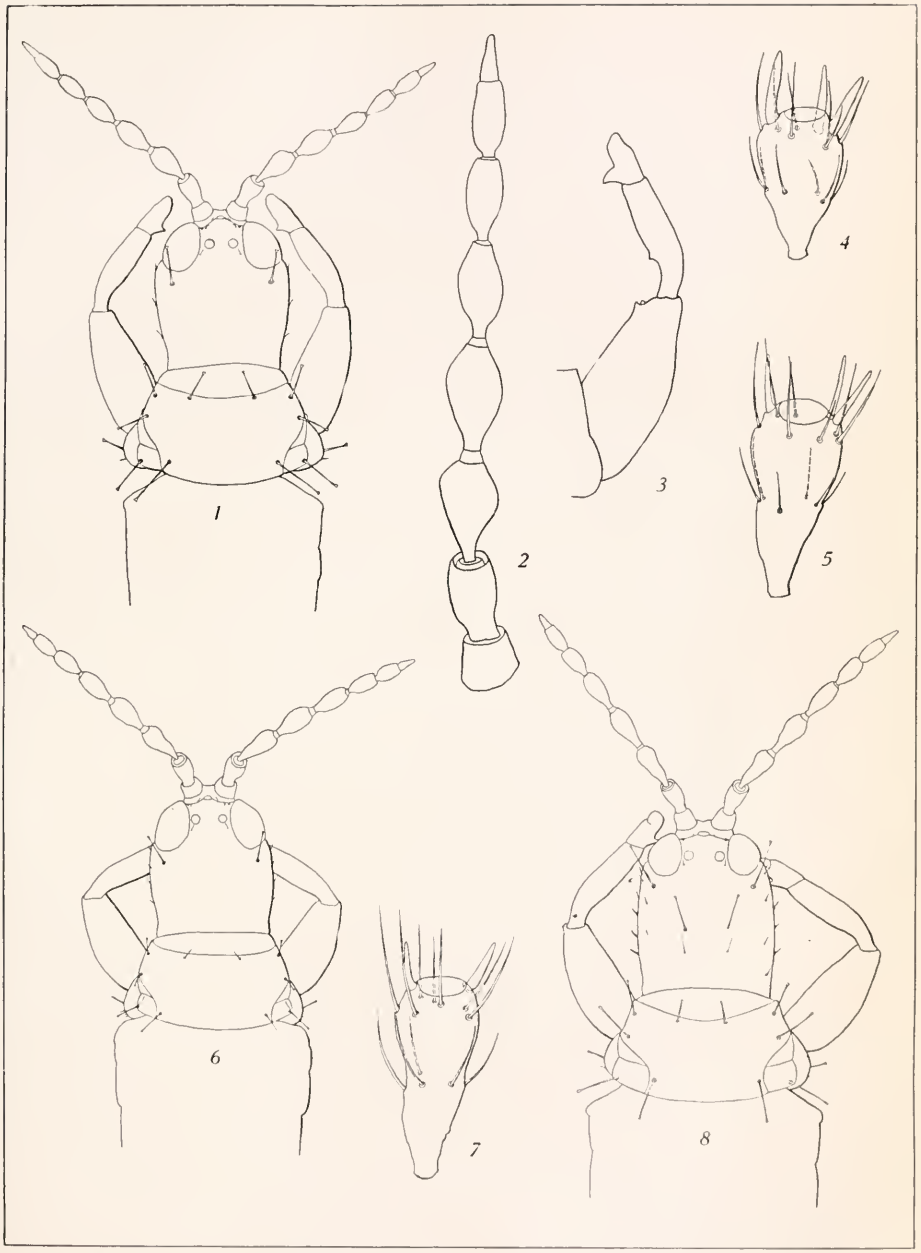
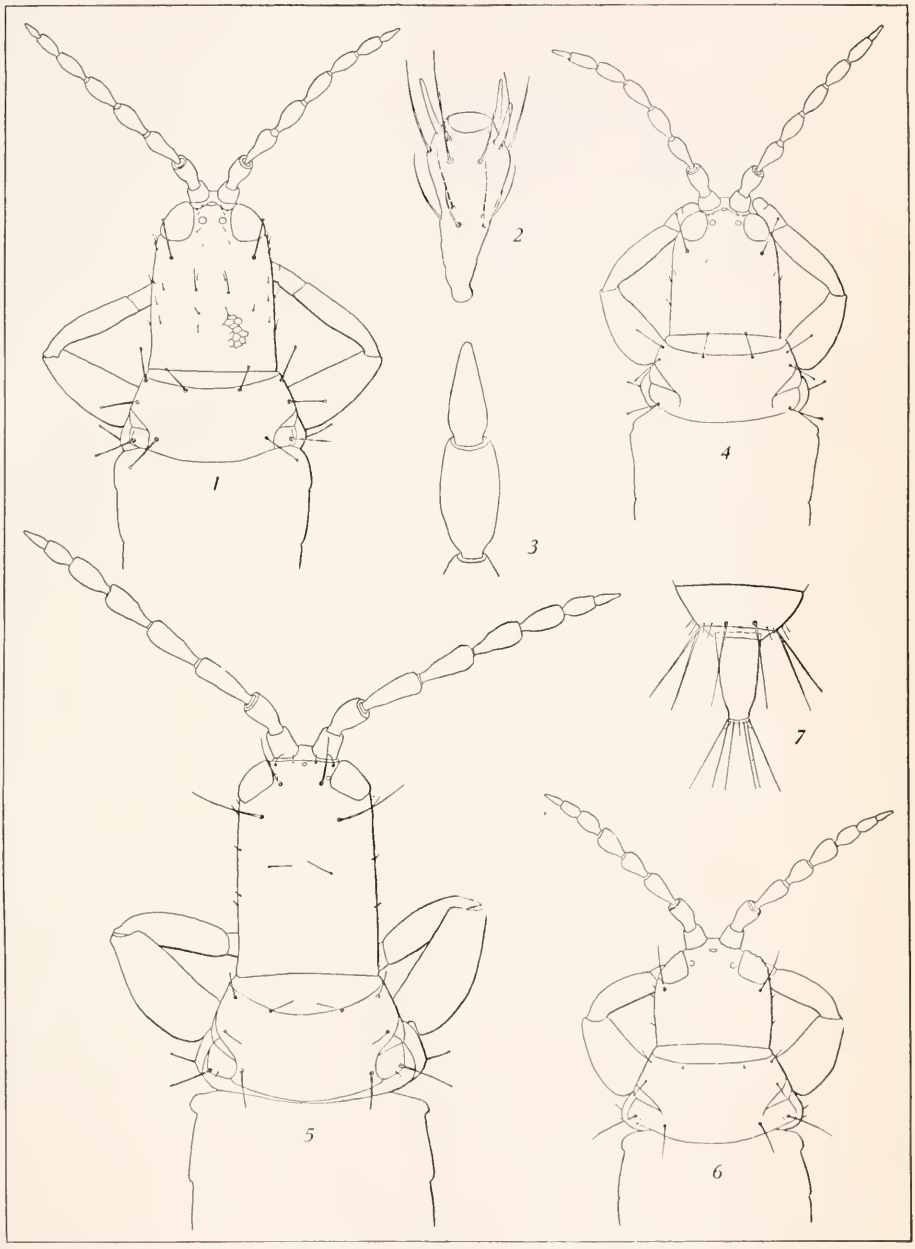



J. D. H. del.

NORTH AMERICAN THYSANOPTERA




J. D. H., del.

NORTH AMERICAN THYSANOPTERA.

## SYMPHOROMYIA AS A BLOOD-SUCKER.

(Diptera, Leptidæ.)

By Frederick Knab and R. A. Cooley.

When preparing his paper on blood-sucking Leptidæ* the senior author was unable to find more than the single original observation, by Osten Sacken, of the biting habit in *Symphoromyia*. As the result of conversation, during the last meeting of the American Association for the Advancement of Science, and subsequent correspondence, Professor Cooley sent him specimens taken in the act of biting, together with the notes reproduced below. Three specimens with the number 143 attached, taken at Sedan, Montana, July 1, 1906, are all females of the same species. The material came to hand too late to be incorporated in the above-mentioned paper.

As it is evident that the blood-sucking habit in *Symphoromyia* is confined to certain species, perhaps a single one, the determination of specimens that have actually bitten is of considerable interest. There was some difficulty in determining the specimens, as it proved that *Symphoromyia* is systematically in a rather unsatisfactory condition. However, the specimens fit very well the description given by Williston for the female of his *Symphoromyia pachyceras*. The proximity of the two regions, northern California for Williston's specimens and southwestern Montana for Professor Cooley's, make the agreement reasonably probable. Whether Osten Sacken had the same species under observation probably can only be determined by examining the original specimens, if these are still in existence. We have been unable to trace the locality, Webber Lake, California, given by Osten Sacken, and, moreover, we know very little of the distribution of the species of *Symphoromyia*. Attention must be called to the fact that the specimen standing as *S. pachyceras* in the National Museum collection, and upon which Coquillett based his diagnosis, are not Williston's species. This is evident from the shining black abdomen. Williston describes his species as "gray pollinose," indicating this condition for both thorax and abdomen; in this the Montana specimens agree. The color of the third antennal joint, palpi, and legs, which have been freely used in differentiating the species of this genus, are, as might be expected, subject to some variation which probably depends not only upon age, but also upon food.

There is considerable diversity in the mouth-parts of different species of *Symphoromyia*. The specimens taken by the junior author have rather short mouth-parts with a broad,

*This volume, pp. 108–109.

fleshy labial sheath which evidently can be retracted, similarly to the sheath of mosquitoes; this sheath is very thick at the sides and there is a central depression in which the other mouth-parts lie. The piercing parts are strongly chitinized and the maxillæ are clothed on their ventral surfaces with minute stiff hairs which on the apical half become transformed into barbs, densest and stoutest at the apex. In *Symphoromyia cruenta* Coquillett the mouth-parts are much longer, the labial sheath much more slender, apparently for the most part well chitinized, and closely surrounds the other parts, which are only exposed through a narrow dorsal slit. The maxillæ are smooth to near the apex, where there is a dense group of strong barbs. Coquillett in his "synopsis" already indicated this difference, but used the erroneous and misleading term "labella" to indicate the mouth parts. It has been thought advisable to keep Professor Cooley's notes on *Symphoromyia pachyceras* intact, and they follow herewith over his own signature.

—Frederick Knab.

We have repeatedly taken a species of *Symphoromyia* in the act of taking blood. They have always attacked me on the hand and they inflict a painful wound. The first time I was bitten by one I slapped with the same caution that I would a mosquito, lest it should escape, but I soon learned that this is unnecessary, for one can pick them up with the fingers as he would an inert object. In fact, you may poke them around with the finger without causing them to fly. They come and alight almost silently and generally come singly. Our note on this species is as follows:

Note 143.—Troublesome blood-sucking fly. Causing swelling. Very painful. Fly is silent when alighting.

It is my impression that this is distinctly a mountain form; that is, we do not find it in our large open valleys, but only in mountainous places. —R. A. Cooley.

## SIX NEW GENERA OF NEARCTIC MUSCOIDEA.

By Charles H. T. Townsend.

The following six new genera are erected for as many described North American species, which can not be placed in any previously erected genera known to me. The reproductive habits of four of these genera are known, and these four are treated in a forthcoming paper on the female reproductive system, eggs, and early stages of muscoid flies.

### Neophorocera, gen. nov.

Erected for *Phorocera edwardsii* Will. (*Euphorocera claripennis* Coq. pt.). The male has the second antennal joint hardly at all elongate, while the female had it noticeably so. The length of the second antennal joint thus becomes a secondary sexual character in this genus, which is the first case of the kind known to me in this immediate group. In the salmaciine and belvosiine flies the same secondary sexual character of the second antennal joint is much more pronounced.

Reproductive habit, oviposition of flattened macrotype egg on host. The egg-chorion is honeycomb-reticulate and without operculum. The uterus is absent, but the uterovagina of one of the dissected specimens (TD394) showed an egg containing a fairly developed maggot. This development of the maggot in the uterovagina is probably exceptional, due to undue retention of egg from failure to find a suitable host. (TD394, coll. by D H. Clemons, Aug. 22, 1908, Melrose Highlands, Massachusetts, and determined by W. R. Thompson as *Euphorocera claripennis* Coq.).

*Type: Phorocera edwardsii* Will., Scudder's Butterflies of New England, vol. III, p. 1921.

The genera *Exorista*, *Tricholyga*, *Euphorocera*, and *Chætotachina* have the egg-chorion without reticulation and furnished with an operculum at the cephalic end. *Winthemia* appears to lack both reticulation and operculum. *Chætolyga* and *Nemorilla* appear to have the chorion reticulate and without operculum, but are at once distinguished from *Neophorocera* by their ciliate hind tibiæ.

### Euacemyia, gen. nov.

Erected for *Acemyia tibialis* Coq. The frontal bristles stop at base of antennæ, the vibrissæ are inserted well above oral margin, the third antennal joint of female is only about one and one-half times as long as second, the cheeks of female are only one-fifth of eye-height, the apical cell is open and ends well before wing-tip. In *Acemyia* the frontal bristles descend nearly or quite to base of third antennal joint, the vibrissæ are inserted practically on the oral margin, the third antennal joint of female is fully or more than twice as long as second, the cheeks of female are over one-

third of eye-height, and the apical cell ends almost in wing-tip. The macrochaetæ of abdomen are only marginal in both genera.

Reproductive habit unknown.

*Type: Acemyia tibialis* Coq., Rev. Tach., p. 116.

*Acemyia acuticornis* Meig. had been reared in Europe from *Acridium*. *Acemyia dentata* Coq., which is not at all typical of the genus, having the apical cell closed and ending well before wing-tip, and the eyes in female descending almost to the level of the vibrissæ, has been reared in North America from *Melanoplus* and *Chortophaga*.

**Doryphorophaga, gen. nov.**

Erected for *Lydella doryphoræ* Riley. It belongs with the compsilurine flies, and bears a strong general resemblance to *Compsilura concinnata*. The eyes are thickly hairy, the facialia are ciliate on about lower two-thirds, the bend of fourth vein is without stump or wrinkle, the intermediate abdominal segments bear discal bristles, and the ventral carina and curved spine-like piercer, both of ordinary character, are present in the female. It differs from *Compsilura* principally in having the second antennal joint noticeably elongate, and the parafacials widened. Differs from *Lydella* and *Dexodes* in the thickly hairy eyes, ciliate facialia, and frontal bristles not descending low; from *Incamyia* in the last character and the ordinary ventral carina; and from *Eucelatoria* in the hairy eyes and the elongate second antennal joint.

Reproductive habit, subcutaneous larviposition in host. The uterus is long, slender, and coiled, and develops white maggots in single file to the number of about 150. The maggot has well-developed rows of microscopic spines, of which the first three rows and the last row encircle the body, the intermediate six rows being on ventral surface and about half encircling the body. (TD370, coll. by D. H. Clemons, Aug. 17, 1908, Melrose Highlands, Massachusetts, and determined by W. R. Thompson as *Phorocera doryphoræ*.

*Type: Lydella doryphoræ* Riley, First Report, Insects of Missouri, p. 111.

The type species has been repeatedly reared from the larvæ of *Leptinotarsa* (*Doryphora*) *decemlineata* in the northern and eastern United States as far west as Missouri.

**Neadmontia, gen. nov.**

Erected for *Admontia limata* Coq. Whole body strongly bristly. The true frontal bristles are numerous, strong and stop at base of antennæ; a row of closely placed weak bristles runs diagonally down the parafacials below end of frontal row, but is not a true continuation of the latter. Facilia not ciliate. Arista very delicately pubescent. Third antennal joint a

little concave on upper (front) edge, the upper (front) terminal angle more or less produced into a short blunt tooth. Abdomen with discal and marginal macrochaetæ. Apical cell closed almost at wing-tip.

Reproductive habit unknown, but probably larviposition.

*Type: Admontia limata* Coq., Proc. U. S. Nat. Mus., vol. xxxv, p. 105.

Coquillett's interpretation of the genus *Admontia* is a complex. His *Ad. demylus* is evidently one of the compsilurine flies, as indicated by the statement in description that the abdomen of female is thickly beset with short spines on underside of third and fourth segments. It parasitizes *Cophyrus* larvæ. It is possible that his *Ad. retiniæ*, described from males only, is an *Actia*. His *Ad. polita* probably belongs to the present genus *Neadmontia*. His *Ad. pergandei* and *degeerioides* seem to fit the genus *Admontia*. His *Ad. setigera* (San Mateo County, California, specimen) is a different genus from all of these. It lacks discal abdominal bristles, and bears on parafacials a true continuation of frontal bristles in a row extending to lower border of eye, all the frontal and parafacial bristles being of equal strength at root. This California specimen is a female and shows no ventral carina.

Specimens determined by J. A. Hyslop as *Admontia pergandei* Coq. were reared by him from larvæ of *Tipula infuscata*, Jackson, Tennessee. Nineteen flies issued from October 7 to 14, 1908. A reared female was found by Hyslop to contain 103 elongate eggs. The genus is recorded as parasitic in larvæ of Tipulidæ in Europe. The female probably deposits maggots on the surface of the soil, and these penetrate later in search of the tipulid larvæ.

TD389, collected by D. H. Clemons, August 21, 1908, North Saugus, Massachusetts, and determined by W. R. Thompson as *Admontia degeerioides* Coq., showed a slender uterus containing about 55 eggs and maggots similar to those of the compsilurine flies in general appearance. Female without piercer, with discal abdominal bristles, ciliate facialia, long, slender third antennal joint, and apical cell ending near wing-tip.

**Oxexorista, gen. nov.**

Erected for *Exorista eudryæ* Towns. This has the general external characters of *Sisyropa*. But until the female of *Tachina thermophila* Wied. of Java (type of *Sisyropa*) is dissected, we shall not be able to say what the genus *Sisyropa* is. *Eumasicera coccidella* Towns. has apparently the same general external characters as *T. thermophila* Wd., and the female fly is almost indistinguishable externally from the female of *Sisyropa hemerocampæ* Towns. Yet the last (TD387, Gip. Moth Lab. 1976) deposits

elongate white maggots on or near host, while the first (TD388, Gip. Moth Lab. 1975) deposits black microtype eggs on foliage. Thus *Sisyropa* may have either one of these habits, or perhaps still a different one. *Sisyropa hemerocampæ* Towns. (syn. of *Exorista amplexa* Coq., acc. W. R. Thompson) probably does not belong to the present genus. Its egg shows no sign of pedicel, while the dissected eggs of *Exorista eudryæ* (TD395) showed an atrophied pedicel. It is most probable that *Sisyropa hemerocampæ* Towns. is congeneric with *T. thermophila* Wd., since both have the front very narrow, the cheeks and especially parafacials extremely narrow, and the eyes thickly hairy.

Reproductive habit, larviposition of white maggots on or near host. The maggot is fat, with 13 wide and complete rows of microscopic spines encircling the body, the spines somewhat weaker dorsally. The spermathecal ducts are elongate and doubled on themselves. Uterine capacity up to 200 or 300 eggs and maggots. (TD395, collected by D. H. Clemons, Aug. 22, 1908, Melrose Highlands, Massachusetts, and TD425, collected by F. B. Lowe, August 29, 1908, near Swampscott, Massachusetts; both determined by W. R. Thompson as *Exorista eudryæ* Towns.

*Type: Exorista eudryæ* Towns., Trans. Am. Ent. Soc., vol. XIX, pp. 287–288.

**Euexorista, gen. nov.**

Erected for *Exorista futilis* O. S. This has the general external characters of *Parexorista*, and was referred to that genus by B. and B., along with the host of other species of various reproductive habits. Thus B. and B's *Parexorista* is another mixed-reproduction genus. The present form has no discal bristles on intermediate abdominal segments, and the hind tibiæ are ciliate.

Reproductive habit, leaf-oviposition of black microtype eggs. Uterine capacity up to 2,000 or 3,000. Chorion with a low power shows a beaded net-like design, the bead strings running from pole to pole and more or less interlaced into a network; with high power (oil immersion) it shows a structure composed of a microscopic network of chitin, the lines of chitin being much narrower than the open spaces between them. (TD361, August 15, 1908, Spot Pond, near Melrose, Massachusetts, and TD344 August 13, 1908, North Andover, Massachusetts; both collected by D. H. Clemons, and determined by W. R. Thompson as *Exorista futilis* O. S.)

*Type: Tachina* (*Exorista*) *futilis* Osten-Sacken, Can. Ent., vol. XIX, p. 161.

It appears from the descriptions that this species can not belong to *Epimasicera*, type *Tachina westermanni* Zett. (syn. of *Tachina mitis* Meig., acc. Thomson, Bezzi and Stein), since this genus has two pairs of median discal macrochaetæ each on second and third abdominal segments and the hind tibiæ are not ciliate.

## THREE NEW NOCTUIDÆ.

By Harrison G. Dyar.

**Arenostola orphnina,** new species.

Gray, over soiled ocherous, generally evenly suffused with gray, nearly obliterating the markings. In specimens with little suffusion all the veins are dark-lined and a row of dark points on the veins represents the outer line; a small white speck at the origin of vein 3; a row of terminal black dots between the veins; a gray shade along costa and from median vein outward, these shades darker than the rest of the wing also in suffused specimens. Hind wing pale gray. Expanse, 27 to 32 mm.

Four males, three females, Hampton, New Hampshire, August 1, 1911 (S. A. Shaw).

*Type:* No. 15098, U. S. National Museum.

A robust species like *inquinata* Guenée, but still larger and longer-winged. The veins are dark-lined as in *defecta* Grote.

**Paracretonia, new genus.**

Falls in the Erastriinæ. Fore wing with vein 9 from 10 anastomosing with 8 to form the areole; frons with rounded prominence, roughened, with a plate below; fore tibiæ unarmed; abdomen without crests; hind wing with vein 5 well-developed from well below middle of discocellulars; eyes large, round; palpi upturned.

**Paracretonia xithon,** new species.

Fore wing light gray, with an almost whitish ground, shaded with blackish gray; a broad dark oblique inner band from costa to claviform; an ocherous elongate mark below; spots white-filled, orbicular round with black dot and ring, reniform constricted, with black spot in lower half, claviform rather large; an oblique white shade before apex; outer line oblique, double, blackish, followed by an ocherous band in which gray rays project along the veins; a marginal row of dark dots. Hind wing fuscous with white fringe. Expanse 21-22 mm.

Three specimens, La Puerta Valley (near San Diego), California (G. H. Field).

*Type:* No. 15112, U. S. National Museum.

This may prove to be the same as *Phyllophila aleptivoides* Barnes and McDunnough (Can. Ent., xliv, 217, 1912).

**Sacadodes, new genus**

Antennæ bipectinate, the branches moderate in the male, short in the female, ciliate. Palpi porrect or oblique, the second joint long, thick; third short, nearly globose in the male, long and slender in the female.

Tongue undeveloped. Eyes large, naked. Front with roughened tubercular prominence, angular in outline. Tibiæ rather densely hairy, without spines. Thoracic vestiture hairy, prothorax slightly crested, metathorax with thick divided crest; abdomen with small crest at base. Fore wing with vein 9 from 10, anastomosing with 8 to form the areole; 7 from near end of areole. Hind wing with vein 5 strong, from well below middle of discocellulars. Retinaculum of male broad, not bar-shaped.

Said to be near *Diparopsis* Hampson, which has vein 5 of the hind wing weak and arising near middle of discocellulars, according to Hampson's description and figure. In the present form vein 5 seems scarcely at all weaker than the other veins.

**Sacadodes pyralis,** new species.

Fore wing clayey ocherous to purplish brown; basal and subterminal spaces darker, olivaceous brown; a narrow dark discal mark; lines lighter, the inner edging the basal dark area, angled below median vein; outer slightly curved, with a narrow dark inner edging; subterminal line straight, near and similar to the outer line. Hind wing whitish in the male, purplish brown in the female. Expanse, 30 mm.

Two males, one female, Trinidad, British West Indies, bred from the "pink cotton-boll worm" (P. L. Guppy).

*Type:* No. 15113, U. S. National Museum.

Both in markings and structure much like *Diparopsis castanea* Hampson, which is destructive to cotton in South Africa.

The larva is cylindrical, robust, the segmental incisures strong. Head moderate, its vertex within joint 2. Cervical shield and anal plate well chitinized. Skin smooth; tubercles and setæ small, normal. Abdominal legs equally developed. The mature alcoholic specimen is colorless; a smaller one is marked with pink in dorsal and stigmatal bands, row of oblique subdorsal dashes and narrow subventral line.

Mr. Schaus kindly examined a specimen and consulted with Mr. Paul Dognin and Sir G. F. Hampson. Mr. Dognin has specimens of the species from Argentina and the one that Mr. Schaus examined was from Venezuela. The distribution of the species is therefore extensive.

The new name was communicated to me by Mr. Schaus, having been suggested, I understand, by Sir G. F. Hampson.

## MORE ABOUT THE SLOTH MOTH.

(Lepidoptera, Pyralidæ.)

By Harrison G. Dyar.

Some time ago I described a pyralid from the fur of the living sloth as *Cryptoses cholœpi* (Proc. Ent. Soc. Wash., IX, 142, and X, 81, 1908). At the time I overlooked the description of a sloth moth by Spuler as *Brachypodicola hahneli*. The English entomologists have concluded that these two forms were the same species and I have lately received specimens of my species positively labeled with the name of Spuler's. However, I am now satisfied that there are at least three sloth moths, each referable to a distinct, though allied, genus.

Of *Cryptoses cholœpi* I have now 30 specimens, 19 males and 11 females, received through the kindness of Mr. William Schaus from different parts of Costa Rica. The sexes differ in venation, in wing shape, and in the distinctness of the markings. The figure of the venation given by me (Proc. Ent. Soc. Wash., IX, fig. 9) is that of the female. The male differs in lacking entirely vein 11, there being only one free vein and three stalked veins from the upper angle of the cell. The wings of the male are more sharply pointed than those of the female. The markings which I described (Proc. Ent. Soc. Wash., X, 81) are those of the male. Those of the female are duller, the pale streaks less contrasted. The moths vary considerably in size in both sexes. The three original types are all females.

Of *Bradypodicola hahneli* I have not obtained any material. A study of Spuler's article, however, shows its distinctness from the above. Spuler figures the venation of the male. In it vein 2 is shown stalked with 3–5, while in *Cryptoses* it arises well before the angle of the cell; vein 6 also in *Bradypodicola* arises further below the angle of the cell than in *Cryptoses*. But these are minor differences, while in general the venation is alike. However, the shape of the head is very different. In *Bradypodicola* it is very prominent at the vertex in side view, the front being concave. In *Cryptoses* the vertex is very slightly prominent and the front continuously convex.

The occurrence of a third form strengthens the above conclusion of the distinctness of *Bradypodicola* and *Cryptoses*. This third form is from Brazil, and I have before me a female specimen sent by Dr. R. von Ihering. Doctor von Ihering will name and describe it, so I will not enter into its discussion at present, otherwise than to say that it differs from both the

above in venation, while the shape of the head is more like *Bradypodicola* than *Cryptoses*.

*Crpytoses cholœpi* comes from Central America and Panama, where it lives in the fur of the sloth *Cholœpus*. *Bradypodicola hahneli* comes from Brazil, where it lives in the fur of the sloth *Bradypus*. Of the habits and distribution of the third species we shall be enlightened later by Dr. von Ihering.

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## NEW SPECIES OF NOCTUIDÆ FROM FRENCH GUIANA.

By W. Schaus.

**Obroatis reniplaga,** new species.

*Male.*—Palpi, head, and collar dark olive brown; thorax fuscous brown, with some lilacine irrorations. Abdomen dark gray brown. Fore wings to outer line fuscous, heavily irrorated with lilacine white; costa finely olive brown; antemedial line vertical, lilacine on costa, then ocherous brown, outwardly expanding on median and submedian into dark points; orbicular minute, dark brown; reniform large, irregular, dark velvety brown, becoming narrower and paler brown anteriorly, finely edged behind with lilacine; a fuscous shade on cost a above reniform, and faint darker shade below it from vein 2 to inner margin; outer line fine, deeply lunular, punctiform on veins, and outcurved below costa, followed by a broad pale yellowish-brown shade; subterminal shade broad, sinuous, fuscous, partly crossed by an indistinct whitish line; outer margin pale brown, with a terminal fuscous line, and white points on veins. Hind wings fuscous to outer line, which is very faint, but with distinct dark brown points on veins; the space beyond and termen as on fore wings. Wings below grayish brown; darker spots on discocellular; the outer line deeply lunular, fine, distinct, but without points; indistinct small subterminal spots on interspaces.

Expanse, 50 mm.

Other specimens are smaller, 39 mm, and paler.

*Habitat:* St. Jean, Maroni River.

Near *O. distincta* Butl.

**Obroatis roseipalpis,** new species.

*Male.*—Palpi bright red, fringed with rosy brown. Head rosy brown, collar olive brown. Thorax, abdomen, and wings ocherous brown; a postmedial straight, broad, purple line, divided by a fine lilacine shade, and closely followed by a fine dentate lunular line, punctiform on veins; subterminal dark streaks marked by yellowish points on interspaces; cilia dark brown crossed at base by a fine pale line, on hind wings tipped with roseate. Fore wings: Costa finely roseate; an almost imperceptible antemedial line; orbicular a minute brown point; reniform constricted medially, yellowish brown, darkly outlined but not distinct. Hind wings: The postmedial terminating

on inner margin near angle. Wings below yellowish tinged with reddish brown, chiefly on fore wings; the spots minute; the postmedial line dark, indistinct, more remotely followed by the dentate lunular line; some fuscous subterminal spots on fore wings.

Expanse, 38 mm.

*Habitat:* St. Jean, Maroni River, Cayenne.

**Obroatis cratinus,** new species.

*Male.*—Palpi gray, shaded with red at base and above. Head, collar and thorax fawn color. Abdomen dorsally shaded with fuscous gray. Legs clothed with vermilion-brown hairs; tarsi gray, spotted with white. Wings light reddish brown. Fore wings: An antemedial fine gray line, angled on subcostal; orbicular a minute yellow point; reniform large, round, black-brown, broadly edged with ocherous gray; postmedial line fuscous brown, outcurved from costa, inbent, touching reniform, terminating at middle of inner margin; a fine dark outer line, deeply lunular, and punctiform on veins, followed by lilacine white irrorations, which extend to apex; subterminal pale spots on interspaces. Hind wings similar, but without antemedial markings; an indistinct fuscous line on discocellular. Wings below rose vermilion, thinly irrorated with black; spots minute, black; outer lunular line fine black, the points on veins distinct.

Expanse, 47 mm.

*Habitat:* St. Jean, Maroni River.

**Athyrma antica,** new species.

*Female.*—Palpi outwardly olive brown, inwardly grayish buff. Head, collar, and thorax grayish brown, tinged and irrorated with lilacine white. Abdomen and hind wings grayish brown. Fore wings gray, tinged with pale reddish brown antemedially and postmedially, the costal margin for two-thirds, and cell medially tinged with lilacine; a subbasal velvety brown line on costa, inbent from subcostal to base; a large velvety black antemedial spot, somewhat triangular with its apex projecting across cell and connected with a darker gray shade on costa, its inner edge oblique from within cell to below submedian, its outer edge outwardly oblique, but less so than inner edge, its posterior edge sinuous, and finely outlined with white except on medial side; a faint postmedial pale reddish brown line, partly finely marked with black scales, oblique, indistinct on costa, vertical, dark-spotted from veins 8 to 6, sharply in and up curved, down bent on discocellular, sinuous to submedian near dark antemedial space, and more heavily marked across this vein; the outer edge of brownish postmedial space oblique from costa near apex to inner margin, somewhat dentate; a terminal dark lunular line.

Expanse, 40 mm.

*Habitat:* St. Laurent, Maroni River.

Near *A. tuberosa* Feld.

**Argidia rufa,** new species.

*Male.*—Palpi, body, and wings above brown-red; abdomen terminally fuscous brown. Wings: A darker straight postmedial line, finely edged outwardly with dull lilacine and some metallic blue scales; faint traces of a darker subterminal shade; darker streaks on discocellular. Fore wings: Basal half of costa finely fuscous, with a few lilacine irrorations below it; a minute darker point in cell; traces of a darker antemedial line. Thorax below black; tibiæ partly fringed with brown; tarsi light brown; abdomen below buff. Wings below fuscous brown; the apex of fore wings broadly lighter brown.

Expanse, 45 mm.

*Habitat;* St. Laurent, Maroni River.

**Argidia suprema,** new species.

*Female.*—Palpi, frons, and legs dark red; tarsi dark gray. Vertex, collar, and thorax dull lilacine gray. Abdomen darker, brownish, shaded with fuscous terminally. Fore wings for two-thirds lilacine gray; a fine darker antemedial line; orbicular large, round, yellowish, finely circled with brown; a fine darker medial line slightly inbent from middle of cell; reniform indistinct, long and narrow, finely darker edged and crossed by a darker gray shade; a postmedial whitish line from vein 3 to inner margin; outer third dark olive brown, almost black beyond reniform, its inner edge slightly incurved on costa; costa at apex finely buff; some terminal whitish irrorations; faint traces of a subterminal fuscous shade. Hind wings lilacine gray at base; a fine antemedial line; medial space broadly fuscous brown mottled with lilacine scales; terminal space dark silky brown; traces of subterminal fuscous shade; terminal lilacine irrorations except at apex. Wings dark below reddish brown; a fuscous straight medial line. Fore wings: A yellow spot at base; orbicular not quite round, bright yellow; reniform large, constricted medially, bright yellow with two small reddish brown spots; the costal margin above it bright yellow, extending broadly towards apex; outer line fine, indistinct; termen broadly shaded with fuscous gray; a subterminal whitish line towards apex; cilia at apex white. Hind wings: A distinct fuscous postmedial line outwardly finely edged with lilacine.

Expanse, 44 mm.

*Habitat:* St. Laurent, Maroni River.

**Oroscopa noctifera,** new species.

*Female.*—Palpi brown, darker mottled above, fringed below with white. Head brown, collar, thorax, and base of abdomen narrowly, pale buff; a velvety brown black line on collar anteriorly. Abdomen buff gray, darkly irrorated and with dorsal dark spots. Fore wings pale buff; costa narrowly whitish buff; a pale brown subbasal dash on costa, followed by a similar

fine dentate and interrupted line, deeply outcurved and barely traceable; a short dash in place of orbicular; reniform irregular, pale brown, preceded by a white point and brown shade, followed by a white streak to postmedial; a medial brown dash below cell; postmedial fine, geminate, dark brown, deeply outcurved beyond cell, and inbent to before middle of inner margin; a dark shade below white streak and postmedial; postmedial followed on costa by a small brown spot and a long, thick black streak to near apex; fine fuscous streaks on veins 6 and 7, and a shorter marginal streak between them; outer space from near vein 6 to inner margin fuscous brown, crossed by an outer sinuous fuscous line, between which and the postmedial there is a buff shade on inner margin. Hind wings: Base narrowly pale buff, otherwise dull brown irrorated with fuscous: A deeply dentate medial fuscous line: the termen broadly fuscous except from vein 6 to above 7, with intervenal brownish streaks. Fore wings below buff shaded with pale brown, base narrowly; a curved brown line crossing discocellular expanding below cell; the postmedial interrupted, less inbent; the dark terminal space narrower, blacker. Hind wings below buff, shaded with pale brown; a broad fuscous antemedial shade, not reaching inner margin; a postmedial brown shade mottled with fuscous from vein 5 to near inner margin; the termen mottled with fuscous from vein 5 to anal angle.

Expanse, 32 mm.

*Habitat:* Cayenne.

**Focilla gregalis**, new species.

*Female.*—Palpi fuscous irrorated with white. Head, and body above brown; some white scaling on vertex; segmental fuscous lines on abdomen. Fore wings brown, tinged with olive gray; an irregular fuscous subbasal line; antemedial fine, lunular, fuscous brown, deeply inbent in cell, preceded by a white point on costa; a black point as orbicular; a wavy reddish brown medial line, followed by a similar shade; reniform indistinct, incurved, fuscous gray, edged with olive gray; postmedial fine, velvety black, wavy, outcurved beyond cell, followed by an irregular reddish-brown shade, subterminal fuscous shadings, forming spots towards apex; a lunular marginal black line connecting intervenal spots, outwardly shaded with lilacine white. Hind wings: a black streak on discocellular; a broad dark reddish-brown shade, followed by the fine wavy black postmedial line, which crosses a faint lilacine shade; subterminal lunular, dentate, fuscous, indistinctly geminate; the marginal dark points distinct, the line connecting them less so. Wings angled at vein 4. Underneath light yellow brown with some darker irrorations; the lines black, very distinct on hind wings, wavy; the subterminal distinctly geminate, interrupted by veins on hind wings.

Expanse, 36 mm.

*Habitat:* St. Jean, Maroni River.

**Focilla furva,** new species.

*Female.*—Body and wings dark brown, lines fuscous; tarsi yellowish; white points at joints of tibiæ. Fore wings: A subbasal light brown line, lunular, inbent to base of submedian; antemedial fine, wavy, crossing a broad lighter brown space, outwardly edged by the wavy medial line; reniform dark grayish with a pale reddish-brown spot behind, partly outlined with fuscous scales; postmedial outcurved, wavy, from a pale streak on costa above reniform, inbent at vein 3 to before reniform, and wavily outbent to inner margin; an indistinct subterminal sinuous brown line, partly shaded with fuscous, and not reaching costa; marginal grayish spots between veins; the termen crenulate, prolonged at vein 4 to beyond apex. Hind wings: A dark reddish-brown shade from postmedial to subterminal; the marginal spots as on fore wings; the termen prolonged at veins 6 and 4. Wings below lighter brown irrorated with lilacine white; orbiculate and lunate discocellular spots black; a fine white outer line, and small marginal intervenal spots.

Expanse, 39 mm.

*Habitat:* St. Laurent, Maroni River; in the British Museum, from Costa Rica.

**Focilla gorge,** new species.

*Male.*—Body above purplish gray, underneath creamy buff. Wings above light brown shaded with purple except on termen, the two separated by a broad subterminal fuscous brown shade; marginal black points between the veins; a wavy medial fuscous line. Fore wings: A dark brown subbasal line; a lunular antemedial line, inbent in cell; postmedial finer, angled on costa, approximate to medial line from cell and lunular to inner margin; reniform vaguely indicated, light brown. Hind wings: A fine dark brown postmedial line, very irregular. Wings below light buff brown, the lines very fine, fuscous brown; black points on discocellular; medial line slightly outcurved; a fine subterminal line; marginal intervenal black points. Fore wings; a black antemedial point in cell; postmedial curved on costa and vertical to inner margin. Hind wings: The subterminal vaguely geminate; the postmedial slightly wavy.

Expanse, 36 mm.

*Habitat:* St. Jean, Maroni River.

## TRYPHONINÆ—A REVIEW.

By Henry Lorenz Viereck.

Mr. Claude Morley has favored the entomological world with another volume of his Ichneumonologia Britannica, being volume IV of his British Ichneumons, Tryphoninæ, and set forth in text and figures comprising pages i–xvi, 1–344, one plate, and many figures.

This compilation will no doubt be consulted by many a student of insects and not vainly, for a mass of facts has been painstakingly gathered and arranged, while some genera have been figured that have previously been known to science only by descriptions.

In view of the circulation that the present book is likely to have, it is the more unfortunate that the author did not lay down his work more securely, as, for example, with reference to the genera there is an evident disregard as to foundation stones.

Forty-nine genera are treated, of which one is a new genus, and a blanket genus at that, including a number of old genera that by some writers have been regarded as good and distinct. The new genus is *Homocidus* and is evidently a mixture of many species belonging to *Zootrephes*, *Syphoctonus*, and *Homotropus*, and possibly *Enizemum* and *Aniarophron*. If these genera are to be fused then *Zootrephes* must be used and a new genus is uncalled for. For the present *Homocidus* Morley, for which I designate *Homocidus elegans* Gravenhorst as type, sinks as a synonym of *Homotropus* (Foerster) Davis, for which latter I designate *Bassus bicapillaris* Walsh as type. In the table of genera *Homocidus* is represented as wanting notauli, but in the table to species under the same genus are to be found two categories, one with notauli present, the other with notauli wanting!

*Bassus* is credited to Fallén instead of Fabricius, who erected the genus. According to Curtis's fixations of types *Bassus* Fabricius can not be used for *Bassus* Authors, which latter should be called *Anomalon* Jurine. *Anomalon* Authors being without a name may be called *Paranomalon* new genus, with *Ophion flavifrons* Gravenhorst as type.

The type of *Acrotomus* Holmgren has never been fixed, so *Tryphon lucidulus* Gravenhorst is hereby designated as type.

*Adelognathus* Holmgren: No type designated. Type *Adelognathus brevicornis* Holmgren, by present designation.

*Catoglyptus* Holmgren: No type designated. Type *Mesoleptus fortipes* Gravenhorst, by present designation.

*Chorinæus* Holmgren: No type designated. Type *Exochus funebris* Gravenhorst, by present designation.

*Ctenopelma* Holmgren: No type designated. Type *Ctenopelma nigrum* Holmgren, by present designation.

*Diaborus* (Foerster) Woldstedt: No type designated. Type *Cteniscus* (*Diaborus*) *sedulus* Woldstedt, by present designation.

*Eclytus* Holmgren: No type designated. Type *Eclytus ornatus* Holmgren by present designation.

*Erromenus* Holmgren: No type designated. Type *Erromenus brunnicaus* Gravenhorst, by present designation.

*Euryproctus* Holmgren: No type designated. Type *Mesoleptus annulatus* Gravenhorst, by present designation.

*Exenterus* Hartig 1838 appears to be the same as *Cteniscus* Haliday 1837.

*Exochus* Gravenhorst: Type designated by Westwood not originally included. Type *Ichneumon gravipes* Gravenhorst by present designation.

*Grypocentrus* Ruthe: No type designated. Type *Grypocentrus incisulus* Ruthe, by present designation.

*Labrossyta* (Foerster) Davis: No type designated. Type *Grypocentrus bimaculatus* Ashmead, by present designation.

*Lathrolestes* (Foerster) Davis: No type designated. Type *Lathrolestes nasoni* Davis, by present designation.

*Mesoleius* Holmgren: No type designated. Type *Tryphon audicus* Gravenhorst, by present designation.

*Mesoleptus* Gravenhorst: As restricted by Curtis's fixation of type in 1837 this genus in synonymous with *Exolytus* Holmgren, which it replaces. *Mesoleptus* Authors not Gravenhorst is left without a name and may be called *Mesoleptidea* new genus. Type *Mesoleptus cingulatus* Gravenhorst.

*Metopius* Panzer: No type designated. Type *Sphex vespoides* Scopoli, by present designation.

*Notopygus* Holmgren: No type designated. Type *Notopygus emarginatus* Holmgren, by present designation.

*Perilissus* Holmgren: No type designated. Type *Mesoleptus limitaris* Gravenhorst, by present designation.

*Perispudus* Thomson = *Perispuda* (Foerster) Kriechbaumer: *Perispuda* (Foerster) Kriechbaumer had priority and is isogenotypic with *Perispudus* Thomson.

*Picrostigeus* Thomson = *Piscrostigeus* (Foerster) Thomson: No type designated. Type *Orthocentrus* (*Picrostigeus*) *setiger* Thomson, by present designation.

*Polyblastus* Hartig: No type designated. Type *Tryphon varitarsus* Gravenhorst, by present designation.

*Polyclistus* (Foerster) Thomson = *Hypsicera* Latreille: No type designated. Type *Ichneumon femoralis* Fourcroy, by present designation.

*Promethus* Thomson: No type designated. Type (*Bassus*) *Promethus sulcator* Gravenhorst, by present designation. This genus is synonymous and isogenotypic with *Promethes* (Foerster) Woldstedt, which has priority.

Mr. Morley includes *Liopsis* Foerster as a synonym of *Promethus* Thomson and is thus the first person to include species under this genus. I select *Promethus sulcator* (Gravenhorst) as type, *Liopsis* (Foerster) Morley thus becoming isogenotypic with *Promethes* (Foerster) Woldstedt.

*Smicroplectrus* Thomson: No type designated. Type (*Exenterus*) *Smicroplectrus jucundus* (Holmgren), by present designation.

*Stenomacrus* (Foerster) Thomson: No type designated. Type *Orthocentrus silvaticus* Holmgren, by present designation.

*Trematopygus* Holmgren: No type designated. Type *Trematopygus ruficornis* Holmgren, by present designation.

*Trichomastix* Vollenhoven = *Bioblapsis* (Foerster) Dalla Torre: The latter genus has priority.

*Zootrephes* Thomson: No type designated. Type *Bassus holmgreni* Bridgman, by present designation, which Morley holds to be the same as (*Bassus*) *Zootrephus rufiventris* Gravenhorst. *Zootrephus* Thomson must be replaced by *Zootrephes* (Foerster) Woldstedt, the genotype of which latter is regarded as congeneric with the genotype of *Zootrephus* Thomson.

Fortunately, the fact that Mr. Morley did not concern himself with the foundation stone or genotype of each genus used by him does not change the status of his concepts in many cases, as quite frequently the constituents of his generic concepts include the genotype of the genus involved. However, in such a painstaking effort as this, one would look for the finality that can come only through the consideration of genotypes, especially in view of the fact that some of the earliest writers from Latreille on recognized the necessity of definite premises upon which to argue the case of the ichneumon flies.

The compilation of biological records is apparently exhaustive and will serve a useful purpose in the hands of the field worker and economist.

The classification of the Tryphoninæ as here set forth is admittedly no improvement over Holmgren's system, except in the acceptance of an additional tribe based on pectination of claws.

Segregates of some of the older, heterogeneous genera, accepted by colleagues of the author, are suppressed, as in the

case of the Bassini, while the conformation of the scape in one case and the character of the claws in another is drawn upon to separate tribes. So we have the time honored inconsistency of treatment repeated.

While we could have wished to have the subject treated from some new viewpoint, yet the result will be of value to all students of this group, no matter what fauna is considered, especially in view of the treatment of a number of species that are genotypes of widely distributed genera and the introduction of so many good figures which act as a guide to the habitus in a group where habitus is so important in introducing the uninitiated to the study of the group.

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## NOTES ON NEARCTIC MANTISPIDÆ.

By Nathan Banks.

Our species of this family are not numerous; on the occasion of adding two more I tabulate the genera that are now known to be represented in the United States. The genus *Trichoscelia* occurs in Mexico, and so may be taken later on our side of the border.

1. Two claws to tarsus I; axillary vein forked in margin; pronotum short, bristly; female with long ovipositor . . . . *Symphrasis*
   But one claw to tarsus I, axillary vein not forked; pronotum more elongate; no ovipositor . . . . . 2
2. Pronotum without transverse furrows or corrugations, finely haired; first radial cell with but one branch . . . . . *Mantispilla*
   Pronotum transversely furrowed, not hairy, usually more than one branch from first radial cell . . . . . 3
3. Upper branch of first radial sector bent up to unite with second radial sector, or connected thereto by very short cross-vein; radial cells very slender . . . . . *Climaciella*
   Upper branch of first radial sector connected to second radial sector by a rather long cross-vein; radial cells broader; pronotum more elongate . . . . . *Mantispa*

*Symphrasis* includes but one species, *S. signata* Hagen, from the Southwest.

*Climaciella* was made by Enderlein for our *Mantispa brunnea* Say; it will also include *M. floridana* Bks.

*Mantispa* includes several species, one of which, *M. mæsta* Hag., has never been refound.

*Mantispilla* was considered a subgenus by Enderlein; as defined above it makes a good genus; we have two species hitherto undescribed.

**Mantispilla scabrosa,** new species.

Pale; a broad median brown stripe on face down over labrum, a narrow brown stripe each side between antennæ and the eye; antennæ mostly pale, but with dark tip, before which it is paler than elsewhere; vertex with a few dark spots; pronotum pale, quite long, broad in front, but tapering evenly behind, clothed above with many short, stiff black bristles; thorax darker on sides above, the lobes with black bristles; pleura dark, with faint yellow streaks; legs pale, femur I reddish brown, blackish within; abdomen dark, unmarked. Wings hyaline, subcostal area and stigma reddish brown, a faint dark cloud under stigma on the cross-vein; venation blackish; first radial cell with one branch, second with two or three, third with two, second cell much narrowed at tip; cells beyond stigma higher than long; cross-vein between first and second radial sectors as long as width of costal area.

Expanse, 28 mm.

From Mesilla, New Mexico (Morse).

**Mantispilla pulchella,** new species.

Pale; a narrow median brown stripe on the face, forked at base of antennæ, basal joint of antennæ pale, beyond dark brown; pronotum long, brown on each side, above with scattered fine, short, pale hairs, likewise some on the lobes of mesonotum, thorax pale yellowish, marked with dark brown on pleura and in front, legs pale, front femora, except base, reddish brown, darker within, middle and hind femora with dark line beneath on basal part. Abdomen pale, darker on venter, above with some dark spots. Wings hyaline, subcostal area and stigma pale yellowish, veins black, except median and radius, which are pale; radial cells broad, each with but one branch in the fore-wings; in hind wings with one branch from first radial cell, two from second cell, none from third; cells beyond end of stigma longer than high.

Expanse, 20 mm.

From Eureka, Utah, July 22 (Spalding)

## BLOOD-SUCKING INSECTS AS CARRIERS OF HUMAN DISEASES.

By C. T. Brues,
*Bussey Institution, Harvard University.*

I have been much interested in the summary published in the last number of the Proceedings of the Entomological Society of Washington (vol. xiv, pp. 79-81, April-June, 1912), of remarks by Dr. Frederick Knab relative to the transmission of human diseases by blood-sucking insects.

He has called attention to the fact that such insects must be rather constant companions of man in order that their potential powers to act as vectors may be utilized. On this account it is stated that such insects as Simuliidæ, Tabanidæ, and sylvan mosquitoes may be eliminated, as they do not feed regularly on human blood, and are active during only a limited season, a condition that would necessitate too great an interval during which no transmission could occur. In addition, it is stated that with insects which do not normally bite man, the chances of such species obtaining parasitic microorganisms from an infected person and then inoculating a second person are too remote to allow for the perpetuation of the disease.

These statements hold good for such diseases as yellow fever and malarial fevers so far as we know, since the pathogenic organisms are confined to man and specific mosquitoes in which they undergo a definite life-cycle.

Two matters have been overlooked, however, which have a very important bearing on certain other insect-borne diseases. In the first place, there is the possibility that some human diseases may be common to animals. This has been demonstrated in the case of some infections, and in at least one insect-borne disease is known to occur. Thus, with African sleeping sickness, wild antelopes and domestic cattle may act as reservoirs for the trypanosomes that produce the disease and tsetse flies infected from them may spread the disease in man. That many more animal diseases may bear some such relation to man is probable, although present information relates mainly to infections (e. g., anthrax) which are not ordinarily insect-borne.

Secondly, the occurrence of chronic carriers must not be overlooked. Such conditions are best known in certain diseases such as typhoid fever and diptheria, where blood-sucking insects do not ordinarily spread the infection; but the piroplasma of tick-borne splenetic fever (Texas fever) of cattle is known to persist in chronic cases. That such is commonly true of some human insect-borne diseases is by no means un-

likely, and although it could hardly account for the persistence of a human disease carried exclusively by a specific insect vector, it renders possible the transfer of diseases by a contaminative carrier during certain short periods alternating with longer periods of inactivity.

## NOTE ON THE AVOCADO WEEVIL (HEILIPUS LAURI BOHEMAN).

By Herbert S. Barber,
*Bureau of Entomology, U. S. Dept. of Agriculture.*

Last month (March 1912) some aguacate seeds (avocado or alligator pear) were planted for germination in one of the greenhouses of the Department of Agriculture in Washington, and while inspecting importations against noxious insects, Mr. E. R. Sasscer had his attention drawn to one of these seeds showing injury which, when the seed was opened, proved to be the result of a large weevil larva therein contained. Unfortunately the seed lay for a time on his desk subject to the attack of the ant-pest (*Solenopsis debilis*) from which the Bureau of Entomology suffers, before he brought it to me. When examined further the seed was found to contain, in addition to the half-devoured larva, two fine pupæ, each in a thin-walled cell of excrementous material, the three together almost completely filling the space formerly occupied by the two great cotyledons.

In the same greenhouse and at about the same time (March 19, 1912) an attendant had picked up and handed to Mr. Sasscer a large weevil that was feeding on the leaves and stem of a seedling aguacate and which had undoubtedly issued from another seed of the same lot. A few days later some one in passing through the greenhouse picked up another adult weevil for a friend interested in insects, who, in turn, brought it to me for determination.

The species was described by Boheman in 1845 (Schönherr, Gen. et sp. Curc. vol. 8, pt. 2, p. 443) under the name *Heilipus lauri*, stating that it was found in the fruit of *Laurus drymifolia*.[1]

In the Biologia Centrali-Americana Champion mentions two specimens of this weevil from Capulalpam, Mexico, in

[1]Having been much confused by the different names assigned to the Aguacate and thinking several species might be involved, it may be well to explain that this name is now considered a synonym of what Small calls *Persea persea* (L.) Ckll. and equals, as far as I can learn, *Laurus persea* Linn., *Persea gratissima* Gaertn., and *Persea americana* Mill., but is a distinct species from the recently described *Persea pittieri* Mez.

the Sallé collection. Two other specimens are in the U. S. National Museum collection, one of which was found on an aguacate at Ontario, California, November 22, 1911, by Mr. S. A. Pease, while the other was found in an aguacate seed in St. Louis, Missouri, by Mr. Clay E. Jordan.

Subsequent to the presentation of this note, further observations were made which would best be added.

On May 2, the greenhouse attendant found another adult in a spider web near a pot containing several avocado seeds and noticed an apparently fresh exit hole over one of them. I visited the greenhouse the following morning and tried to trace up all receipts of *Persea* seeds from which weevils might have issued. It seems only one lot was infested. This was received from a dealer in San Jose, Costa Rica, December 26, 1911, consisting of 26 seeds of *Persea pittieri*, which were then noted as being in poor condition. Five of these seeds had germinated and grown to plants from a foot to a foot and a half in height, and from the cotyledons of three of these plants weevils had issued, leaving a still very obvious exit hole in the soil close to the plant stem. These three plants were taken up and the cotyledons showed the same injury that had appeared from the other seeds, but, of course, this injury had not affected the germ. On May 23, four additional plants that had been grown at Miami, Florida, from seeds of the same lot were examined and the cotyledons showed no exit holes.

A plant grown in the local greenhouse which when examined three weeks earlier had shown no sign of infestation, now had an apparently fresh exit hole in the soil about an inch from the stem, which led down into the pupal chamber in the cotyledon. This plant seemed less robust in its growth than the others. Another adult, dismembered by ants, was found on a ledge in the greenhouse, but may have been there for weeks.

A specimen of this weevil was taken early in July at Whittier, California, in a grove of avocados about 2 years old, in the nursery of Mr. Rideout. Mr. P. H. Dorset, of the Bureau of Plant Industry, who found the weevil, believes it came from Mexican seed, but states that no seed had been planted in that part of the nursery for nearly a year.

Seven adults, two pupæ, and a larva of this species are now in the National collection. Of the adults the four that issued in the Washington greenhouse from the seed of *Persea pittieri* from Costa Rica are of a decided red ground-color, with red femora, and lack the two transverse white fascia of the elytra, while the other three are dark brown, have unicolorous legs, and display the prominent patches of white scales mentioned and figured in the Biologia Centrali-Americana.

THE AVOCADO WEEVIL (HEILIPUS LAURI BOH.).

Coupled with the different host plant, these characters may later lead to the splitting up of this species.

From these records it is quite obvious that the species may become of some economic importance to tropical horticulturalists and its transportation to other countries where the avocado is grown should be more closely guarded against. Further observations are urgently needed to determine the probable extent of its depredations. Plate IX represents a pinned adult and lateral and ventral views of the pupa.

Mr. Schwarz said that the genus *Heilipus*, with its several hundred species, naturally will have quite a variety of food habits. One species, *H. guttatus* Boh., was bred by him last year from a section of a felled tree (probably a *Ficus*) at Paraiso, Panama, and was also collected at wounds on tree trunks in Guatemala. *H. albovenosus* was found by him at Tampico, Mex. in December, 1910, on the fruit of *Nectandra sanguinea?* (as determined by Dr. Rose), which has been formerly included in the genus *Persea*, with its probable larva within the fruit. Another species, *H. elegans*, breeds under the bark of camphor trees in Jamaica, as he noted some years ago (Proc. Ent. Soc. Wash., vol. IX, 1909, p. 15). Only one species of the genus, *H. squamosus*, is native in the United States (Georgia and northern Florida). It is extremely rare in collections and its habits are still unknown, but it may be found to develop in the fruit of *Persea borbonia* (*P. carolinensis*). A genus allied to *Heilipus*, *Calvertius araucariæ*, has been described by Dr. D. Sharp (Ann. and Mag. Nat. Hist., Jan., 1891, p. 150) from Chile, where its larvæ bore in the trunks of *Araucaria imbricata*. It may be added that three other small rhynchophorid beetles have been found to live in the seeds of the avocado. One of them is a calandrid beetle, *Caulophilus latinasus* Say, found in seed of the "Trapp" variety of avocado from Miami, Florida, in November, 1909. The second is a small undescribed scolytid of which a few specimens were found in the seed of an undescribed wild species of *Persea*, discovered by Dr. Henry Pittier at Boquete, 2,100 meters altitude, on the slopes of the Volcan de Chiriqui, in Panama, in April, 1911. The third is the cosmopolitan coffee weevil, *Araœcerus fasciculatus* De G., which appeared in numbers in old seeds from Livingston, Guatemala.

## TWO NEW CALIFORNIAN ACROLOPHIDÆ.

(Lepidoptera.)

By August Busck

**Acrolophus diversus,** new species.

Labial palpi as in the abandoned genus *Neolophus* Wlsm., short, erect, reaching vertex; joints nearly equal in length, first and second slightly tufted, third smooth; dark brown, each scale tipped with ocherous. Face, head, and thorax ashy brown with ocherous scale-tips. Fore wings light ocherous brown with bluish black markings consisting of a series of equidistant costal dots, which is continued into a paler subterminal row; a large black second discal spot crossing the fold on the middle of the wing; the upper third of the wing is somewhat darker than the lower two-thirds and the entire wing is dotted with faint black transverse striations in longitudinal rows. Cilia light ocherous with equidistant black tufts. Hind wings blackish fuscous with an ocherous submarginal line. Abdomen blackish fuscous with ocherous anal tuft. Legs blackish brown with ocherous annulations on the tarsal joints; front tibiæ with long external scale tuft.

In some specimens the ornamentation on the fore wing is much less pronounced than in others and the black striation is sometimes obsolete, but the black costal dots and the two discal and plical spots persist.

Alar expanse, 27 to 28 mm.

*Habitat:* San Diego, California, July (Geo. H. Field, collector).

*Type:* No. 15122, U. S. Nat. Mus.; cotype in Mr. Field's collection.

Nearest in pattern and size as well as in the form of the palpi to *Acrolophus* (*Neolophus*) *persimplex* Dyar, from which it differs in the clearer color, more distinct pattern, and less hairy labial palpi.

**Acrolophus hirsutus,** new species.

Labial palpi as in the foregoing species, reaching vertex; ocherous, touched with dark brown. Head and thorax dark ocherous, mottled with black; thorax with short ocherous posterior tuft. Forewings ocherous, strongly suffused and mottled with dark brown and black; a faint series of terminal and costal dark dots, a black second discal spot, preceded and followed by a clear ocherous space, a short oblique plical spot, surrounded by light scales.

Hind wings dark brown with lighter base and a faint ocherous submarginal line. Abdomen dark brown above; anal tuft and under side ocherous.

Alar expanse, 20 to 22 mm.

*Hibitat:* La Puerta Valley, California, June (Geo. H. Field, collector).

*Type:* No 15123, U. S. Nat. Mus.; cotype in Mr. Field's collection.

*Actual date of issue, Sept. 30, 1912.*

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# PROCEEDINGS

OF THE

# ENTOMOLOGICAL SOCIETY

OF

# WASHINGTON.

Volume XIV, 1912.

OCTOBER -- DECEMBER, 1912.

(Meetings of April 4, 1912, to October 3, 1912.)

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# THE
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# OF WASHINGTON

ORGANIZED MARCH 12, 1884.

The regular meetings of the Society are held on the first Thursday of each month, from October to June inclusive, at 8 P. M.,

Annual dues of active members, $3.00; of corresponding members, $2.00; initiation fee (for active members only), $1.00.

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*Representing the Society as a Vice-President of the Washington Academy of Sciences* ... A. L. QUAINTANCE

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## PROCEEDINGS
## ENTOMOLOGICAL SOCIETY OF WASHINGTON.

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PROCEEDINGS

OF THE

# ENTOMOLOGICAL SOCIETY

# OF WASHINGTON.

VOL. XIV OCTOBER - DECEMBER, 1912. No. 4

## MEETING OF APRIL 4, 1912.

The 258th regular meeting of the Society was entertained by Mr. Marlatt in the Saengerbund Hall, 314 C Street NW. on the evening of April 4, 1912, and there were present Messrs. Banks, Barber, Caudell, Ely, Gahan, Howard, Knab, McAtee, Popenoe, Quaintance, Sasscer, Schwarz, Snyder, Stedman, Vickery, members, and Messrs. F. C. Craighead, J. R. Malloch, C. S. Minot, and W. B. Wood, visitors. President Quaintance occupied the chair.

The minutes of the preceding meeting and of the special meeting of March 14, 1912, were read and approved.

Mr. W. B. Wood was elected active member.

The first paper of the evening, "Description of an injurious Otiorhynchid," by F. H. Chittenden, was read by title.[1]

The second paper, "Notes on Blood-sucking and Supposedly Blood-sucking Leptidæ," by Frederick Knab, was read by the Recording Secretary.[2]

Dr. Howard remarked that this added another family of Diptera to those to be considered in connection with insect-borne diseases. He inquired whether such diversities of habits within a genus is known among the families of Diptera generally considered blood-suckers.

Mr. Knab stated that this was the case in the Culicidæ. In this group we get closely related species, some of which are

[1] Published, Proc. Ent. Soc. Wash., XIV, 106, 1912.

[2] Published, Proc. Ent. Soc. Wash., XIV, 108, 1912.

habitual blood-suckers and must have blood for the perpetuation of the species, others that are indifferent blood-suckers, and still others that do not attack warm-blooded animals at all. And this condition repeats itself in a number of genera, so that it is clear that the habit can not serve as a guide to the exact systematic position of the species. In the case of the Leptidæ the habit perhaps appears so remarkable because we know so little of the habits of the group. Mr. Knab stated that he had been unable to find anything beyond the general statement that these flies are predaceous. He asked Mr. Malloch if he knew of any exact records by European entomologists.

Mr. Malloch said that he only knew that the Leptidæ are generally considered predaceous. The fact that *Leptis* rested upon tree trunks always with its head downward suggests that it watches for prey; its very sudden flight also suggests the predaceous habit.

Mr. Schwarz said: As to *Symphoromyia*, he had observed it on the wing, evidently hunting for prey among the bushes, although he had never actually taken one with prey. Too much reliance should not be placed on the structure of the proboscis. Mr. Green, of Ceylon, had sent a muscid fly, *Ochromyia jejuna* Fab., to Professor Poulton with the statement that it had been found preying upon termites. This observation had been questioned on the ground that the mouthparts of *Ochromyia* are unfit for piercing another insect. Although the flies were seen capturing the termites, Colonel Yerbury expressed his belief that the only possibility was that the termites had been injured in some way.

Mr. Malloch stated that he had observed the female of an anthomyid fly, *Spilogaster nigrinervis* Zett., which was feeding upon another fly, *Hilara litorea* Fall.; also a female and predaceous. In spite of the apparently inadequate structure of its proboscis the *Spilogaster* devoured the abdomen and all the softer parts of its victim, leaving only a small bundle of the chitinous parts. He had also seen *Spilogaster* preying upon small neuropteroid insects and upon Homoptera.

Mr. Knab exhibited a number of species of the genus *Atherix* and expressed the opinion that they are not all con-

generic. He showed *Atherix ibis* Fab., from Europe, and *A. variegata* Walk., from the northern part of our continent, and contrasted with them *A. longipes* Bell., and three other species, all from the warmer parts of America. The four tropical species agreed in their graceful form, longer and more slender legs and a number of evident characters. Mr. Knab said that he was unwilling to propose a generic name at this time, as a number of genera had been created agreeing in general characters with *Atherix* and usually placed as synonyms of it. The status of these genera should be carefully established before creating a new one.

Mr. Banks said that he was of the opinion that the southern forms are probably a new genus, since the European and Northwestern species of *Atherix* are locally common and if they are blood-suckers the habit would have been noticed long ago.

The third paper, "A New Genus and Species of Gryllidæ from Texas," by A. N. Caudell, was read by title.

## A NEW GENUS AND SPECIES OF GRYLLIDÆ FROM TEXAS.

By A. N. Caudell.

### TRIGONIDOMIMUS n. gen.

*Description* (Female, the male unknown).—This genus belongs to the subfamily Gryllinæ, but bears a strong superficial resemblance to *Cyrtoxipha* and related genera of small crickets of the subfamily Trigonidiinæ. The second segment of the tarsi is minute, not at all depressed or cordiform. Hind tibiæ more slender than usual in the subfamily Gryllinæ and armed above on the outer half with three spurs on each margin and on the basal part there are a few serrations, small but distinct when viewed through a hand lens. There are five apical calcaria, two ventral ones subequal in length and both short, scarcely as long as the tibial spines, and two longer ones on the inner side and one on the outer. On the inner side the middle calcar is about three times as long as the ventral one and the upper one a fourth longer than the middle. The second outer calcar is fully as long again as the ventral one. Metatarsus of hind tarsi rounded above, armed only with hairs, as are also the hind tibiæ between the spurs and serrations. Fore tibiæ furnished with foramina only on the anterior face. Head large and rounded, broader than the pronotum, the front convex; eyes very small and but little prominent. Antennæ inserted

immediately beneath the eyes, distinctly nearer the clypeal suture than to the top of the head. Apical segment of the palpi moderately enlarged apically and triangular in shape as common in many gryllid genera. Ovipositor approximately equaling the hind femora in length and almost straight.

*Type: Trigonidomimus belfragei,* new species.

**Trigonidomimus belfragei,** new species.

Head large; eyes small, broadly oval, and set far apart. Pronotum nearly quadrate, narrower than the head or the width across the base of the elytra. Elytra shorter than the abdomen, about three times as long as the pronotum; wings caudate, extending half their length beyond the tip of the abdomen. Anal cerci very long. Legs moderately slender, hind femora moderately swollen and tapering to the very tip, the hind tibiæ slender.

General color brownish yellow, the tip of the ovipositor and the eyes and the base of the antennæ blackish; the legs are clear honey yellow and the elytra are darker. The antennæ grow paler towards the tip.

Length, antennæ, 15+ mm.; pronotum, 1.25 mm.; elytra, 3.75 mm.; wings, 11 mm.; hind femora, 4.75 mm.; ovipositor, 4.5 mm.; anal cerci, 5.5 mm.; width, pronotum, 1.5 mm.

Two females, Texas, Belfrage.

*Type:* Coll. Museum of Comparative Zoology, Cambridge, Mass.; *paratype,* U. S. National Museum, Washington, D. C. (Cat. No. 15389). The type bears the following written label: "59 Quite rare specimens, coming to light at night Sept.-Oct."

At the conclusion of his paper, Mr. Caudell said he did not quite understand the significance of No ."59" which appeared on Belfrage's label.

Mr. Schwarz explained that Mr. Belfrage had the habit of numbering those species of each order which he collected himself in Texas and to distribute them always under the same number among his numerous correspondents and customers in the United States and in Europe, so that should these numbers be preserved it would add considerably to the identification of his specimens. Among the orthopterists in Europe he had a good customer in Professor Stal in Stockholm. Belfrage collected only at two points in Bosque County, Texas, viz, Waco and Clifton, although in his letters he constantly speaks of proposed trips to other parts of the State. At the instance of Dr. Le Conte he commenced about the year 1875 to write up a list of the insects collected in Bosque County.

As far as Mr. Schwarz recollects, only the list of the Coleoptera was ever finished, and he has seen this manuscript in the possession of Dr. Le Conte in the year 1878. However, it has never been published and the manuscript is probably still in the possession of Mrs. Le Conte. A small fraction of a copy of this list of Coleoptera in the handwriting of Belfrage, including the Carabidæ and Dytiscidæ, is still in the possession of Mr. Schwarz. Belfrage was not in the habit of labeling the specimens he sent to his correspondents; his peculiar and neat way of pinning and mounting render the specimens collected by him easily recognizable. Of the numerous letters Belfrage received from his correspondents from all over the world many are preserved in the National Museum. An obituary note on Mr. Belfrage will be found in the American Naturalist, 1883, p. 424.

—The fourth paper was "Notes on Some Nearctic Mantispidæ," by Nathan Banks.[1]

In connection with his remarks, Mr. Banks exhibited a new genus of Mantispidæ from Australia which appears in three striking color varieties. He also showed specimens of a new thynnid wasp, and a new genus of Scoliidæ from Arizona.

—At the conclusion of the regular papers on the programme President Quaintance called on Dr. C. S. Minot, of Cambridge, Mass., who responded with a few remarks on the early New England entomologists and related some very amusing anecdotes regarding Dr. Hagen.

—Under Notes and Exhibition of Specimens Mr. Banks exhibited a bottle of insects taken from a freshly painted house and suggested that there was something in the color as well as the odor that attracted them to it.

Mr. Barber stated as his opinion that the so-called attraction of painted surfaces is exaggerated. A more logical explanation in most cases would give greater importance to the temporary alighting and immediate continuance of flight in the seasonal swarmings of many insects caught on adhesive surfaces. Different species behave differently; with some insects the odor of paint will be attractive and with others repulsive.

[1] Published Proc. Ent. Soc. Wash., XIV, 178, 1912.

Pine-infesting scolitids and other insects are probably attracted by the odor of paint, while other insects not instinctively associated with turpentine odor are undoubtedly repelled. A common *Pityophthorus* was flying in great numbers along a woodland creek but did not appear to alight on his clothing. When, however, he stripped for a swim, he was greatly annoyed by their alighting and crawling, apparently due to the attraction of the light color.

Mr. Schwarz said that in his experience insects are not only attracted by light surfaces, but also by dark-colored ones if they are of sufficient size. He cited the north side of the old Department of Agriculture building, where in former years large numbers of specimens of various orders could always be found on each morning at the proper season.

Mr. Knab stated as his opinion that the reason for the common habit of many insects flying against white objects may perhaps be explained in that with their defective sight such objects are mistaken for open spaces—for example the openings among trees or other objects.

Mr. Schwarz related that in the month of March of the present year, while on the island of Key West, Florida, he had the experience of being stung by the big black scorpion *Centrurus gracilis* Latr., which is so common in tropical Florida. He was stung at the base of his right thumb and for some minutes the pain was most intense. No swelling followed, but the thumb as well as the whole hand was paralyzed for the rest of the day, the accident having happened about 11 o'clock in the morning. A dull pain extended from the hand nearly to the elbow, but did not prevent him from having good sleep. On the morning of the next day the pain had greatly lessened, but still he was hardly able to hold a pen for letter-writing, but there was no swelling of any extent and by evening the pain and paralyzed feeling had greatly subsided. On the third day hardly any effect of the sting was felt. No remedial measures whatever were applied. This scorpion feeds largely upon longicorn beetles, crickets, and roaches, which are so commonly found under bark of dead trees. In former years

he had found at Miami a female of this species with 26 young on her back.

Mr. Banks said that this species was one of our longest and was found from Florida to South America, in many places common. He referred to the poisonous scorpion of Durango, a species of *Vejovis*, of which Mr. Schwarz had received additional evidence of its poisonous qualities.

Mr. Schwarz added that a few years ago he was in company with Mr. F. C. Bishopp at Durango City, where upon their first arrival they were treated by the inhabitants with many accounts of the deadly nature of the "alacron" (*Vejovis* sp.). Hunting within the city produced only specimens of a common scorpion which is certainly not of a severely poisonous nature, and the accounts given by the natives were so contradictory that manifestly no reliance could be placed upon them. Information from more reliable sources elucidated the fact that the home of the real poisonous scorpion is the slope of the plateau towards the Pacific side, known as the Sierra de Durango, about 15 or 20 miles west of the city. This is a timbered country, whereas the city of Durango is situated on the bare plateau. It is from the Sierra de Durango that the specimens sent to Mr. Banks were collected. Mr. Schwarz added that while in Key West he met a most intelligent American who had resided for several years in the Sierra de Durango and who fully corroborated the former accounts of the severely poisonous nature of the "alacron."

In connection with scorpions, Mr. Schwarz said many people passing through Yuma, Arizona, have no doubt witnessed the performance of the Yuma Indians who come to the station at train-time, holding the big yellow scorpion, so common in that region, by the tail end and allowing the animal to crawl up their bare arms. The scorpions are offered for sale to the passengers, who usually pay liberally to be excused.

Mr. Quaintance exhibited specimens of an interesting aleyrodid received from Dr. C. W. Hooker, collected by him in Porto Rico, December 15, 1911. This species had recently been described by Dr. G. Leonardi in Bollettino del Labora-

torio di Zoologia generale e agraria della R. Scuola superiore d'Agricoltura in Portici, vol. IV. The insect is remarkable by reason of the long curling wax threads secreted by the pupa, of which there are only two pairs. The species falls in a new genus, as set forth in a forthcoming paper on the classification of the Aleyrodidæ by Messrs. Quaintance and Baker.

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## Meeting of May 2, 1912.

The 259th regular meeting of the Society was entertained by the bachelors in the Saengerbund Hall, 314 C Street NW. on the evening of May 2, 1912, and there were present Messrs. Barber, Caudell, Ely, Heidemann, Knab, McAtee, Quaintance, Rohwer, Russell, Sasscer, Schwarz, Vickery, Viereck, and Walton, members, and Messrs. J. R. Malloch, William Middleton, J. R. Strauss, and R. Wooldridge, visitors. President Quaintance occupied the chair.

Mr. Rohwer read a letter from Mrs. J. B. Smith, expressing her deep appreciation for the action of the Society in calling a special meeting on March 14, 1912, for the purpose of drawing up resolutions in recognition of the work of the late Dr. John B. Smith.

Mr. Schwarz brought up the question of a meeting in June and on a vote of the Society it was decided that such a meeting should take place.

Mr. Rohwer suggested that the Society take some action in electing a representative at the meeting at Oxford this summer, and after some discussion the matter was laid on the table until the next meeting.

At this juncture the question arose as to whether the Society should publish a biography of the late Dr. John B. Smith, and it was moved and seconded that Dr. Howard and Mr. Schwarz should draw up such a biography to be published by the Society.

The first paper of the evening was by H. L. Viereck, on "Entomology at the Centenary of the Academy of Natural Sciences of Philadelphia."

The second paper was by O. Heidemann, on "New North American Species of Tingitidæ."[1]

Under "Notes on Nearctic Orthoptera" Mr. Caudell spoke of a catalogue of the Orthoptera of Nearctic America which he has in course of preparation. Following his comments he presented a paper by T. D. A. Cockerell on "A New Genus of Orthoptera from Guatemala."

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## ENTOMOLOGY AT THE CENTENARY OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

By Henry Lorenz Viereck.

At the one hundredth anniversary of the Academy the whole field of the natural sciences was fittingly represented. If any one branch of science paid more homage or received more recognition than another on this memorial occasion, then that honor belongs to entomology, for from the beginning until the end of the proceedings the great achievements of the Academy and of entomology, from modest beginnings, were brought out in the addresses.

Nineteen entomologists were appointed as delegates from at least seven distinctly entomological organizations and a number of more general institutions of learning. O the entomologist delegates Prof. P. P. Calvert, Prof. J. H. Comstock, Mr. E. T. Cresson, Prof. S. A. Forbes, Mr. Samuel Henshaw, Dr. W. J. Holland, Dr. L. O. Howard, Mr. C. W. Johnson, Dr. Henry Skinner, Mr. H. L. Viereck, and Prof. F. M. Webster were present at the celebration, which covered a period of three days or from March 19 to March 21.

The entomological organizations represented were the American Entomological Society, the Association of Economic Entomologists, Société Entomologique de France, the Entomological Society of America, the Entomological Society of London, the Entomological Society of Ontario, and the Entomological Society of Washington.

The entomological papers read were by Dr. Henry Skinner on "Mimicry in Butterflies," and Mr. James A. G. Rehn on "The Orthopteran Inhabitants of the Sonoran Creosote Bush."

The splendid entomological resources of the Academy were shown to the interested, who were also introduced to the new entomological quarters just nearing completion.

In the address of the president at the opening exercises such entomological pioneers as Thomas Say, Titian R. Peale,

[1]To be published later.

Thomas B. Wilson, J. L. Le Conte, George H. Horn, Henry C. McCook, E. T. Cresson, and others were mentioned as the builders to whom we owe the entomological foundation laid down at the Academy. To quote, the president then said: "The knowledge gathered by the abstract naturalist and the tabulation of scientific data concerning all forms of animal and vegetable life have a very close and direct relation to public health and preventive medicine." Then he referred to such examples as yellow fever, malaria, sleeping sickness, and other diseases transmitted by insects, and pointed out what a boon it has been to humanity to know the minutest details of the life history of such creatures. To quote again, the president said: "The work of the Academy has been so distinctly pure science that the lay public have not until recently appreciated the great practical relationship it has to health and economics. The description of the various species, their life history, the geographical range, have enabled those working in applied sciences to conduct the already successful war against the enemies to man, to the lower animals, and to plant life." Then he went on to show what a great intrinsic loss to our food supply and comfort was due to the depredations of insects, quoting the latest statistics to this end.

Dr. Edward J. Nolan, the esteemed secretary of the Academy, under the title of "Reminiscences," gave interesting accounts the results of his opportunities to observe men of science, and mentioned Thomas Say as one of four men who had stood out prominently in the first century of the Academy.

The meetings, the entertainments, and every feature of this memorable centenary of one of the foremost institutions of its kind in the world were so inspiring and genial that all who attended were happy to be present.

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## RECOGNITION OF PALINDIA MERRICKI HOLLAND.

This species was described from a specimen taken flying in low herbage near New Brighton, Pennsylvania. The describer recognized that it was a stray from the tropics, but he could not locate it specifically. Recently in going over the *Palindia* in the National Museum collection, I found a series of this species under *P. egista* Bar. There were, however, two forms confused, and as Bar plainly indicates the other form as *egista* the name *merricki* will stand. Our specimens are from Venezuela. Probably the original specimen reached Pennsylvania as pupa with tropical fruit.

HARRISON G. DYAR.

## A NEW GENUS OF ORTHOPTERA FROM GUATEMALA.

By T. D. A. Cockerell, *University of Colorado.*

Among the Orthoptera recently collected by my wife at Quirigua, Guatemala, is a large *Ceuthophilus*-like species, which I could not place in any described genus known to me or referred to in the literature at my command. Thinking that it might have been described in the Biologia Centrali Americana, I sent a brief account of it, with sketches, to Professor L. Bruner, who kindly writes me that he finds no such insect described, adding: "Undoubtedly your insect is new, and comes near *Glaphyrosoma.*"

### MAYACRIS gen. nov. (STENOPELMATINÆ).

*Female.*—A large insect, with the general form and color of *Ceuthophilus,* entirely apterous; feet with pulvilli; hind tibiæ on upper side with two rows of short spines, all of the same type or grade. Head oblong, not wider than thorax; eyes elongate, twice as long as broad; ocelli represented by large oval chalky-white patches, one on the prominence between the antennæ, the others on each side of the broad flattened frontal prominence; vertex not tuberculate; clypeus much narrowed below, the lower half strongly longitudinally sulcate in middle; labrum large, broad-oval not in the least emarginate, with scattered hairs; mandibles with strong apical teeth; third joint of labial palpi as long as the other two together; maxillary palpi with joints 2 to 4 greatly elongated, the fifth flattened and spoon-like; antennæ more than twice as long as body; prothorax large, smooth, its lateral inferior margins nearly straight; anterior coxæ with a strong but short spine; anterior tibiæ with a sulcus on each side, at the upper end of which is a rounded pallid foramen-like depression (wholly unlike the foramina of the Decticinæ, however); femora wholly unarmed; anterior tibiæ with two rows of five spines each on lower side, the last three of each row crowded toward the apex; there is also an apical spine on inner side; middle tibiæ with the same ten interior spines, and also six superior ones, in two rows, the last of each row apical; hind tibiæ with two rows of ten short spines above, none apical, no spines below except at apex; apex of hind tibiæ with two very large spines (about as long as first joint of tarsus) on inner side and two not so large on outer, and in addition two pairs of spines beneath, the most apical pair larger and close together at base; first three tarsal joints strongly sulcate or excavated beneath, and variously produced at apex, but not in the least spinose; the tarsal joints are only moderately compressed; ovipositor very short, compressed, gently curved upwards.

**Mayacris bruneri,** sp. nov.

*Female.*—Body smooth and shining, about 26 mm. long, dark purplish brown above, very pale yellowish beneath; frontal prominence dark pur-

plish, invaded from behind by two lobes of pale ochreous color; clypeus pallid with two suffused brownish patches; maxillary palpi about 15.5 mm. long; cerci about 5 mm.; ovipositor slightly over 4 mm. in length; anterior femora 9 mm., their tibiæ 9.5; hind femora shining, pale purplish-brown, 22 mm. long, the greatest depth not quite 6 mm.; hind tibiæ 20 mm., dusky at base, pallid apically; hind tarsi a little over 7 mm.; third antennal joint longer than the next two combined.

*Habitat:* Quirigua, in the tropical lowlands of Guatemala, February, 1912 (W. P. Cockerell). The generic name is derived from the Mayas, who in ancient times erected splendid temples and monuments at Quirigua. The species is dedicated to Professor Bruner, who has done so much to make us acquainted with the Orthoptera of Central America.

*Type:* Unique female, Cat. 14799, U. S. National Museum

This insect bears a superficial resemblance to certain members of the Rhaphidophorinæ, but its structure shows it to belong to the Stenopelmatinæ.

I take this opportunity to record a few other Orthoptera collected by Mrs. Cockerell at Quirigua, and kindly determined by Mr. A. N. Caudell: *Neolobophora ruficeps* Burm., *Homeogamia mexicana* Burm., *Periplaneta australasiæ* Fabr., *Stagmomantis fraterna* S. & Z., *Harpagonyx maya* S. & Z., *Heteronemia incongruens* Brunn., *Arnilia marschalli* Bruner, *Xiphidion mexicanum* Sauss., and *Amphiacusta azteca* Sauss.

Mr. Caudell said that except for a character not mentioned in Professor Cockerell's description, i. e., the absence of apical spines above on both margins of the hind tibiæ, he would be inclined to consider the above genus inseparable from *Glaphyrosoma*.

—Under Notes and Exhibition of Specimens, Mr. Caudell spoke of the great numbers of insects found on snowbanks in high altitudes. He mentioned particularly observations made in July on Pikes Peak, when hundreds of insects, mostly ones ascended from lower altitudes by flight or ascending currents of air, were seen on snow. He reasoned that these snow-fields caught the ill-seeing eyes of the insects, and attracted them, otherwise some few would most certainly have been found on the grass or stones in the vicinity. But only one small beetle, a native of high altitudes, was found in any numbers anywhere except on the snow-fields.

—Mr. Caudell spoke briefly on the desirability of miscellaneous observations being published. He pointed out that even

the most fragmentary notes made and published by different observers on the habits and development of insects often accumulate into more or less complete life histories. Care should be taken to not duplicate published articles along these lines, but the republication of known facts is not necessarily to be decried, as such often serves as a check on the results as published by others.

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## Meeting of June 6, 1912.

The 260th regular meeting of the Society was entertained by the married members at the Saengerbund Hall, 314 C Street NW., on the evening of June 6, 1912, and there were present Messrs. Cory, Cushman, Ely, Gahan, Heidemann, Knab, Myers, Quaintance, Rohwer, Sasscer, Schwarz, Snyder, and Wood, members, and Messrs. F. C. Green, Fritz Johansen, and J. R. Malloch, visitors. President Quaintance occupied the chair.

The minutes of the preceding meeting were read and approved.

The name of Reginald Wooldridge was proposed for active membership and in accordance with the rules laid over until the next meeting.

Under unfinished business Mr. Rohwer brought up the question of a delegate to the Oxford meeting, and after some discussion it was moved and seconded that the matter be referred to the Executive Committee with power to act.

Mr. Schwarz gave a brief report as a member of the committee to draw up a biography of the late John B. Smith, and Mr. Rohwer moved that the committee be relieved. Seconded by Mr. Gahan, and carried.

The first paper of the evening was "A New Tachinid from Porto Rico," by W. R. Walton, and in the absence of the author is was read by Mr. Rohwer.

## A NEW SPECIES OF TACHINIDÆ FROM PORTO RICO.

(Plate X.)

By W. R. Walton.

The tachinid parasites on the adult beetles of the genus *Lachnosterna* so far as recorded seem to be confined to two genera, namely, *Cryptomeigenia* B. & B., and *Eutrixa* Coq. Although the above-named genera have been widely dissociated in all the tables classifying the family, they are not dissimilar in general appearance, though varying in size, and may well be much more closely allied than has generally been acknowledged. But two species, belonging to each of the genera before mentioned, have hitherto been recorded as b ing parasitic on the adults of *Lachnosterna*, the habits of the remainder of the species included being as yet unknown to science. The hitherto known are *Eutrixa exile* Coq., and *Cryptomeigenia theutis* Walker, the host of which is mentioned below. One other North American species, namely, *Microphtalma disjuncta* Wied., is known as a larval parasite of "May beetles." This was reared from a larval skin of *Lachnosterna arcuata* by Mr. Theo. Pergande, October 5, 1891. *Microphthalma* occurs also in Europe, where it will probably be found to parasitize the larva of *Melolontha*.

The genus *Cryptomeigenia* was erected by Brauer and Bergenstamm[1] in 1891 from a single male specimen collected in Brazil and which they called *setifacies;* although Walker[2] had previously described a species, namely, *theutis*, under the old genus *Tachina;* it was evidently overlooked by the authors of the genus. The late Mr. D. W. Coquillett was, it seems, the first person to recognize this species as being congeneric with *setifacies* B. & B., and we find it referred to its proper place in his indispensable "Revision of the North American Tachinidæ." Brauer and Bergenstamm's description of *Cryptomeigenia setifacies* is in a large degree unsatisfactory because of its lack of specific detail, but since it disagrees in some important particulars with several specimens in hand, and as it is impossible for the author to see the type, a new species is herewith proposed for their reception, which is called *aurifacies*. This is obviously distinct from *theutis* of Walker, which is known as a parasite of *Lachnosterna* in the northern United States, having been reared from an adult of *Lachnosterna inversa* Horn, by Mr. Theodore Pergande, at Washington, D. C., in 1892.

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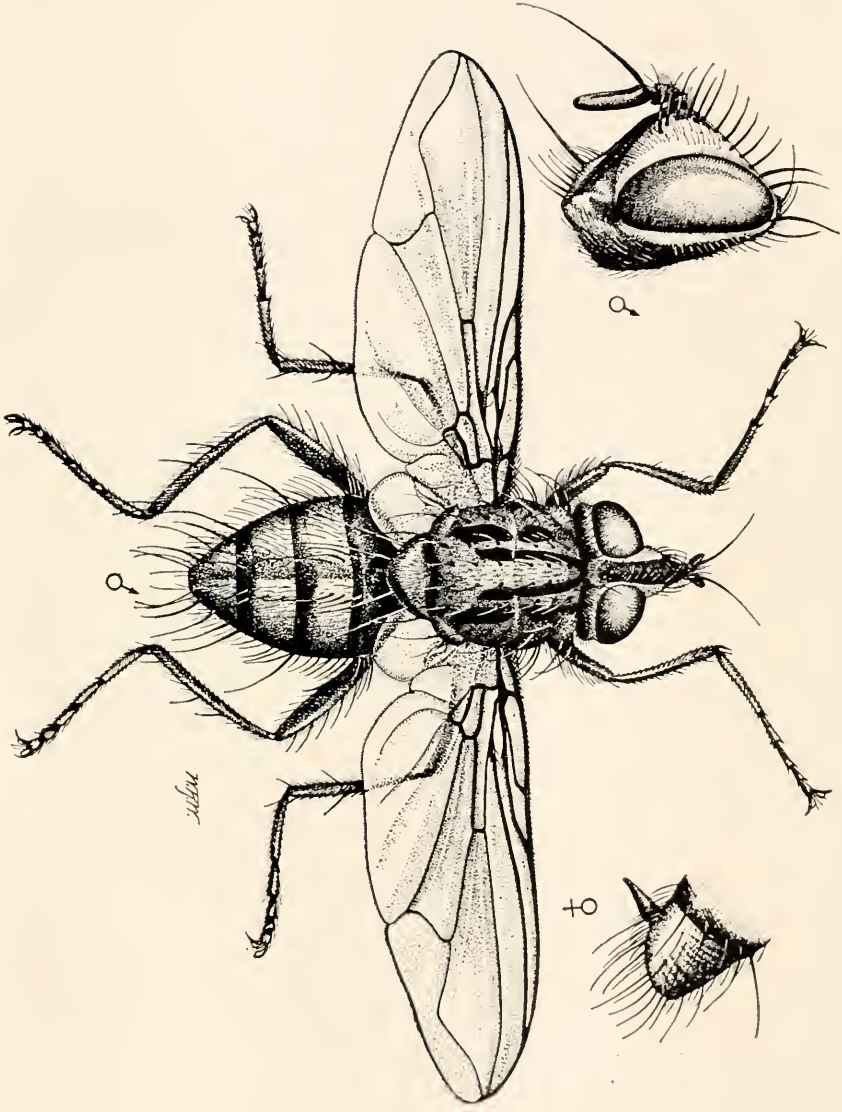
[1] Zweiflüg. des Kaiser. Mus., v, 331, 1891. [2] List, iv, 228.



A NEW SPECIES OF TACHINIDAE.

Synopsis of Genus Cryptomeigenia B. & B.

1. Dorsal vittæ of thorax distinct velvety black ..... 2
   Dorsal vittæ of thorax indistinct brownish, pollen of front and face gray ..... *theutis*, Walk.
2. Legs except tarsi yellow. Second and fourth longitudinal veins yellowish ..... *setifacies* B. & B.
   Legs black, wing veins black, front and sides of face golden yellow ..... *aurifacies* n. sp.

**Cryptomeigenia aurifacies,** new species.

Length 3 to 10 mm. Eyes apparently bare, but microscopically haired, frontal vitta opaque, dark brown, somewhat lighter approaching root of antennæ; sides of front golden yellow pollinose extending narrowly upward around sides of ocellar triangle and connecting with the posterior orbits, which are also yellow pollinose. Sides of face golden yellow pollinose, barely connecting beneath the eyes with the yellow of posterior orbit. Anterior two-thirds of parafacials with fine, black, bristly hairs. Facial ridges when viewed from side, brown and haired on lower one-fourth only. Cheeks, facial depression, and epistoma grayish pollinose. First two segments of antennæ reddish and abundantly haired on upper surfaces, third joint slender, gently rounded at tip, black. Arista about twice the length of third joint, thickened on basal one-fourth, microscopically pubescent for a little more than one-half its length, black.

Thorax, pleuræ, and pectus, including coxæ, grayish pollinose, slightly yellowish gray at humeri and in supra-alar region. Thoracic vittæ four, velvety black; the inner pair slender anteriorly, entire, thickened posteriorly beyond the suture, ceasing about midway between suture and anterior edge of scutellum, the outer abruptly thickened anteriorly and interrupted at suture extending backward to a point immediately above center of postalar callus.[1] Post-dorso-central bristles three, sternopleural bristles three, the lowest of which is in the male often quite weak. Scutellum with two marginal and a long apical pair and many rather coarse hairs on the disk. Abdomen somewhat conical, silvery-gray pollinose; when viewed from the rear the posterior margins of segments 1 to 3 broadly, and a narrow median vitta, slightly shining, black. Fourth segment almost entirely gray pollinose. Segments, 1 with marginal and 2, 3, and 4 with discal and marginal macrochætæ. Tip of ovipositor in female exserted, acute, and pointing forward.

Wings hyaline, veins black; posterior cross-vein sinuous.

Squamæ translucent, yellowish white. Trochanters and extreme apices of femora reddish, remainder of legs and tarsi black.

[1] In viewing marking of thorax and abdomen in Tachinidæ one should always look at them from the rear at a vertical angle of about 45°, the markings appearing most intense at this angle.

*Habitat:* Porto Rico.

Described from six specimens, male and female, reared from the "sugar cane May-beetle"[1] by D. L. Van Dine, collected April 29, 1912 at Anasco, Porto Rico.

*Type:* Deposited in U. S. National Museum, Washington, D. C.

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Under Notes and Exhibition of Specimens Mr. Rohwer mentioned having bred the fly *Dasyllis thoracica* from the galleries of a scarabæid beetle in chestnut. This may establish a parasitism for this fly, which collectors have often found flying around old stumps infested by beetle larvæ.

In answering Professor Quaintance's query in regard to the important parasites of *Lachnosterna* larvæ, Mr. Rohwer stated that the people in Porto Rico were working more with the hymenopterous parasites than they were with the dipterous. They have bred one species belonging to *Campsomeris* and are trying to introduce a species of *Tiphia* from the middle United States with the hope that this species will work effectively as a parasite to the *Lachnosterna* larvæ in Porto Rico. Professor Froggatt, of Australia, has bred a species of *Scolia* from the larvæ of white grubs in Australia and has carefully described and figured these parasites of white-grub larvæ. Mr. Rohwer stated that he was of the opinion that the people of Porto Rico could do better if they worked more extensively on the species belonging to family Scoliidæ and did not endeavor to introduce North American *Tiphia*, as it is doubtful if the species *Tiphia* will acclimatize themselves to Porto Rico. He also stated that most of the North American species of *Tiphia* which live in the eastern United States have been considered to be *Tiphia inornata*, but that there are really many forms which belong to this specific group and that the species of the Middle West, in the main, are different from the species of the Atlantic Coast. Judging from the diverse species it is impractical to endeavor to introduce *Tiphia inornata* into Porto Rico. As most of the species which belong to this group

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[1] Mr. E. A. Schwarz says that this is in all probability *Lachnosterna crenatocollis* Blanchard.

of families in Porto Rico are of the family Scoliidæ, it would be much better to endeavor to work with these rather than with the species of the family Tiphiidæ.

—Under a discussion of geographical distribution Mr. Knab remarked that Diptera as a whole are not as widely distributed as is generally supposed, but when carefully studied are found in most cases to be equally restricted in habitat with other insects not so well equipped for locomotion. Most of the species that show an exceptionally wide distribution are such as are favored by human activities. Aside from these the supposed wide distribution is based largely on inexact identification, similar species in different areas being confused. It will, accordingly, be found that the more obscure species, and the groups least understood, show the widest distribution. Another factor to be guarded against is errors in labeling. These are particularly to be guarded against in the collections of the older entomologists, who cared little for exact data of this kind and often did not affix locality labels to their specimens. Thus the labels on some of the older material in the National Museum collection are obviously wrong and in some cases have gone on record. Some striking cases have turned up among the material from the collection of the late Mr. Coquillett. His collection consisted largely of material collected by himself in northern Illinois and around Los Angeles, California. The collection came to the Museum unlabeled and was afterwards labeled by an assistant. It was inevitable that errors should occur. A striking case is *Psorophora ciliata*, which was recorded by Dr. Dyar from Los Angeles on the strength of a specimen from the Coquillett collection. The species has not been found in California by anyone else, nor at points farther west than Texas, and Mr. Knab said that he was convinced that the species does not occur in California. Mr. Knab said that he believed that we have another case of this kind in *Simulium bracteatum* Coquillett, the types of which are labeled "Cambridge, Mass." and "Los Angeles Co., Cal." Specimens from other eastern localities have since been turned up, but none from California, and the latter record is to be looked upon with suspicion.

Mr. Malloch said: There are certain causes which limit the geographical distribution of an insect, and one of the principal factors in the limitation of phytophagus species is the range of the food plant. Although the species may not necessarily occur everywhere its food plant does, it does not occur where the plant does not, unless in certain cases where there may be closely allied plants upon which it may feed. This principally applies to Trypetidæ. In the case of species feeding on carrion or decaying vegetation the distribution is not governed by the occurrence of their food, but by climatic and other factors. Of the 29 British species of *Fannia*, an anthomyid genus of habits last referred to, he took 23 species within a radius of 5 miles in Scotland, and of these 16 occur in North America, which is a much larger proportion than is the rule in other groups, and particularly in the phytophagus genera.

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## Meeting of October 3, 1912.

The 261st regular meeting of the Entomological Society of Washington was entertained by Mr. Schwarz at the Saengerbund Hall, 314 C Street NW., on the evening of October 3. Present, Messrs. Barber, Busck, Caudell, Corey, Cushman, Dyar, Gahan, Gill, Heidemann, Hopkins, Myers, Popenoe, Quaintance, Rohwer, Schwarz, Stedman, Symons, and Walton, members, and Messrs. J. D. Hood, W. Middleton, J. B. Parker, and R. C. Shannon, visitors.

President Quaintance occupied the chair, and in the absence of Mr. Sasscer, Mr. Busck was asked to act as Recording Secretary pro tem.

The minutes of the preceding meeting were read and approved.

Mr. Caudell proposed the name of Mr. J. D. Hood, Mr. Rohwer the names of Messrs. F. Johansen and W. Middleton, Dr. Hopkins the name of Mr. C. T. Green, and Mr. Busck the name of Mr. Carl Heinrich, for active membership. These names were laid over according to the rules.

The President informed the Society that Mr. R. Wooldridge, whose name had been proposed at the last meeting, had asked

to have his name withdrawn on account of his unexpected removal from Washington, and in view of this his name was not voted on.

The first paper, "Notes on Nearctic Orthoptera. I. Non-saltatorial Forms," was read by the author, Mr. A. N. Caudell.[1]

Discussing Mr. Caudell's paper, Mr. Schwarz asked how the number of species of Phasmidæ in arid regions compares with the species from the more humid regions. Mr. Caudell replied that it was his impression that the species recorded from arid regions are somewhat less than those from more humid areas.

Professor Quaintance asked how many cave species occur in the Orthoptera. Mr. Caudell answered that aside from the species of the genus *Hadenœcus*, which are mostly confined to caves, there are few of our species peculiar to caves.

Professor Symons asked what the distribution of *Diapheromera femorata* is. Mr. Caudell stated that it occurs all over the north and south into Texas, where it is replaced by *D. velli*, which, however, ranges north as far as New York.

Mr. Busck remarked that he was glad to note that Mr. Caudell had united genera and subgenera, which differed only in secondary sexual characters, and the generic value of such characters was discussed at some length.

Mr. Caudell said that it is his opinion that genera based only on secondary sexual characters should not stand, but so far he has not carried this out radically.

Mr. Schwarz remarked that in Coleoptera the secondary characters situated in close proximity to the primary sexual characters have been and still are successfully used as generic characters; the more remotely they are situated from the primary sexual characters, the more they lose their value as generic characters, without, however, losing their value as one of our best means of distinguishing species.

Mr. Barber asked Mr. Busck what constitutes a secondary sexual character, to which Mr. Busck responded that he con-

[1]To be published in the Proceedings of the United States National Museum.

siders any difference between the sexes outside of the primary sexual characters to be such. Mr. Barber then asked what one was to do in such groups as the Strepsiptera and the coleopterous group Phengodini, in which there is not a single structure common to the opposite sexes.

Dr. Hopkins interpreted secondary sexual characters as those external characters which are peculiar to either sex and finds that the combination of these characters on both sexes of the same species serve as good generic characters.

Mr. Knab said that in the Diptera he considered the employment of secondary sexual characters objectionable. These are often misleading; as similar modifications may rise independently at different points they can not be relied upon as indications of relationship.

Mr. Walton said that in the Tachinidæ the late Mr. Coquillett quite successfully and wisely avoided the use of secondary sexual characters in the delineation of his genera. On the other hand, Mr. C. H. T. Townsend has made very general use of these characters in erecting genera, even when the genotype happened to be a unique. The genus *Eunyomma* Townsend was erected on a unique male solely because of the fact that this specimen possessed hairy eyes. This genus was split off from *Myiophasia* B. & B. In a series of 24 specimens of *Myiophasia ænea* Wied. reared as parasites of *Chalcodermus æneus* Boh. by G. G. Ainslie, of the United States Bureau of Entomology, at Clemson College, South Carolina, the males have hairy eyes and the eyes of the female are bare. The amount of pilosity of the male eye varies from a few scattered hairs to the densely hairy form. Notwithstanding this, Mr. Townsend persists in declaring that "the genus may be distinguished from both *Myiophasia* and *Phasioclista* by its thickly hairy eyes." From the above-mentioned facts, however, it will be seen that this hairiness is extremely variable, and at best is a secondary sexual character, and as such, in Mr. Walton's opinion, should not be used as a primary character for the erection of a genus in Tachinidæ.

Dr. Gill remarked that supplementary sexual characters developed independently of the real sex organs are used to a

large extent in mammals and in birds; they are sometimes developed in a remarkable manner, as in the birds of paradise, of which some 20 or 30 species in nearly as many genera are distinguished and recognized by all ornithologists entirely on these accessory characters, such as peculiar feathers on the forehead, tail, or elsewhere, found in the male, while the female is quite ordinary. Dr. Gill said that if such a male were divested of its feathers it could not be recognized generically.

—Dr. Hopkins spoke of a minute scolytid beetle from the Philippines, in which the tibia of the male is very broad and carries very long, branched, featherlike hairs and a long spine, neither of which is found in the female.

—Dr. Dyar showed a copy of "Moths of the Limberlost," by Gene Stratton Porter (pub., Doubleday, Page & Co., 1912). This is a book intended for "nature lovers," not for students or even beginners. It gives a general account of the appearance and habits of some of our larger moths and of the doings of the author and members of her family in relation to these moths, all very entertainingly told. The author herself has apparently been very unfortunate in her use of books. Harris's "Insects Injurious to Vegetation," which would probably have been her best guide, she seems never to have heard of. She searched in vain through Holland's "Moth Book" and Packard's "Guide to the Study of Insects" for details of the life histories of two species of *Catocala* that came under her notice. The authors of these works, as well as other entomologists, receive scant courtesy at her hands, which seems scarcely edifying and somewhat detracts from the tone of the book. The two species of *Catocala* referred to above, *C. amatrix* Hubn. and *C. neogama* S. & A., are well-known inhabitants of the cottonwood and hickory, respectively, overwintering in the egg state in crevices of the bark after the manner of other species of the genus. Is it a fact that these well-known details of the histories of our moths are so buried in the literature that one comparatively unacquainted therewith can not find them out? We scarcely think so, but attribute the failure to the author's ill fortune in selection of literature and advisors. In another place (p. 343) the author expresses the

opinion that *Citheronia regalis* is "beyond all question" of tropical origin. This is true, of course, of the genus, but the author is speaking of the species, which is confined to the United States east of the Plains, as is well known. Some little space is devoted to a discussion of the ground color of the fore wing of this species. It appears that Dr. Packard described it as olive green, whereas Mrs. Porter insists that it is gray, and she wonders who is color-blind. As a matter of fact, the lady is right—it is gray; but the optical effect of the contrast of the red veins on the neutral gray ground gives the effect of the complementary color, green, so that the general impression is of an olive-gray wing. This is the impression I had carried of the species myself, and in a way justifies Dr. Packard's description. Many interesting photographs from life are found in the book and several colored plates, reproduced from paintings by the author, in which she has tried to represent exactly the colors at their best, sometimes somewhat to the detriment of the markings.

—Dr. Dyar also showed a copy of "Elementary Entomology" by E. D. Sanderson and C. F. Jackson (pub. Ginn & Co.).

—Mr. Caudell stated that Señor Federico Mejia, minister from Salvador, brought to his office yesterday for identification and information an adult pair of a locust which threatens to become, if indeed it is not already, a most serious pest to the coffee bean. Some weeks ago immature specimens were sent in, but the species could not be determined, though it was clear that it belonged to the genus *Cocconotus*, a genus of the subfamily Pseudophyllinæ. Mr. Caudell had not yet had an opportunity to determine the species, but the adults which he had for exhibition are very surely the same as some brought from Salvador some years ago by Mr. Knab, who stated that they were injurious to the coffee bean and leaf, according to the reports of the natives. Señor Mejia stated that these insects occur in immense numbers and cause thousands of dollars' damage. A single nip means the ruin of a coffee bean, as the place bitten turns black and makes the berry unsalable. The insect stays in the trees day and night and the remedies tried so far were the gathering by hand by

children at so much per pound and the use of turkeys, which ate the insects when shaken from the trees or such as were within their reach on the lower limbs. Some years ago he had all the banana and other trees and shrubbery cut from the coffee fields, hoping that would serve to discourage the pest. Little result seems to have followed. He now asks very earnestly what he shall do. Knowing little of the life or habits of the insect and nothing of the effect of arsenical or other sprays on the coffee tree, Mr. Caudell did not know what to advise.

Mr. Quaintance suggested that arsenical treatment might be used and Mr. Knab thought sweetened poisoned bait might be of value.

Mr. Schwarz stated that according to Señor Mejia, these Orthoptera appear at the beginning of the rainy season as unwinged specimens and acquire their wings shortly after. It appeared to Mr. Schwarz that oviposition probably is made in the twigs of a tree, as the eggs from dissected females would seem too long to be laid in the stems of weeds; this ought to be ascertained, as it has an important bearing on eventual remedial measures, whether the young specimens are found on weeds or on tall trees used universally in these regions as shade for the coffee trees.

—Mr. Walton said: I wish to announce on behalf of Mr. E. O. G. Kelly, of the Bureau of Entomology, who is now stationed at Wellington, Kansas, that he has apparently settled definitely the old argument as to whether the American members of the genus *Sarcophaga* are truly parasitic or not. During the past summer there has been a severe outbreak of *Melanoplus differentialis* and *Melanoplus bivittatus* in Kansas, which Mr. Kelly has been studying.

In the course of his observations he noticed that when the grasshoppers flew through the air certain flies apparently followed them and darted down at them while on the wing. Upon capturing some of the grasshoppers he discovered tiny maggots attached to the abdomen, watched them enter the grasshopper through the tender spaces between segments, and reared the adult flies from them. I have examined the series of adults sent me for determination, and have been able to

determine one specimen as a male of *Sarcophaga hunteri* Hough. This species happens to be structurally distinct, and, therefore, quite easily determinable. There are, however, at least three species involved in the problem, and in all probability more than three.

Mr. Knab said that the Sarcophagidæ illustrate very well how backward we are in America in some branches of Dipterology. In Europe it has long been known that certain species of Sarcophagidæ are parasitic on other insects; the facts having been established beyond all question, by competent observers. Kunkel d'Herculais, in his studies on injurious locusts (*Stauronotus maroccanus*) in Algeria, made useful investigations and found that certain species of Sarcophagidæ are important parasites of the locusts. The females of these forms have a modified ovipositor and pierce the host to introduce their larvæ, just as is the case with certain Tachinidæ. Lahille, in the Argentine Republic, has shown that certain Sarcophagidæ are parasitic there. Villeneuve has established genera on certain parasitic species. In this country Chittenden has bred a sarcophagid from a live beetle. A scarophagid has also been bred repeatedly in this country from the box-turtle, and this observation has been made so often that the insect involved must be looked upon as a true parasite of the turtle.

—Mr. Caudell presented the followingnotes on *Orchelimum pulchellum:*

On October 2, 1912, at Rosslyn, Virginia, I found near the river a bunch of *Hibiscus militaris* Can., which has very soft wood with a corky pith. The stems were literally filled with the eggs of what I am quite sure is the above species, as many of both sexes were found on the bush, though none of the females were found in the act of egg-laying; the time of oviposition, however, was not past, as I found the females still with eggs. It may have been another species that laid the eggs, but it was more likely the above species. Eggs taken from the abdomen of captured females were very like those taken from the stems. It seems, so far as I can make out from the eggs as placed in the stems studied, that from two to

a dozen eggs are laid in one puncture. The insect appears to sit facing up the stem and when but two or three eggs are laid in one puncture the ovipositor is directed only down the stem, but when several eggs are deposited some are directed towards the base of the stem and some towards the tip, showing that the ovipositor is directed towards the base of the stem part of the time and then towards the tip. I do not know whether the insect withdraws the ovipositor in changing the direction of the puncture.

The eggs are usually placed in the wood, very close under the bark in the larger stems, as shown by the specimens exhibited, but in the smaller stems they are sometimes deposited in the soft inner pith. Green stems seem preferable for purposes of oviposition, but fresh eggs are also found in dead stems.

—Upon request from the chair Professor Parker spoke of his experience with *Cuterebra* in rabbits; he had shot a half-grown rabbit in August in Knox County, Ohio, which had three infestations, one larva already dropped out, another dropped out when he lifted the rabbit up from the ground, and one larva had to be pressed out. In 1907 he had likewise seen full-grown larvæ in a rabbit not more than 2 or 3 months old, which would prove a rapid larval growth of this species, the adult of which appeared in June.

Mr. Knab mentioned that the mature larvæ are frequently received from hunters in the fall. This spring he succeeded in breeding an adult from a larva received last fall. May and June is the normal time of appearance of the fly.

Mr. Walton said he had bred *Cuterebra cuniculi* in Harrisburg, Pa., the fly appearing in June.

Mr. Caudell asked whether the larvæ occurring in rats were of the same species. Mr. Knab answered that he has not seen larvæ of this species and that he was not aware that it had been bred, but as *Cuterebra* seems to be restricted to rodents it is probable that the larvæ in rats are also *Cuterebra*. Probably different species of *Cuterebra* infest different rodents indifferently. One species, *C. emasculator*, has been described from the genitalia of a male squirrel; but he did not think that species was peculiar to the squirrel. Mr. Walton

thought that the *C. emasculator* would prove an exclusive parasite of squirrels and that this is indicated by its smaller size.

—Mr. Barber exhibited specimens of the eggs of *Cicada lyricen* and presented the following notes for publication:

## EGGS OF CICADA LYRICEN DEGEER.

By Herbert S. Barber.

The egg-laying habits of the periodical cicada are so well known to everyone that we are too apt to consider its injury as typical of the cicadas. Newell (U. S. Dept. Agr., Bur. Ent. Bull. 60. pp. 52–58) has, however, described the oviposition of a second species, *Cicada erratica* Osb., in the South, but beyond this it seems that nothing on the subject is known of our more common species.

The reference by Smith and Grossbeck (Ent. News, April, 1907, p. 118) to DeGeer's "egg-laying habit of the adult" of his *Cicada lyricen* seems unfortunate in that the eggs he mentions must belong to some other insect. From DeGeer's account (Mem. Hist. d. Insects, vol. 3, 1773, p. 215) one finds that his specimens consisted of adults and pupal skins sent him by M. le Prevots Acrelius from Pennsylvania and New Jersey, with some remarks on the song and egg-laying habit. The reference to the latter, freely translated, is as follows: ". . . the females place their eggs in the forks of the branches and these eggs, which are like white points, are confined in a sort of hard and transparent gum-like mass of the size of a hazlenut." Obviously this refers to the eggs of some other insect, but my own experience does not offer a satisfactory guess at its probable identity.

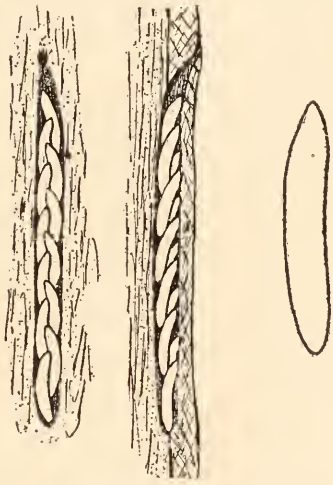

Fig. 2. Eggs of *Cicada lyricen* deGeer. Vertical and lateral view of egg-cluster in incision between wood and bark. Outline of single egg, enlarged.

A female of one of the common cicadas collected at random on Plummers Island, Maryland, was placed in a jar with a hard, dry hickory twig of about one-half inch diameter standing

upright in the sand. A few days later she was found dead, and on close examination two or three very slight indications of punctures were found in the smooth, hard bark. Many clusters of eggs were found by cutting into the bark, but in very few cases could the puncture be detected before the eggs were exposed. These punctures appear to have been closed with a mucilaginous secretion which allows the disturbed and broken fibers of the bark to swell back into their original position before drying, when they are firmly cemented together. In some instances a thin membrane like dried albumen covers the open spaces between the fibers. The incision is a cylindrical cavity 8 mm. long and less than a millimeter wide, parallel to the surface and usually in the inner bark, but often partly in the wood. One incision was found in which the eggs were within the wood itself. The eggs are laid alternately in a double row and usually number 12 or 13. The eggs measure 2.1 to 2.2 mm. in length by 0.35 mm. in width, are subcylindrical, slightly curved; one end tapers more gradually and is more evenly rounded, the other is more bluntly conical.

. The identity of the female is somewhat doubtful, but appears from comparison with specimens in the National Museum, and reference to Smith and Grossbeck's paper, to be *Cicada lyricen* DeGeer.[1]

Dr. Hopkins thought these eggs were truly those of the cicada and complimented Mr. Barber on their discovery.

—Mr. Quaintance called attention to injury to walnut leaves and shoots by the walnut curculio, *Conotrachelus juglandis*, and exhibited photographs of the injury. Specimens of injured leaves and shoots have been received the present season from Titusville, Pennsylvania, Upper Marlboro, Maryland, and Stamford, Connecticut. Dr. R. T. Morris, writing of the injury at Stamford, Connecticut, states:

Ordinarly in the vicinity of my country place at Stamford, Conn., this species has confined itself, so far as I know, to the involucre of *J. cinerea;* at least I have never noticed it except there before. When I introduced large numbers of exotic walnut trees this beetle changed its habits, finding a suitable place for depositing its eggs in the rapidly growing herbaceous shoots of the species of Juglandaceæ mentioned (*Juglans regia*, *J. siboldii*, *J. cordiformis*, *J. cinerea*, and *Hicoria minima*). It has practically wiped out one orchard of *J. regia* for me and threatens the industry

[1]This determination has very kindly been confirmed by Mr. W. T. Davis.

so seriously that we probably shall have to give up raising *J. regia* in the East unless some means for control can be found.

The larvæ infest the swollen base of the leaf-stalk and also hollow out the tender shoots. As stated by Dr. Morris, the eggs are deposited in the shoots of various walnut trees from the first week in May until September, and he has noted beetles on the trees as late as October 5.

—Mr. Quaintance exhibited specimens of a chrysomelid beetle, the grubs of which had been complained of as quite injurious to cranberries in one locality in New Jersey. The insect was determined by Mr. Schwarz to be *Rhabdopterus picipes* Oliv. The species has not heretofore been reported as of economic importance, and, in fact, but little is known as to its habits.

The larvæ were present in a cranberry bog in the neighborhood of New Egypt, New Jersey, and had destroyed the plants in small patches here and there over the bog. The injury consists in the destruction of the fibrous roots of the cranberry plant and the eating off of the bark of the larger roots. The injury is very similar to that done by the grape root worm, *Fidia viticida*, to roots of the grape.

Observations made in the cranberry marsh indicate that the beetles feed, to a certain extent at least, on the tender foliage of the cranberry plant, and it is thought possible that advantage might be taken of this fact to secure their destruction by the timely use of arsenical sprays. Beetles confined with cranberry plants in rearing cages in the insectary at Washington fed freely upon the foliage, but spent a good deal of time below the surface of the soil, where they probably oviposit, as eggs were found in the soil.

—Mr. Schwarz remarked that of the multitude of eumolpid Chrysomelidæ which inhabit America hardly anything is known of their natural history or of their range of variation. Even in North America there are genera of which we know very little, for instance the genus *Typophorus*, which includes the strawberry leaf-beetle (now known under the name of *T. canellus* Fabr.). At present all our eastern spotted or black forms are listed as varieties of one species, whereas it is almost

certain that we have several good species among them. At any rate, the form described by Say as *Colaspis sexsignata*, which is very abundant on juniper (as already stated), never occurring on any other plant and never exhibiting any noteworthy color variations, is certainly a good species. How many species we have among the other forms must be settled by future observations.

The following papers were accepted for publication:

## NEW SPECIES OF NOCTUIDÆ FROM THE GUIANAS.

By W. Schaus.

**Safia cæruleotincta**, sp. n.

*Female.*—Palpi laterally fuscous brown irrorated with whitish. Frons brown. Vertex and collar dark reddish brown mottled with buff. Thorax dark brown mottled in front with buff; some bluish scales on patagia. Abdomen fuscous brown mottled with some pale scales; a darker transverse shade at base followed by some white irrorations on a dark red-brown shade. Fore wings chiefly dull steel blue; a fine and irregular, vertical, basal, and antemedial line; costa medially shaded with brown; a yellowish-brown shade at end of cell, forming the reniform, and beyond it in angle of postmedial line, which is surmounted on costa by a darker brown spot; a geminate, faint, medial line terminating in a large fuscous spot above inner margin; reniform outwardly edged with fuscous; postmedial outbent on costal margin, dentate and inbent to before reniform, outangled on fold, inwardly edged with brown on inner margin; a dentate whitish line outwardly edges the dark brown costal spot; an outer coarse, brown-black line interrupted at vein 5, dentate between 4 and 3, preceded by a dark shade below vein 2; subterminal dark spots inwardly shaded with light brown, and connected by short streaks to a faint lunular terminal line. Hind wings brown irrorated with dark red; costal margin, streak below cell, and inner margin grayish brown; postmedial and outer line dentate lunular, not reaching costa, the outer line heavily marked towards inner margin, forming two lunules; veins terminally irrorated with blue, especially veins 2–4; subterminal spots as on fore wings; the terminal line more distinct. Wings below dark grayish brown; white shades on cilia at vein 5. Fore wings; some white spots on costa towards apex; a dark postmedial line. Hind wings somewhat paler; a medial and postmedial line; a broad subterminal dark brown shade.

Expanse, 42 mm.

*Habitat:* St. Jean, Maroni River.

**Barydia nigrescens**, sp. n.

*Male.*—Palpi light brown shaded above with fuscous. Head and collar mottled light and dark brown. Thorax paler brown. Abdomen grayish

brown. Fore wings: basal half brown, shaded with gray on inner margin; black basal, subbasal, and geminate antemedial lines on costa, the subcostal partly suffused with black near base; an outangled antemedial black line on inner margin; some darker shading medially on inner margin; a black orbicular point in cell; a dark brown medial shade from costa, black edged and widest on costa, outbent and narrowing to vein 2, suffusing with postmedial line; reniform space whitish mottled with gray and brown, crossed by confused lines, the white extending to costa and inclosing a black and brown spot from which the postmedial originates; this is light brown, vertical, dentate, inbent below reniform, and then outbent to inner margin, and is partly defined by a dark brown line; terminal third of wing steel black; a velvety brown-black subterminal line, oblique to vein 6, inset across vein 5, then outcurved, shaded with dull brown, below vein 3 the line is almost obsolescent, only the dull brown shadings being conspicuous; marginal small black linear spots on interspaces, outwardly edged with white. Hind wings brown shading to black on outer margin, where veins 2–5 are shaded with steel and velvety black; some black and white lines on inner margin above angle, and traces of a similar downbent postmedial line from below vein 5. Wings below grayish brown-termen darker with a broad fuscous brown subterminal shade; a medial and two postmedial dark lines, better defined on hind wings; costa of fore wings postmedially mottled with white; a small black discal spot on hind wings; cilia on hind wings mostly white.

Expanse, 52 mm.

*Habitat:* St. Jean, Maroni River.

**Boryza æraria,** sp. n.

*Male.*—Palpi fuscous tipped with pale brownish gray. Head, collar, and patagia grayish brown, the collar finely edged with white; thorax white shaded with golden bronze. Abdomen dark bluish gray dorsally, shaded with golden bronze at base; laterally paler gray tinged with brown. Fore wings white shaded with pale golden brown; base broadly black shaded with golden brown, not reaching inner margin, though its hind edge forms a slight hook below submedian; a minute brown point as orbicular; a fuscous medial shade on costa, oblique and suffusing with reniform, which is also very oblique, steel black, edged by a fine black line; postmedial line fine, black, shaded with fuscous on costa, outcurved to vein 4, then twice incurved, being outangled on submedian fold; from just above vein 5 to inner margin the line is followed by a more distinct golden brown shade; the subterminal shade suffusing with terminal shadings at vein 5. Hind wings brown tinged with golden; from vein 4 to anal angle the termen is whitish, irrorated with brown, preceded by a clearer white dentate line. Fore wings below and outer margin of hind wings dull grayish brown, the hind wings otherwise somewhat whitish.

Expanse, 39 mm.

*Habitat:* Omai, British Guiana.

Near *B. commiscens* Wlk.

**Orthogramma olivescens**, sp. n.

*Male.*—Palpi dark olive green. Head brown. Body and wings olive buff. Fore wings: some antemedial white scaling on veins; some scattered white irrorations on medial space; a gray-brown medial shade expanding outwardly on subcostal, median, and submedian, not reaching inner margin, crossing in cell the round dark brown orbicular spot; reniform large, dark brown shaded with white in front and behind, also followed by a white shade to line, which is dark brown, fine, outwardly pale edged, and extends from apex to beyond middle of inner margin; an irregular row of small subterminal black and white spots; terminal brown triangular spots. Hind wings: a straight postmedial fine brown; subterminal spots inset on inner margin and slightly larger. Wings below olive brown; dark discal points; a brown postmedial line slightly curved.

Expanse, 39 mm.

*Habitat:* St. Laurent, Maroni River, French Guiana.

**Bendis brevimarginata**, sp. n.

*Male.*—Body dark grayish brown shaded with purple, the patagia in front bright red. Wings purple brown tinged with red; termen finely red; cilia white basally crossed by a red line, terminally olive gray irrorated with white. Fore wings: extreme costa for two-thirds dull olive, edged behind by a white line which expands to extreme costa on outer third and does not quite reach apex; indistinct antemedial and postmedial geminate, darker, wavy lines, marked by white points on inner margin; a faint darker line on discocellular. Hind wings: Costal margin broadly dull dark brown; a medial and postmedial darker line; the anal angle obliquely truncated. Wings below dull brown tinged with purple terminally, broadly at apex of fore wing; a dark postmedial line; cilia brown, crossed by a broad white line.

Expanse, 37 mm.

*Habitat:* Rockstone, British Guiana.

**Tyrissa bellula**, sp. n.

*Female.*—Palpi mottled brown and grayish buff. Head brown, vertex mottled with gray. Collar crossed by a velvety black line. Thorax whitish irrorated with brown. Abdomen pale brown with white segmental lines. Fore wings white, shaded and irrorated with grayish brown, the costa arched antemedially, incurved postmedially; basal line reduced to angled spots on costa and median; antemedial defined by shadings, forming an angled white line on costa, and an incurved line below cell, with a short dark streak in cell followed by the orbicular white point; a small black spot follows antemedial below cell; medial line fine, dark brown, outangled on subcostal; markings on discocellular very confused, forming a horizontal narrow oval spot in front, and a small dark-edged spot behind; postmedial fine from vein 8, deeply lunular beyond cell, crossed by a black line below 6, outset below 5, and wavily oblique to inner margin near

medial line; a subterminal line deeply dentate below apex, inbent below vein 5; termen narrowly dark grayish, expanding between veins 4 and 5, and from vein 2 to tornus; terminal black spots. Hind wings more heavily and darker shaded; the base and costa to postmedial narrowly whitish; the antemedial shade with a small white spot, and an irregular white line, medial line wavy, distinct, followed by a fainter line; the postmedial distinct, geminate, approximating medial line between veins 5 and 6; space beyond more uniformly brown; a distinct outer and subterminal line, the space between them shaded with white; terminal line interrupted. Wings below buff, shaded with brown. Fore wings: costa whitish; an orbicular white point; medial line fine, black, wavy, angled at discocellular; the subterminal angled line inwardly shaded with velvety black-brown between veins 8 and 5, followed by a similar shade at tornus. Hind wings: the inner margin alone whitish; the subterminal shade heavily black brown; medial and postmedial lines finely wavy.

Expanse, 29 mm.

*Habitat:* Cayenne, French Guiana.

**Tyrissa abscisa,** sp. n.

*Male.*—Palpi laterally dark brown. Frons dark brown; vertex and collar brown mottled with gray, the collar edged behind with buff. Thorax, abdomen, and wings yellowish buff; abdomen with narrow transverse fuscous shadings. Fore wings: pale brown shadings along subcostal to apex, and from inner margin obliquely towards termen; some scattered brown-black irrorations form an interrupted outcurved antemedial line, and there are a few similar scales at base of costa and submedian; from middle of inner margin a broader darker brown shade extends towards termen near apex, followed by a finer brown line, inbent towards costa beyond cell; a partly geminate darker brown line from inner margin before tornus to termen at vein 4; the darker brown shades are partly irrorated with brown-black scales; some black scales at end of cell, a marginal fuscous spot between veins 6 and 7. Hind wings: a dark antemedial fascia; a fine medial line followed by a small white discal spot edged with black; a postmedial line of dark scales; an outer straight brown fascia beyond which the outer margin is grayish brown mottled with black, and crossed by some lunular subterminal whitish spots. Wings below whitish, the fore wings shaded with pale yellowish brown; fuscous irrorations forming a broken antemedial line. Fore wings: some medial and subterminal irrorations on inner margin; a small round spot at end of cell, containing a white point; a small terminal black spot near apex. Hind wings: a black discal spot, and fine medial and postmedial lines; a broad subterminal fuscous shade irrorated with whitish.

Expanse, 20 mm.

*Habitat:* Geldersland, Surinam.

**Freilla alastor,** sp. n.

*Male.*—Palpi whitish buff, second joint laterally brown, the third joint with a brown ring. Body buff white; some brown irrorations on collar; abdomen with a few scattered black scales, and transverse brown shades basally and terminally. Fore wings light brown, the termen whitish buff; the costa at apex gray with the extreme edge black cut by pale points; some fuscous striae and scattered black scales to outer line; costa with dark brown shadings; a fuscous spot at end of cell; outer line fine, dark brown, outbent from costa, incurved from vein 7 to below 4, then inbent to middle of inner margin, when it is preceded by three faint brownish lines; a subterminal reddish brown shade, expanding opposite cell and on inner margin; a terminal interrupted dark-brown line. Hind wings buff white, irrorated with pale brown beyond middle; a macular basal line; three antemedial and a medial brown line, all close together; a small dark brown postmedial spot on costa, followed by a very faint line; subterminal line dark velvety brown from vein 6 to anal angle, very faint above vein 6, terminating in a small dark spot on costa, followed by a paler brown shade from apex to anal angle, this shade expanding to projection at vein 7; termen below vein 5 shaded with gray, and with some fuscous striæ; an interrupted terminal fuscous brown line. Wings below buff white, the forewings shaded with brown with some scattered black scales, and fuscous striæ on costa; also orbicular black point, black edged reniform, a fine interrupted postmedial line, black subterminal point between veins 5 and 6, and geminate black lines on inner margin near tornus. Hind wings with outer margin broadly fuscous, the termen narrowly buff white.

Expanse, 25 mm.

*Habitat:* Cayenne, French Guiana.

**Freilla abjecta,** sp. n.

*Male.*—Head, collar, and thorax pale brown. Abdomen pale buff with some dark-brown irrorations. Wings pale buff thinly irrorated with dark brown; a fine terminal dark line partly punctiform. Fore wings: a fine, indistinct, dark antemedial line, incurved across cell; orbicular a fuscous-edged white point; reniform round, black irrorated with gray; a broad pale brown postmedial shade, darkest on inner margin, outcurved around cell, its outer edge defined by a fine wavy lunular line; a faint subterminal line, somewhat punctiform, but thick, black, from veins 7–4, where it is followed to termen by a fuscous gray shade. Hind wings; two small black spots on discocellular; postmedial brown shade downturned and narrowing to anal angle, its outer edge defined by a darker line; subterminal shade brown, marked by some black points; termen shaded with gray. Wings below buff brown with darker irrorations. Fore wings: a black orbicular, and white reniform point, postmedial line finely lunular; sub-

terminal punctiform. Hind wings: the postmedial shade broader, outwardly edged by a lunular line.

Expanse, 25 mm.

*Habitat:* Rockstone, Essequibo River.

**Freilla abluta,** sp. n.

*Male.*—Palpi outwardly brown, inwardly, and tips of second and third joints buff white. Head and thorax pale buff, the collar narrowly velvety black in front and then brown, but broadly pale buff behind. Abdomen slightly darker with broad transverse dull gray shades, and some black and brown irrorations. Wings pale buff, with some scattered dark irrorations; terminal dark-brown points. Fore wings: some dark striæ on costa; traces of an antemedial outangled brownish line; a fuscous spot irrorated with gray at end of cell; a faint postmedial line, outangled beyond cell, and inbent to middle of inner margin, followed by three similar lines only visible from below vein 3; a faint outer, indistinct line, outwardly paler edged, lunular, marked by small dark brown spots on interspaces; termen shaded with brownish gray at tornus, and between veins 4 and 8. Hind wings: antemedial dark points on inner margin; three fine medial dark-brown lines, followed by five pale lines, the fourth of these with some small black-brown spots; a subterminal brownish shade from below apex to anal angle, darker spotted, beyond which the termen is faintly shaded with gray. Wings below whitish buff, the fore wing shaded with pale reddish brown; an irregular outer fine fuscous line; fore wings with darker striæ on costal and inner margins; traces of an antemedial shade, a black point in cell, and a small spot at end of cell; hind wings with discal point, and geminate medial line.

Expanse, 28 mm.

*Habitat:* Cayenne, French Guiana.

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## A NEW ULOPHORA FROM FLORIDA.

### (Lepidoptera, Pyralidae)

By Harrison G. Dyar.

**Ulophora caricæ,** new species.

Fore wings gray, whitish over the disk; a broad line of raised black scales near the base; a broad pale ocherous band beyond, oblique, followed by a faint reddish line; median space gray, whitish beyond of cell, discal dot double, very small and faint; outer line slightly excurved mesially and denticulate, double, reddish, followed by a dark purplish shade, which fills all the terminal space and is intensified at apex. Hind wing sordid whitish, gray at tip. Expanse, 17 mm.

*Cotypes:* Male and female, No. 15428, U. S. National Museum, Miami, Florida. Bred from larvæ on papaya. December 2, 1912 (W. W. Yothers).

## A NEW INJURIOUS PLUTELLA.

By August Busck.

**Plutella armoraciæ,** new species.

Labial palpi ochreous white with a longitudinal, dark golden-yellow streak on the tuft of the second joint exteriorly. Face and crown of head chalky white; sides of the head yellow. Thorax white; patagina yellow. Fore wings light saffron yellow with costal edge narrowly white and with a series of single deep black scales along the dorsal and terminal margin to apex. Cilia whitish yellow. Hind wings silvery white with light fuscous edges and light yellow cilia. Abdomen ochreous white above; entire body white below. Legs white, with the numerous short spines on the underside of the tarsal joints deep black, contrasting conspicuously with the light color of the legs.

Alar expanse, 16 to 18 mm.

*Food plant:* Horse-radish (bred by Mr. H. O. March).

*Habitat:* Rocky Ford, Colorado.

*Type:* No. 15388, U. S. National Museum.

Intermediate between *P. omissa* Walsingham and *P. porrectella* Linnæus, but amply distinct from either; differing in the yellow color and the marginal spots from the former; and differing in the lack of wing ornamentation otherwise from *P. porrectella.*

The injury caused by this species to horse-radish in Colorado is of some economic importance and the present description is published at this time in order to provide a name for it in a forthcoming publication of the Bureau of Entomology, U. S. Department of Agriculture.

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## BLOOD-SUCKING INSECTS AS TRANSMITTERS OF HUMAN DISEASE.

By Frederick Knab.

In the September number of our Proceedings (pp. 180–181) Dr. C. T. Brues discusses remarks by the writer, made at the meeting of January 4, 1912, and published in our June issue (pp. 79–81), on the association with man of those blood-sucking insects that have proved to be disease-transmitters. It was not my intention to review the entire field of insect transmission of disease, but simply to point out that in the case of insect-borne blood-diseases such association does exist. I aimed to make it clear that my remarks were restricted to diseases caused by parasites requiring alternate hosts. Being aware of the contradictory or seemingly contradictory facts, and appreciating that my remarks were open to some of the

objections raised by Dr. Brues, I wrote a more extended discussion of the subject and touched (too lightly, it now appears) upon the contradictions. This paper appeared in a well-known entomological periodical[1] nearly two months in advance of the discussion criticized and should have come to Dr. Brues's notice. I find it necessary to reply to Dr. Brues's criticism, as he has somewhat confused the subject by introducing the mechanical conveyance of other classes of disease into the discussion. Such diseases very obviously do not depend upon such close association of particular insects and may be acquired in a variety of ways. In the case of true blood-parasites the association is necessary, not only that, as Dr. Brues puts it, transmission may take place, but in order that the host-relation may become established. I am fully aware that it has been experimentally proved that certain blood-diseases can be transmitted mechanically by blood-sucking insects which are not hosts of the disease-producing parasite. In these experiments positive results were only obtained when the partly fed insect was at once transferred to a healthy animal and the bite followed immediately. This combination of circumstances must occur very rarely, if at all, in nature. Even should it occur, the transfer of the parasite will not be, by any means, always effected. In a practical consideration of blood-disease transmission it is certainly a negligable factor.

The case of the African sleeping-sickness requires some explanation, as it is in a different category from those diseases caused by true blood-parasites of man. Here we have to do with a disease caused by hæmatozoans not normally parasites of man. These protozoans are normally the parasites of the wild animals which abound in those parts of Africa; they do not seriously affect their normal hosts, but they become highly pathogenic when introduced into the human circulation. That this is the true condition with sleeping-sickness is now generally recognized. In this respect, then, the parasites of sleeping-sickness differ from most other blood-parasites, that they may become established in a vertebrate host other than their normal one. In the case of most other blood-parasites, as those of malaria, yellow fever, pappataci fever, and filariasis, it has been determined beyond question that they can thrive only in a single vertebrate host. But with trypanosomiasis, as with the diseases just mentioned, the continuance of the disease depends upon the association

[1]Unconsidered factors in disease transmission by blood-sucking insects. Journ. Econ. Ent. vol. 5, pp. 196-200 (April, 1912).

of the two hosts, in this case the tse-tse flies and the vertebrates, and a sufficient abundance of both. That the association between the hosts of trypanosomiasis is not a close one is compensated for by the long period during which the parasites are present in the circulation of the vetebrate host and by the great abundance of these hosts. Furthermore, there is reason to believe that when the habits of the different species of *Glossina* have been carefully studied, specialization of habits along the lines indicated will be found to exist in the species concerned in disease transmission.

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## A SYNONYMIC NOTE ON THE MYMARIDÆ.

By A. A. Girault.

*Parvulinus* Mercet equals *Alaptus* Haliday.

In the *Boletin de la Real Sociedad española de Historia Natural*, Madrid, June, 1912, pp. 332–335, figs. 1–3, Ricardo Garcia Mercet describes the genus *Parvulinus* as new to the family Mymaridæ for the species *P. auranti* Mercet. Unfortunately, the author has been mistaken, for a perusal of the description shows that *Alaptus* Haliday has been redescribed. The species *auranti* is thus an *Alaptus*, and knowing the wide distribution of members of this genus it would not be surprising if it should turn out to be one of the common European species of that genus, for instance, *minimus* of Walker. Thus, the species must be considered at best but doubtfully valid. The figures given of the antenna and wings certainly resemble those appendages in what I have identified as the species *minimus*.

Mercet also probably falls into error concerning the host of his *Alaptus*, since the members of this genus are usually parasitic upon psocid eggs, while Mercet states them to be parasitic upon coccids, merely from the fact that, if I have rightly understood, they were reared from twigs infested by coccids. Now, psocid eggs often occur among colonies of coccids.

In this connection I must again state that the genera of the Mymaridæ are few.

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## A SYNONYMIC NOTE ON THE TRICHOGRAMMATIDÆ.

By A. A. Girault.

*Jassidophthora* Perkins equals *Brachistella* Girault.

R. C. L. Perkins, in Bulletin No. 10, Entomological Series, Experiment Station of the Hawaiian Sugar Planters' Asso-

ciation, Honolulu, 1912, on pages 17 to 19, describes the genus *Jassidophthora* for *J. prima* as new to the family Trichogrammatidæ of the Hymenoptera Chalcidoidea. As I have just completed a paper on the Australian forms of the family, describing a number of new genera, and also because I have in course of publication a new description of the genera of the family, it became necessary to examine at once the status of this new genus of Perkins. Unfortunately, it appears to be the same as my *Brachistella* described in 1911. As I will have fully explained elsewhere, the genera *Brachistella* and *Abbella* are much alike, closely related, differing only in the density of the discal ciliation of the fore wing, and *Jassidophthora* agrees very well with the description of the former.

I am more anxious to come at the truth concerning this new genus, since I have been at fault in the original descriptions of both of my own genera, there being *two* ring-joints, instead of but the *one*, in the antennæ of both. This is also true of *Ittys* Girault. Full details are given elsewhere. The first funicle joint in *Jassidophthora* is doubtless a second ring-joint and the antennae thus agree with those of *Brachistella*. It thus seems necessary to designate *Jassidophthora prima* Perkins, *Brachistella prima* (Perkins), a species which appears to be valid. Perkins has, I think, been misled in thi case by my own errors.

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## NEW MEXICAN ACROLOPHIDÆ.

By August Busck.

The following new species are part of extensive collections of Lepidoptera, received for determination from Mr. R. Müller, of Mexico City.

**Acrolophus fervidus,** new species.

Labial palpi erect, reaching just beyond vertex, loosely haired, light ochreous with dark brown base. Antennæ short, stout, light ochreous. Head and thorax reddish ochreous; patagina light ochreous with a reddish brown longitudinal stripe. Forewings whitish ochreous, heavily overlaid with bright reddish-brown scales, especially on basal two-thirds; on the middle of the wing from base to lower corner of the cell is a broad unmottled whitish streak, edged above and below with dark brown; above this is a black longitudinal line from the middle to the end of the cell terminating in a small black spot; veins 2 to 5 are indistinctly traced by dark brown lines; cilia with alternate whitish ochreous and reddish-brown tufts. Hind wings of a rich dark brown color with light ocherous cilia.

Abdomen blackish brown above; dusky ochreous below; anal tuft ochreous. Legs clothed with mixed ochreous reddish and black hairs.

Alar expanse, 28 to 32 mm.

*Habitat:* Orizaba, Mexico, R. Müller, collector. June.

*Type:* No. 15419, U. S. National Museum.

In the National Museum is also a large series of this species from Sixola River and Turialba, Costa Rica, William Schaus, collector.

**Acrolophus directus,** new species.

Labial palpi very short, reaching only to the middle of the face, porrected, clothed with long black and gray hairs. Antennæ short, thin, simple. Head and thorax long-haired, woolly, gray. Fore wings light gray with the veins faintly outlined with ochreous scales and dotted with equidistant single blackish-brown scales; costal edge with series of small equidistant blackish dots; across the end of the cell is a bold heavy blackish-brown oblique streak. Cilia light gray. Hind wing light bluish fuscous with somewhat lighter cilia. Abodmen and legs gray.

Alar expanse: 30 mm.

*Habitat:* Mexico City, Mexico, June, R. Müller, collector.

*Type:* No. 15420, U. S. National Museum.

**Acrolophus modestus,** new species.

Labial palpi porrected or even deflected, rather short for the genus, light ochreous mottled with black and brown. Head and thorax ochreous gray mottled with black. Fore wings dark fuscous with indistinct and ill-defined lighter longitudinal streaks; costal edge light ochreous fuscous with equidistant dark fuscous dots; on the middle of the wing near base and along the fold are scattered single bluish-black scales; on the middle of the fold is a faint triangular dark brown spot; terminal area deep brown, edged with a faint, oblique, straight row of single, bluish-black scales from apex toward the end of the fold, beyond which row is a light ochreous fuscous area. Cilia with alternate light ochreous and dark fuscous tufts. Hind wings dark fuscous, with cilia a shade lighter. Abdomen dark fuscous; legs dirty ochreous with faint dark brown tarsal annulations.

Alar expanse, 32 to 36 mm.

*Habitat:* Tehuacan, Mexico, June, July, R. Müller, collector.

*Type:* No. 15421, U. S. National Museum.

**Acrolophus icarus,** new species.

Labial palpi long, recurved, plumose, reaching beyond thorax, whitish gray mixed and tipped with bluish black. Head and thorax dirty white mottled with light brown. Fore wings white, closely overlaid with light brown, ochreous, and black scales so as to make the impression of light gray to the unaided eye; on the middle of the wing is an ill-defined and

inconspicuous, longitudinal, zigzag, ochreous band, edged with irregular groups of bluish black scales, most conspicuous on the cell, but faintly continued to apex; on the costal edge is a row of small, faint, equidistant, blackish spots; cilia light gray, mottled with light brown. Hind wings light fuscous with whitish fuscous cilia. Abdomen dark gray with ochreous anal tuft. Legs gray; tarsi annulated with black.

Alar expanse, 22 mm.

*Habitat:* Tehuacan, Mexico, August–November, R. Müller, collector.

*Type:* No. 15422, U. S. National Museum.

**Acrolophus barbipalpus,** new species.

Labial palpi long, erect, reaching well beyond vertex with compressed tuft of long yellow and black hair throughout. Head and thorax with long, matted, light ochreous, black tipped hairs. Fore wings light ochreous, mottled by irregular, heavy, transverse strigulation of dark brown and black; on the costal edge is a series of equidistant, black dashes, continued around apex and along terminal edge as a row of short, black lines; a deep black, interrupted line on the fold; cilia with alternating, light-ocherous and dark-brown tufts. Hind wings dark fuscous with narrow blackish edge; cilia light fuscous with narrow light-ocherous basal line. Abdomen and legs dark fuscous; tarsi with black annulations.

Alar expnase, 22 to 24 mm.

*Habitat:* Tehuacan, Mexico, June, R. Müller, collector.

*Type:* No. 15423, U. S. National Museum.

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