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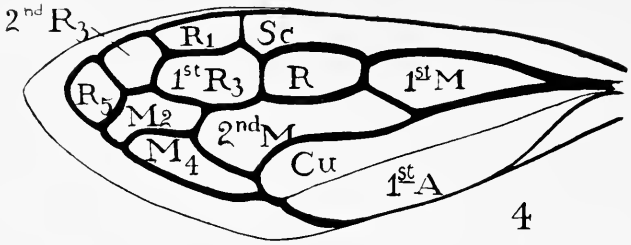

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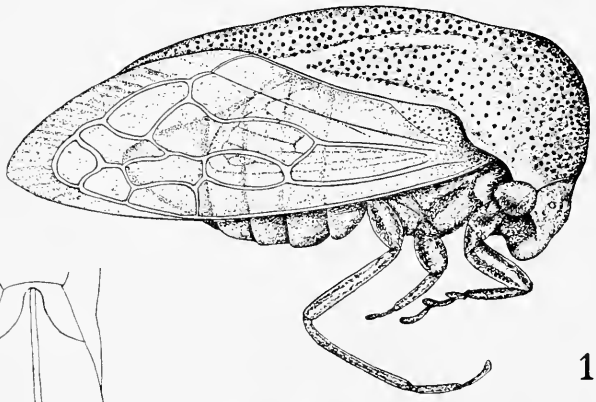

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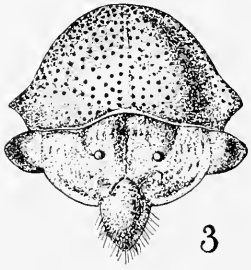

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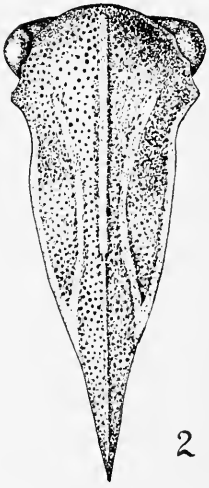

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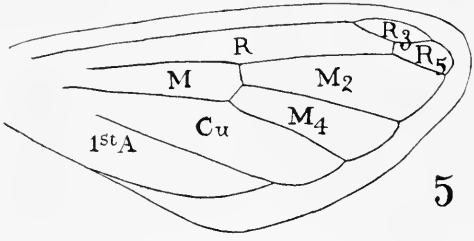

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STICTOLOBUS SUBULATUS—METCALF.

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AND

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ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

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The Rediscovery of Membracis subulata Say, with a Description of a New Genus (Homop.).

By Z. P. METCALF, North Carolina Agricultural College and Experiment Station, West Raleigh, N. C.

(Plate 1)

In 1831 Say described *Membracis subulata* in a paper entitled "Descriptions of New North American Hemipterous Insects Belonging to the First Family of the Section Homoptera of Latreille." As far as I am aware this species has not been seen since. Van Duzee first suggested that it was a species of *Stictocephala* (Goding's Catalogue of the Membracidae, page 410). Later (Studies in North American Membracidae, page 50) he accepted Goding's statement on Uhler's authority that this species is but a variety of Say's *Atymna inornata*. It was, therefore, with a great deal of pleasure that I discovered among the Homoptera collected last season, a specimen that agreed in every way with Say's description save for a few minor points. It is of interest further to note that while the wing

venation is similar to a *Stictocephala,* the general shape of the insect suggests a *Cyrtolobus.* I propose, therefore, a new genus to include this rare and interesting form.

STICTOLOBUS new genus.

Allied by wing venation to the Cerasini near *Stictocephala* Stal. Pronotal hump entirely different, suggesting *Cyrtolobus* Goding.

Head with median sulcus faint, two rather prominent oval callosities either side, between the ocelli; ocelli about equidistant from each other and eyes; eyes rather prominent, their diameter equalling one-fourth the width between eyes; head with median length only one-half width between eyes, contour of cheeks convex, basal contour of head sinuate, disk of face vertically rugose.

Metopidium a little wider than high; lateral angles short triangular directed backward; a smooth callosity above each eye extending from lateral margin about one-third distance of the base of the metopodium; median carina almost obsolete at base, becoming stronger posteriorly; whole metopidium finely and uniformly punctured; pronotum long, not high, highest at middle; base distinctly sinuate, whole surface, save two impunctured lines either side, finely and evenly punctured; impunctured lines arising above and behind humeral angles; one running along the lateral margin of the pronotum to behind the middle; the other arising about half way between the humeral angles and the dorsal carina, curving upward and backward and eventually downward in a wide curve to meet the impunctured line on the lateral margin of the pronotum; posterior process long, subulate, strongly curved downward, equalling the abdomen, shorter than the fore wings.

Legs normal, hind tarsi longest. Fore wings, venation similar to *Stictocephala* Stal. Subcosta marginal unbranched; radius with three branches; medius with two branches, medius 1 plus 2 and medius 3 plus 4; medius merging with radius for more than half its length, then suddenly divergent and running free until it branches; medius 1 plus 2 merging with radial sec-

tor through its middle third, then diverging and forming with radius 4 plus 5 a triangular stylate terminal cell; cubitus unbranched, connected by two cross veins with medius; three anal veins. Radial cell undivided; cell radius one narrowed apically; first radius three nearly quadrangular; second radius three smaller; radius five terminal, triangular; first medial cell triangular; second medial cell larger, constricted medially; medius two smaller than first radius three; medius four equalling first medius in size. In the hind wing, radial vein two-branched, radius 4 plus 5 not confluent with medius 1 plus 2, but connected by a short cross vein; medial vein two-branched; cubital vein unbranched; cell radius three small, shorter than radius five, which is terminal truncate; other cells about as in *Stictocephala.*

Type of the Genus, *Membracis subulata* Say.

Stictolobus subulatus Say.

General color of pronotum soiled testaceous yellow, more or less marked with yellowish; two impunctured lines either side yellowish; dorsal carina anteriorly yellowish, posteriorly blackish testaceous; callosities yellowish; face reddish; eyes black; mostly yellow beneath with legs pale yellowish; rather closely set everywhere with paler hairs; fore wings transparent slightly infumed apically; veins brownish.

Female genitalia: last ventral segment deeply, broadly, roundly emarginate, pygofers long, slender, slightly exceeded by the ovipositor. Length of pronotum, 4.6 mm. Width at humeral horns, 2.0 mm. Height from humeral horns, 1.1. mm.

Described from a single female specimen taken at light at Raleigh. Early July. Perhaps from oak. Collection of the Department of Zoology and Entomology of the North Carolina College of Agriculture and Mechanic Arts, West Raleigh, N. C.

Explanation of Plate I.

All the figures relate to *Membracis (Stictolobus) subulata* Say ♀.

Fig. 1. Lateral view.
Fig. 2. Dorsal view of the pronotum.
Fig. 3. Anterior view showing head and metopidium.
Fig. 4. Fore wing with cells numbered.
Fig. 5. Hind wing with cells numbered.
Fig. 6. Last ventral segment and genitalia.

Notes on North American Mymaridae and Trichogrammatidae (Hym.).

By A. A. Girault, Washington, D. C.

1. **Abbella subflava** Girault. The following specimens: "Parasites of chinch bug eggs, J. W. McCulloch, Manhattan, Kansas." Also, "Reared from jassid eggs, C. N. Ainslie, Elk Point, South Dakota, July 25, 1914. Webster No. 11874."

2. **Abbella auriscutellum** new species.

Female.—Length, 0.60 mm. Black, the scutellum and postscutellum bright golden yellow, also the caudal margin of the scutum narrowly (and apparently the median line of the scutum more or less, very faintly). Coxae and femora black. Scutum scaly reticulate. Rest of legs very pale yellow, including the knees broadly. Antennae dusky yellow, the two funicle joints subequal.

Fore wings with the distinct substigmal spot continued right across the wing, the stripe broader and fainter than the spot and often broadly interrupted caudad of the middle; the wing also infuscated across under all of the submarginal vein and part of the base of the marginal. Discal ciliation of the fore wing dense, normal, about twenty lines where widest, the marginal cilia rather short (about one-sixth the greatest wing width). No line of cilia back from the stigmal vein. Caudal marginal cilia of hind wings distinctly longer than the longest cilia of the fore wing, about twice longer than the average width of the blade. Caudal wings with two complete lines of discal cilia cephalad and one caudad, the latter spaced farther apart in the line.

Abdomen about as in *Trichogramma japonicum* Ashmead. Abdomen disto-dorsad suffused with yellowish. Mandibles tridentate, the two outer teeth more distinct than the inner.

Described from six females "reared from eggs of *Draeculacephala mollipes*, Tempe, Arizona, May 26, 1914, E. H. Gibson, Coll. Webster No. 12, 211."

Type: Catalogue No. 19182, United States National Museum, Washington, D. C., a female on a slide with two paratype females and two heads of paratypes.

3. **Oligosita americana** Ashmead. Several specimens of both sexes reared from jassid eggs, Las Vegas, New Mexico, C. N. Ainslie, Webster No. 6689.

4. **Oligosita sanguinea claripes** new variety.

Female.—Like the typical form but the legs are white excepting the red caudal femora (not all pale brownish as in the other form) and

the caudal tibiae just below the knees dorsad. Also, the scape and pedicel and funicle 1 are white and there is no suffused stripe across the wing from the substigmal spot. Compared with paratypes of the typical form and with type *girault*i. The latter has a silvery band across base of the abdomen, at least ventrad.

Described from one female on a slide labelled "W 5529. Secondary parasite of *Asphondylia miki* on alfalfa seed. Sacaton, Ariz., June 5, 1911. Smyth."

Type.—Catalogue No. 19183, United States National Museum, a female on a slide.

5. **Lathromeroides neomexicanus** new species.

Female.—Length, 1.00 mm. Dusky yellow, the abdomen with three to four black cross-stripes, thus like *fasciativentris* but the antennae and legs are pallid except the distal half of the club (joint 3), proximal two-thirds of the pedicel, coxae, femora, most of tibiae and distal tarsal joint which are dusky. Exserted valves of the ovipositor black. Pedicel elongate. Two-ring joints.

Described from one female reared from jassid eggs, Las Vegas, New Mexico, C. N. Ainslie. Webster No. 6689.

Type.—Catalogue No. 19184, United States National Museum.

The hypopygium is very prominent in this genus.

6. **Trichogramma minutum** Riley. The following rearing records: From eggs of *Estigmene acreae* Drury, Dallas, Texas, W. D. Pierce. A male from eggs on *Cyperus,* Lakeland, Florida, G. G. Ainslie. Webster No. 5272 AA. Three females, same locality and collector, from eggs of *Eudamus proteus.* Webster No. 8390. January 6, 1913. A male, same locality, from egg of *Bactra lanceolana,* Webster, No. 5272 T. Two females from alfalfa, Tempe, Arizona. T. S. Wilson, August 3, 1913. Webster No. 7222 G. And a female from eggs of *Anisota senatoria,* College Park, Maryland, August 1, 1914. N. Kisliuk, A. B. Gahan. Also many specimens, 9-7, 1912, Mitchellville, Maryland, from eggs of *Ceratomia catalpae,* A. B. Gahan.

XENUFENS new genus CHAETOSTRICHINI.

Female.—In my table of genera runs to *Japonia* but differs notably in the structure of the antennae, which are short and strongly capitate, the club short and enlarged, the funicle transverse-sen[illegible]rcular, both joints much wider than long, the pedicel o[illegible]half the size of the club, the one ring-

joint distinct. Moreover, the abdomen is as in *Ufens.* The venation in poor specimens resembles that of *Trichogramma,* but the stigmal vein is distinctly shorter than the really straight marginal, yet well-developed, the oblique hairless line from it containing many setae and is complete and more or less confused with the discal ciliation which is mostly normal. Hind wings with two complete lines of discal cilia which are cephalic; a short caudal line under the venation. There is one more or less distinct line of discal cilia from the apex of the stigmal vein to apex of the wing. Tarsal joints not long but distinctly longer than wide.

7. **Xenufens ruskini** new species. Genotype.

Female.—Length, 0.45 mm. Jet, the face and vertex yellowish, the fore wings slightly infuscated out to the end of the venation, the apex of the abdomen above and the parapsides, orange yellow. Venation, tarsi and antennae dusky yellowish. Fore wing with about fifteen lines of discal cilia where broadest. Funicle 1 longer than 2. Mandibles tridentate.

Described from eight females reared from the eggs of *Eudamus proteus,* Lakeland, Florida, G. G. Ainslie, Webster No. 8390 B., January, 1913.

Type.—Catalogue No. 19185, United States National Museum, two females on a slide. Two slides with six paratypes in the same collection.

8. **Anagrus armatus nigriventris** Girault. A female from jassid eggs, Salt Lake City, Utah, September 2, 1912, C. N. Ainslie, Webster No. 8827.

9. **Anaphes perdubius** new species.

Female.—Length, 0.65 mm. Agrees in nearly every particular with the original description of *iole* but the thorax is normal, no longer than the abdomen and the distal funicle joints are somewhat longer.

Described from one female on a slide with No. 8, same data.

Type.—Catalogue No. 19186, United States National Museum, one female on a slide.

10. **Anaphes picinus** new species.

Female.—Length, 0.75 mm. Differs from *gracilis* Howard in having the segments of the funicle different—thus joint 4 is subquadrate in

gracilis but here distinctly longer than wide, longest or subequal to 6; the legs are distinctly darker here and while the discal cilia of the fore wing are about the same, here a midlongitudinal line of 3 to 4 isolated setae runs farther proximad. Also, here, there is a more distinct infumated cross-stripe on the fore wing about midway between the apex and the venation (much less distinct in *gracilis*); otherwise about the same but larger. Differs from *cinctiventris* Girault in that the latter has hyaline wings (including the hind wings, these maculate dusky here), its hind wings bear two lines of discal cilia at cephalic margin and one at the caudal (proximad) as in *gracilis* but here the two cephalic lines are more separated and the fore wings are broader in *cinctiventris*. Cephalic tibiae, tips of other tibiae and the tarsi pallid. Across the widest part of the blade, only about four lines of discal cilia. Compared with type of *cinctiventris* and a specimen of *gracilis*.

From two females on a slide labelled "No. 5054. Koehler, N. Mex. No. cages 3.5 B. H8, F. H. Gates."

Types.—Catalogue No. 19187, United States National Museum, the above specimens with type of the following species (on the side nearest the white label).

11. **Anaphes gracilipes** new species.

Female.—Length, 0.58 mm. Differs from *gracilis* in having the funicle joints longer, 6 the longest, nearly twice longer than wide, the legs are much darker, the discal ciliation of the fore wing all disto-cephalad and distad (about three lines, more or less) and there is an isolated line of five (5) cilia caudad of middle about as in the preceding new species (*picinus*); a line of discal cilia does not go around the apex and along the disto-caudal margin as in *gracilis;* funicles 2-3 are longer than wide. From *cinctiventris* in the maculate hind wings, the shorter fore wings and much less discal ciliation in the fore wing. From the preceding new species (*picinus*) in the hyaline wings, the shorter wings, the different arrangement of the discal ciliation in the fore wing and in having funicle 6 longer than 4. Compared with the three species in question.

From one female mounted with the types of *picinus*, same data.

Type.—Catalogue No. 19208, United States National Museum.

Anaphes picinus and *gracilipes* belong really to *Erythmelus* Enock like *gracilis* and its allies.

12. **Camptoptera pulla** Girault. Two females, Compton, California. Reared from leaves with *Aleyrodes* species and *Heliothrips fasciatus*. H. M. Russell, collector.

13. **Camptoptera saintpierrei** Girault. The type is on a slide in the United States National Museum, Catalog No. 19188. The species was described in the Memoirs of the Queensland Museum, III.

14.. **Gonatocerus dolichocerus** Ashmead. The fore legs are all pale yellow.

15. **Gonatocerus dolichocerus ashmeadi** new variety.

Female.—Length, 1.15 mm. The same as the typical form but funicle 1 is longer, somewhat longer than the pedicel, twice longer than wide and the legs are all light lemon yellow except the dark hind tibiae (hind femora dusky distad in the typical form, rest of legs yellow).

The *male* has a very short scape, not twice longer than wide; pedicel a little wider than long; funicle 1 is shortest, somewhat longer than wide, 2 nearly twice longer than wide, subequal to the following, the club joint a little shorter, all longitudinally striate.

Described from three males, one female labelled "No. 965. *Ooctonus homalodiscae* Ashmead, August 14, 1904." The host has been published.

Types.—Catalogue No. 19189, United States National Museum, the above specimens on a slide.

16. **Polynema striaticorne** Girault. Two females, Hagerstown, Maryland, July 21, 1912. Webster No. 5967.

A. **Polynema striaticorne boreum** new variety.

Differs from the typical form in having the scape all black, the body black not brown-black, funicle 1 is as long as 4 or 5 (4 longer than 1 in *striaticorne*, 5 still more so) and the wings are somewhat smaller but not greatly (funicles 4-6 increase in length in the typical form but here they are subequal). Also, the cephalic femora are wholly black (mostly yellow in *striaticorne*). Differs from *consobrinus* in having the wing longer and the discal ciliation somewhat finer; also funicle 1 is longer. The species *brittanum* has shorter wings and the general coloration is brown, the cephalic tibiae lighter.

Described from one female taken by sweeping wheat, December 29, 1914. W. 8844, C. N. Ainslie, Elk Point, South Dakota.

Type.—Catalogue No. 19190, United State National Museum, the specimen on a slide.

Additions to Insects of New Jersey, No. 3.

By Harry B. Weiss, New Brunswick, New Jersey.

According to Mr. Buchholz, the *Leucania extincta* Gn. (Lep.) records in the 1909 list, "Insects of New Jersey," refer to *Leucania linita* Gn., which was wrongly identified as *extincta*. Mr. Buchholz further informs me that *Leucania extincta* is a Southern species and has never been taken in New Jersey. This correction was made in my second list (Ent. News, June, 1915, p. 261) without the above explanation. In Dyar's "List of N. A. Lepidoptera," *linita* Gn., *scirpicola* Gn. and *amygdalina* Harvey are given as synonyms of *Heliophila* (*Leucania*) *extincta* Gn. *Leucania scirpicola* Gn. is recorded as a distinct species in my second list by Mr. Buchholz. In Smith's "Check List of the Lepidoptera of Boreal America," *extincta* Gn. is listed with *amygdalina* Harv. as a synonym. I would appreciate hearing from interested persons concerning the above confusion and difference of opinion.

Ochria sauzelitae (Lep.) should be cancelled from my first list (Ent. News, March, 1915), as Mr. M. H. Mead informs me that the record was based on a misidentification. *Papaipema necopina* Grt. (Lep.) is mentioned by Smith in his 1909 list as being sure to occur in New Jersey. In my first list of additions it is definitely recorded from Passaic Park by M. H. Mead. In my second list, Mr. Buchholz states that *necopina* has never been taken south of Buffalo, New York, and that *Papaipema maritima* Bird, which he records from Union County, New Jersey, should take the place of *necopina* in the 1909 list which was wrongly identified. In order to clear up the doubt in this matter, it will be necessary for the gentlemen in question to compare their specimens.

To Mr. J. R. de la Torre Bueno, I am indebted for the following notes and corrections relating to the Heteroptera in the 1909 list. *Thyreocoris lateralis* Fab. equals *Thyreocoris gilletteii* V. D. and all records under the latter should apply to the former. *Lygaeus reclivatus* Say is a Western form and not found in New Jersey. *Orsillus scolopax* Say is still un-

recognized. *Cymus claviculus* Fall. is really *discors* Horn to which all records under the former should be referred. *Heraeus plebejus* Stal. is the only species in New Jersey, *orbicollis* Uhl., being a mss. name and undoubtedly referring to the same species. *Reduviolus pallescens* Reut. is a synonym of *R. sordidus* Reut., and all records should be transferred to the latter. *Barce simplicipes* Uhl. is a variety of *annulipes* Stal.

Mr. Torre Bueno also gives the following species which should undoubtedly be found in New Jersey: *Blissus hirtus* Mont. (New York); *Carpilis ferruginea* Stal. (Long Island in cranberry bog); *Leptoglossus magnoliae* Heid. (New York, Long Island, Massachusetts); *Tollius curtulus* Fab. (New York); *Ceraleptus americanus* Stal. (Long Island), (to be found in sandy places probably at roots of beach bushes); *Garzaphia angulata* Heid. (Eastern States); *Carthasis decorata* Uhl.; *Merragata hebroides* B. (Staten Island); *Enicocephalus culicis* Uhl. and *formicinus* Uhl.; *Milyas barberi* Ds.; *Fitchia spinosula* Stal. (Long Island) and *Phymata vicina* Handl. (New York).

Order MALLOPHAGA.

Docophorus platyrhynchus Nitzsch. From *Buteo lineatus*. C. H. Richardson.

Order NEUROPTERA.

Sisyra lampra Navás. Lakehurst, June 28, 1911. Torre-Bueno.

Hesperoleon placidus Navás. Pt. Pleasant, July 25, Bueno. (Brook. Bull. Vol. x, No. 3).

Order TRICHOPTERA.

Neuronia pardalis Walker. Lakehurst, June 5, 1909. L. B. Woodruff. (Jour. N. Y. Ent. Soc., Vol. 21, p. 163.)

Oecetina fumosa Bks. Pemberton, June 20. H. B. Scammell.

Plectrocnemia cinereus Hg. Pemberton, June 24. H. B. Scammell.

Order ODONATA.

Agrion aequabile Say. Great Notch, May 30. W. T. Davis. (Jour. N. Y. Soc. Mar., 1913.)

Lestes uncatus Kirby. Newfoundland, August 4. W. T. Davis. (Jour. N. Y. Soc., Mar., 1913.)

Enallagma cyathigerum Charpentier (*annexum* Hagen) Ramsey, May 20. (Jour. N. Y. Soc., Mar., 1913.)

Enallagma piscinarium Williamson. Lakehurst, May 29, 1910. Woodruff. (Jour. N. Y. Soc., Mar., 1913.)

Enallagma ebrium Hagen. Newfoundland, Lake Hopatcong, July. (Jour. N. Y. Soc., Mar., 1913.)

Gomphus abbreviatus Hagen. Greenwood Lake, June 18, 1911. F. M. Schott.

Cordulegaster erroneus Hagen. Bear Swamp, Ramapo Mts., August 18, 1910. Chas. E. Slight. (Jour. N. Y. Soc., Mar., 1913.)

Lanthus albistylus Hagen. Bear Swamp, Ramapo Mts., June, July. C. E. Slight. (Jour. N. Y. Soc., Mar., 1913).

Tetragoneuria spinigera Selys. Newfoundland, May 28, W. T. Davis. Greenwood Lake, June 30. Watson. (Jour. N. Y. Soc., Mar., 1913.)

Williamsonia lintneri Hagen. Paterson, May 4, J. R. Grossbeck. (Bull. Brook. Ent. Soc., Vol. 8, p. 93.)

Order THYSANOPTERA.

Hoplothrips karnyi Hood. Pemberton, August 29, 1914, on dead tree. H. K. Plank.

Cryptothrips gilvipes Hood. Pemberton, April, 1915. In cocoons of *Gelechia trialbamaculella.* H. B. Scammell.

Order HOMOPTERA.

Aphis sorbi Kaltenbach. Throughout the state on apple. T. J. Headlee & C. H. Richardson. The rosy apple aphis. (This is the form *malifoliae* of *Aphis mali* of the 1909 list.)

Aleyrodes coryli Britton. Norwood, August, on hazel nut. H. B. W.

Aleyrodes packardi Morrill. Westwood, May, 1915, on strawberry. G. Kircher.

Aleyrodes waldeni Britton. Somerville, July, on leaves of *Juglans* sp. H. B. W.

Chionaspis wistariae Cooley. Rutherford, on wistaria. Plants originally came from Japan. H. B. W.

Chrysomphalus perseae Comst. In greenhouses on orchids. H. B. W.

Leucaspis bambusae Kuwana. Riverton, March 16, 1911. On bamboo. H. B. W.

Order HEMIPTERA (HETEROPTERA).

Aradus shermani Heid. Lakehurst, May 25. Torre-Bueno.

Drymus crassus V. D. Camden, Torre-Bueno.

Acantholoma denticulata Stal. Schooleys Mt., May 20. Lutz. (Jour. N. Y. Ent. Soc., Vol. 20, p. 138).

Order COLEOPTERA.

Trechus borealis Schaeffer. New Jersey, Nicolay. (Jour. N. Y. Soc., Mar., 1915).

Atheta virginica Brnhv. Vineland, March 10. H. B. W.

Oxypoda (Sphenoma) obliqua Casey. Vineland, September 14. H. B. W.

Philonthus varians Payk. Franklin Furnace, F. M. Schott. (Jour. N. Y. Soc., Mar., 1915).

Ips caelatus Eichh. Rutherford, May 10, 1915. In shoots of *Pinus mughus*. H. B. Weiss.

Monotoma parallela Lec. Anglesea, March. H. B. Weiss.

Zenoa picea Beauv. Red Bank, July 4, 1908. Kaeber. (Ent. News, Vol. 26, p. 238.)

Hylecoetus lugubris Say. Coytesville, April 18, 1915. R. P. Dow.

Dyscinetus (Chalepus) rubra Web. New Egypt, May 21. H. B. Scammell.

Leptura exigua Newm. Hewitt, June 21 on flowers of *Cornus paniculata*. Woodruff. (Jour. N. Y. Soc., Mar., 1915.)

Sphenophorus solitaris, Whitesbog, July 16. H. B. Scammell.

Order LEPIDOPTERA.

Pachnobia salicarum Walker. Passaic Park, April, 1914. M. H. Mead.

Xylomiges dolosa Grote. Passaic Park, April 24, 1914. M. H. Mead.

Euharvey a carbonaria Harvey. Passaic Park, April 7, 1914. At light. M. H. Mead.

Catocala innubens Gn. var. **hinda** French. Passaic Park. M. H. Mead.

Notolphus antiqua Linn. Rutherford, on roses in nursery. H. B. Weiss.

Tornos scolopacinarius Gn. Irvington, August 15, 1914. F. Lemmer.

Sesia rhododendri Beutm. Somerville, August, 1914. Larva in rhododendron stem. H. B. Weiss.

Diathrausta daeckealis Haimbach. Browns Mills Jc., June 22, 1907. E. Daecke. (Ent. News, Vol. 26, No. 7.)

Evetria buoliana Schiff. Somerville (U. S. Bur. Ent. Bull. 170). Rutherford, May 12, 1915. In *Pinus mughus*. H. B. Weiss. The European pine shoot moth.

Epagoge lycopodiana Kearf. Pemberton, August 25, September 23, October 7, sweeping cranberry bog. H. B. Scammell & H. K. Plank.

Zelleria haimbachi Busck. Wenonah. Bred from short needle pine. F. Haimbach. (Proc. Wash. Soc., June, 1915.)

Dichomeris vacciniella Busck. Pemberton. Bred from cranberry. H. B. Scammell. (Proc. Wash. Soc., June, 1915.)

Symmoca novimundi Busck. Montclair. W. D. Kearfott. (Proc. Wash. Soc., June, 1915.)

Stenoma algidella Wlk. Whitesbog, May 26, 1914. Adult resting on cranberry vine. H. B. Scammell.

Coleophora limosipennella Dup. Hackensack, summer of 1914. H. B. Weiss. Case bearer on elm.

Coleophora laricella Hbn. Rutherford, on larch. H. B. Weiss. The larch case bearer.

Anaphora busckella Haimbach. Jamesburg, July 4. Haimbach. (Ent. News, Vol. 26, No. 7.)

Urophora tephrosinella Dyar. Woodbine, Sept. 20, 1914. Larvae in seed pods of sand vetch (*Cracca virginiana*). H. B. Weiss.

Order HYMENOPTERA.

Kaliosysphinga ulmi Lund. Westfield, summer of 1914. H. B. Weiss. Leaf miner of elm.

Rhodites mayeri Schl. New Brunswick, J. B. Smith (Bt.) (Bull. Brook. Soc., Dec., 1914.)

Stigmus conestogorum Roh. New Brunswick, mid-summer. C. H. Richardson.

Oxylabis bifoveolatus Brues. Snake Hill. (Canad. Ent., April, 1904.)

Itoplectis conquisitor Say. Browns Mills, Sept. 24, 1914. Bred from *Peronea minuta* Rob. H. B. Scammell.

Order DIPTERA.

Prosimulium notatum Mall. Pemberton, April 22. H. B. Scammell.

Proctacanthus nigriventris Macquart. New Jersey, H. S. Harbeck. (Annals. Ent. Soc. Amer., vol. 4, No. 2.)

Aphiochaeta iroquiana Mall. Pasadena, October 2, 6, 7. Bred from grasshopper. H. K. Plank.

Pipiza albopilosa Will. Palisades, May 10. Osburn. (Jour. N. Y. Soc., vol. 22, p. 336.)

Leptocera palliceps Johnson. Clementon, May 12, 1899. (Psyche, vol. 22, p. 22).

Phytomyza aquifolii Gour. Rutherford. Leaf miner in English holly. Has also been taken on holly imported from Holland. H. B. Weiss.

Monarthropalpus buxi Lab. Peapack, July, 1914. Boxwood leaf miner.

Spring Orthoptera found on the Islands in the Vicinity of Charlotte Harbor, Florida.

By Morgan Hebard, Philadelphia, Pa.

In May, 1915, the author was able to investigate a number of localities in this region[1]. The work covered only a brief period, but in that time the various environmental conditions of these islands were, in several cases, thoroughly investigated. The material, 216 specimens, representing forty-five species, is in the collection of the author.

Hammock.

Scarcely any "hammock" jungle condition was to be found on these islands. One small area, however, on the north end of Captiva Island was examined, where, in the heavy scrub, occasional gumbo limbo (*Bursera simaruba*) and other of the typical trees of this environment were found. Scarcely any Orthoptera were obtainable, probably due mainly to the dilute condition of this element, the surrounding groves of cabbage palmetto (*Sabal palmetto*) proving almost wholly unproductive and nearby extensive sandy stretches of short grass revealing only a few of the more ubiquitous forms. On one tree (*Exothca paniculata*), scarce in this hammock growth, a single specimen of *Oligacanthopus prograptus* was found, while from nearby bushes a specimen of *Cryptoptilum trigonipalpum* and of *Cyrtoxipha gundlachi* was beaten.

Live Oak Groves.

Useppa Island is in part considerably elevated and on this ridge are found numerous live oaks (*Quercus virginiana*) and cabbage palmettoes (*Sabal palmetto*). This area is comparable with the oak groves on the borders of the hammock at Miami. Few Orthoptera, and only well known species, were found during the day, but at night *Pyrgocorypha uncinata* was to be heard everywhere in the tops of the palmettoes and

[1] See J. W. Harshberger for map of this region with particular reference to botanical conditions. Trans. Wagner Free Inst. Sci., Phila., xii (1915.)

occasionally in other trees and bushes, while on the ground *Hapithus agitator quadratus* was found and in a wild grape vine a single specimen of *Tafalisca lurida*. This locality in the autumn would be far more productive, as indicated by the numerous immature examples of various species of Orthoptera present in May.

Pine Woods.

On Pine Island, a large flat area of pine woods (*Pinus caribaea*), with low undergrowth, the dominant plants of which are saw palmetto (*Serenoa serrulata*) and wire grasses (*Aristida* sp.), was twice visited. In this area the Orthoptera were found to be very similar to those found in the pine woods (*Pinus caribaea*) about Miami, Florida. Of the species found here, however, *Macneillia obscura* was present in greater numbers, and was more general in distribution than at any locality we have previously visited. The presence of *Gymnoscirtetes pusillus* and *Falcicula hebardi*, not known previously from Southern Florida, is of particular interest in showing the incursion of a more northern influence than is found at Miami, at this locality, situated very near the extreme southern boundary of the distribution of the long-leaf pine (*Pinus palustris*).

Mangrove Swamps.

Large areas of black mangrove (*Avicennia nitida*) were examined without success, both on Useppa and Pine Islands. In brief areas of red mangrove (*Rhizophora mangle*), bordering Useppa Island and forming the dense covering of several small adjacent islands, nothing was found, though at the former locality a small colony of *Orocharis gryllodes* and occasional individuals of *Pyrgocorypha uncinata* were to be heard every night.

Salt Marshes.

No salt marshes were to be found on the borders of the islands visited. Such areas have, in the spring, proven almost wholly unproductive of Orthoptera in southern Florida.

Sea Beaches.

As on Biscayne Bay, sandy beaches were found on the seaward margins of the outer islands. On these *Trimerotropis acta* was locally not scarce, and back of these on the sand *Scirtetica marmorata picta* was local and few in numbers, much as on Biscayne Bay.

The following list cannot be considered in any way complete for the forms present in this region in the spring, but will serve to indicate the majority of the species to be found on these islands at this time.

Blattidae.

Ischnoptera uhleriana fulvescens Saussure and Zehntner. Useppa Id., Fla., V, 17, 1915 (H.), 1 juv. ♀.

Eurycotis floridana (Walker). Useppa Id., Fla., V, 19, 1915 (H.; on ground in heavy tangle after dark), 1 ♀.

Mantidae.

Stagmomantis carolina (Johannson). Pineland, Pine Id., Fla., V, 18, 1915 (H.), 1 very small juv. ♂.

Phasmidae.

Manomera tenuescens (Scudder). Pineland, Pine Id., Fla., V, 20, 1915 (H.; rank vegetation near sand dunes), 1 ♂, 1 juv. ♂.

Manomera brachypyga Rehn and Hebard. Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.; occasional in undergrowth of pine woods, locally moderately numerous in low bayberry bushes (*Myrica cerifera*)), 12 ♂, 6♀, 4 juv. ♂, 1 juv.♀.

This series and the specimens of *M. tenuescens* are of particular interest, taken with other material before us, in proving that the proportions of the abdominal segments, which so readily separate adults of the two species, are of equal value in separating immature examples in the later instars. Moreover, the material shows that, in the immature condition, the males of both species have straight, delicate in structure and pilose cerci. All of the immature specimens in the present series are in the instar preceding maturity.

In the present series of adults the extremes of length are: males, 66.3 to 74.8; females, 82.2 to 92.8 mm. The males average much smaller than the typical males from Homestead, Fla. (87.4 to 88.5 mm.), but appreciably larger than a male from San Pablo, Fla. (69.6 mm.).

ACRIDIDAE.

Nomotettix cristatus floridensis Hancock. Pineland, Pine Id., Fla., V, 18, 1915 (H.; juv. very scarce in undergrowth of pine woods), 1 juv. ♂.

Neotettix femoratus (Scudder). Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.; occasional in undergrowth of pine woods), 7 ♂, 5 ♀.

Neotettix bolteri Hancock. Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.; undergrowth of pine woods), 1 ♂, 1 ♀.

Radinotatum brevipenne peninsulare Rehn and Hebard. Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.; moderately numerous in undergrowth of pine woods), 11 ♂, 9 ♀.

Mermiria intertexta Scudder. Useppa Id., Fla., V, 17, 1915 (H.; grasses on shore), 1 juv. ♀.

Macneillia [2] **obscura** (Scudder). Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.), 36 ♂, 19 ♀.

This insect, usually so rare and local, was found in small numbers everywhere throughout the undergrowth of the pine woods and the large series taken was easily secured. Though individuals in this series are not as highly colored as is often the case, the females particularly exhibit a great variety of coloration. Of the entire series but two females are marked with green, this color phase rarely developing in the present species.

Amblytropidia occidentalis (Saussure). Pineland, Pine Id., Fla., V, 18, 1915 (H.; undergrowth of pine woods), 1 ♀. Captiva Id. at Captiva Pass, Fla., V, 19, 1915 (H.; in hammock), 1 ♂.

Orphulella pelidna (Burmeister). Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.), 2 ♂, 1 ♀. Captiva Id. at Captiva Pass, Fla., V, 19, 1915 (H.; common in short grass areas), 2 ♂, 1 ♀.

[2] Caudell, adhering strictly to a one letter rule, has recently attempted (Proc. U. S. N. M., xlix, p. 28 (1915.)), to resurrect McNeill's *Pedeticum* for this genus, preoccupied by *Pedeticus* of Laporte, and for this reason renamed *Macneillia* by Scudder. Caudell's action is unwarranted and if consistently followed would cause endless confusion. The matter has long been settled by Mammalogists and Ornithologists, the one letter rule being suppressed unless indicating different word derivations. At a time when the first glimmering of hope for nomenclatural stability, at least in certain groups, is beginning to dawn, we strongly object to changes of well-known names where the validity of such a change is either everywhere debatable or considered utterly incorrect by all but a very few.

Arphia granulata Saussure. Pineland, Pine Id., Fla. (H.; scarce in undergrowth of pine woods), 3 ♂, 2 ♀.

Chortophaga australior Rehn and Hebard, La Costa Id. at Boca Grande Pass, Fla., V, 18, 1915 (H.; low grasses near strand), 1 ♂, 1 brown juv. ♀. Pineland, Pine Id., Fla., V, 18, 1915 (H.; low grasses in field), 1 ♀. Captiva Id. at Captiva Pass, Fla., V, 19, 1915 (H.; few juv. in areas of short grass), 1 green juv. ♀.

Scirtetica marmorata picta (Scudder). South Boca Grand, Gasparilla Id., Fla., V, 18, 1915 (H.; sand grasses on shoreward border of beach), 1 ♂. La Costa Id. at Boca Grande Pass, Fla., V, 18, 1915 (H.; sand grasses near strand), 4 ♂, 3 ♀. La Costa Id. at Captiva Pass, Fla., V, 20, 1915 (H.; near strand), 2 ♂, 1 juv. ♀. Captiva Id. at Captiva Pass, Fla., V, 19, 1915 (H.; on strand), 2 ♂.

One male from La Costa Island at Captiva Pass is exceptionally pale, being drab in general coloration, with characteristic dark markings weak and greatly reduced.

Psinidia fenestralis (Serville). Pineland, Pine Id., Fla., V, 20, 1915 (H.; sandy area near dunes), 1 juv. ♀. Captiva Id. at Captiva Pass, Fla., V, 19, 1915 (H.; sandy area of short grass), 1 ♀.

Trimerotropis acta Hebard. South Boca Grande, Gasparilla Id., Fla., V, 18, 1915 (H.; numerous on broad sandy area, about sand grass and a local fleshy-leaved beach plant, *Sesuvium portulacastrum*), 8 ♂, 9 ♀, 3 juv. ♀. La Costa Id. at Boca Grande Pass, Fla., V, 18, 1915 (H.; few in much restricted area like the above), 3 ♂, 3 ♀, 1 juv. ♂, 1 juv. ♀. La Costa Id. at Captiva Pass, Fla., V, 20, 1915, (H.; in small numbers on strand, particularly about a beach plant, *Sesuvium portulacastrum*), 5 ♂, 3 ♀, 1 juv. ♂, 1 small juv. ♀.

The present series is in every way typical, but one female from South Boca Grande has the tegmina unusually suffused (army brown marked with bone brown); the charactertistic weak darker markings of the species are, however, as distinct as is usual.

Series from different beaches of slightly different shades of color show an average correspondingly slight difference in general coloration; the whitish suffusion, characteristic of the species, however, remaining the same. Thus, in the present series, those from South Boca Grande show weak cinnamon browns (light pinkish cinnamon to wood brown); from La Costa Island at Boca Grande Pass, weak ochraceous browns (light ochraceous buff to weak sayal brown), and from La Costa Island at Captiva Pass, drabs (pale drab gray to avel-

laneous). The wing coloration and width of band are as in the typical series.

Romalea microptera (Beauvois). Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.), 1 juv. ♂.

Schistocerca serialis (Thunberg).

Schistocerca americana of authors.

Useppa Id., Fla., V, 17 to 19, 1915 (H.; moderately numerous in scrub), 2 ♂, 1 ♀.

Schistocerca damnifica calidior Rehn and Hebard. Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.; scarce in undergrowth of pine woods), 3 ♂.

Gymnoscirtetes pusillus Scudder. Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.; few small colonies of juv. in undergrowth of pine woods), 1 juv. ♂, 2 juv. ♀.

The southernmost previously known record for this species was Lakeland, Fla.

Eotettix signatus Scudder. Pineland, Pine Id., Fla., V, 18, 1915 (H.; damp spot in undergrowth of pine woods), 1 very small juv. ♀.

Melanoplus puer Scudder. Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.; widely distributed through undergrowth of pine woods, but never in colonies), 15 ♂, 11 ♀, 3 juv. ♀, 1 very small juv. ♀.

This series averages about the size of the smallest individuals in the large series before us from Miami, Fla.; distinctly larger than material from Lakeland, Fla. The increase southward in size of the present species is very rapid, the dissimilarity of the extremes remarkable.

Paroxya clavuligera (Serville).

Paroxya floridana of authors.

Useppa Id., Fla., V, 17, 1915 (H.; juv. occasional in low vegetation of red mangrove swamp), 1 juv. ♀.

Aptenopedes sphenarioides clara Rehn. Useppa Id., V, 17, 1915 (H.; juv. occasional in low vegetation of red mangrove swamp), 1 juv. ♂. Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.; only one adult seen, juv. numerous in undergrowth of pine woods), 1 ♂, 1 juv. ♀.

Aptenopedes aptera Scudder. Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.; only two adults seen, juv. numerous in undergrowth of pine woods), 2 ♂.

TETTIGONIIDAE.

Arethaea phalangium (Scudder). Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.; very scarce in undergrowth of pine woods), 2 ♂, 1 ♀.

The capture of adults of this rare and striking species in May, adds to the weight of the opinion we have held, that the species appears in greatest numbers considerably earlier than do the majority of the species of this family and that by August only occasional survivors are to be found, over all or the greater portion of the insect's distribution.

Scudderia texensis Saussure and Pictet. Pineland, Pine Id., Fla., V, 20, 1915 (H.; undergrowth of pine woods), 1 ♀, 1 juv. ♀.

Amblycorypha floridana floridana Rehn and Hebard. Pineland, Pine Id., Fla., V, 20, 1915 (H.; in tangle of rich vegetation near dunes), 1 ♂.

Belocephalus sabalis Davis. Pineland. Pine Id., V, 17 and 20, 1915 (H.; juv. in moderate numbers in undergrowth of pine woods), 1 juv. ♂, 4 juv. ♀.

Two of the immature females are being bred. They are active only at night and are thriving on various green vegetable matter, lettuce appearing to be most relished. The growth of the species is exceedingly slow.

Pyrgocorypha uncinata Harris. Useppa Id., Fla., V, 19 and 20, 1915 (H.), 4 ♂.

This species was heard everywhere after dark on Useppa Island, singing in the tops of cabbage palmettoes (*Sabal palmetto*), where the insects were usually located in the berry clusters. A few were also to be heard in bushes, in the undergrowth of the heavier tangles and in mangroves on the edge of the swamp.

The song is very loud, the notes rapid, rhythmic and somewhat metallic in timbre, *dzit-zit-zit-zit-zit-zit-zit-dziit-zit-zit-zit*, these sounds produced at a rate of twenty-two to five seconds. While singing, the males were very wary when approached, usually ceasing their song even at a distance of fifteen or more feet. Locating the individual was, however, alone difficult, as the insect was found to be slow in its movements, clinging tenaciously to its support and easily seized if approached cautiously.

Conocephalus gracillimus (Morse). Pineland, Pine Id., Fla., V, 18, 1915 (H.; very scarce in undergrowth on edge of pine woods), 1 ♀, 1 juv. ♂.

Odontoxiphidium apterum Morse. Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.; adults very scarce, juv. numerous in undergrowth of pine woods), 2 ♂, 1 ♀, 2 juv. ♂, 3 juv. ♀.

Atlanticus glaber Rehn and Hebard. Pineland, Pine Id., Fla., V, 18, 1915 (H.; in undergrowth of pine woods, found occasionally on first visit but none seen on the second), 1 ♂, 5 ♀.

GRYLLIDAE.

Ellipes minuta (Scudder). Pineland, Pine Id., Fla., V, 20, 1915 (H.), 1 ♂, 3 juv.

Cryptoptilum trigonipalpum Rehn and Hebard. Captiva Id. at Captiva Pass, Fla., V, 19, 1915 (H.; beaten from bayberry (*Myrica cerifera*), in hammock), 1 juv. ♂.

Oligacanthopus prograptus Rehn and Hebard. Captiva Id. at Captiva Pass, Fla., V, 19, 1915 (H.; under bark of tree (*Exothea paniculata*), in hammock), 1 juv. ♀.

This extraordinary species was previously known only from the type locality, Miami, Fla.

Nemobius ambitiosus Scudder. Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.; common in undergrowth of pine woods), 1 ♂, 3 ♀.

Gryllus assimilis Fabricius. Pineland, Pine Id., Fla., V, 20, 1915 (H.; common in pile of decaying grapefruit), 1 ♀.

This specimen is a strongly marked individual of the *scudderianus* variant.

Falcicula hebardi Rehn. Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.; undergrowth of pine woods), 1 ♂, 1 ♀.

This species was previously not known in Florida south of Gainesville.

Cyrtoxipha gundlachi Saussure. Captiva Id. at Captiva Pass, Fla., V, 19, 1915 (H.; beaten from bayberry (*Myrica cerifera*), in hammock), 1 juv. ♂.

Hapithus agitator quadratus Scudder. Useppa Id., Fla., V, 19, 1915 (H.; low vegetation on ground under oaks, heard occasionally after dark), 1 ♂. Captiva Id. at Captiva Pass, Fla., V, 19, 1915 (H.; beaten, in hammock), 1 juv. ♀.

Orocharis gryllodes (Pallas).

Orocharis saulcyi of authors.

Pineland, Pine Id., Fla., V, 18 and 20, 1915 (H.; juv. not scarce in undergrowth of pine woods), 2 very small juv.

The species was heard, but not taken, on Useppa Island.

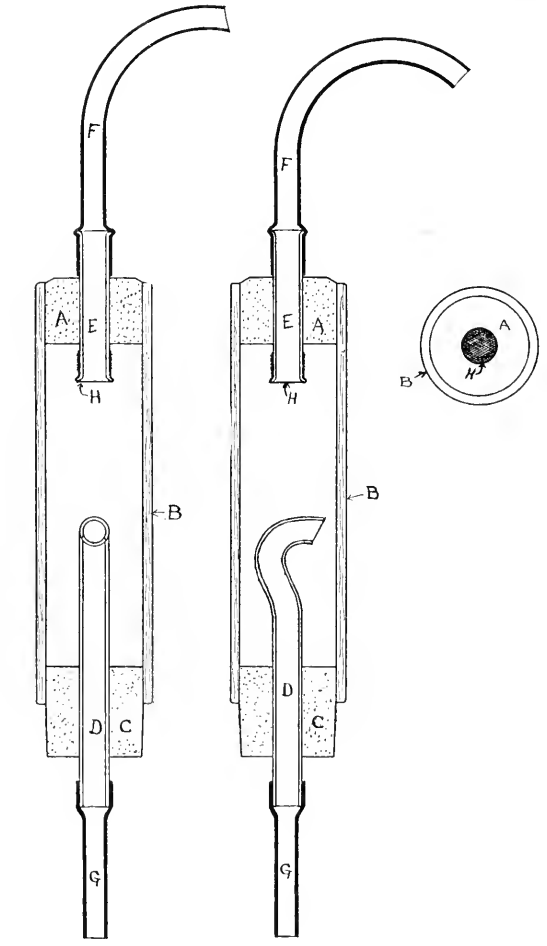
Tafalisca lurida Walker. Useppa Id., Fla., V, 19, 1915 (H.; feeding on wild grape flowers on vine, after dark), 1 juv. ♂.

This is a large immature specimen (length 21.4 mm.); the tegminal and wing pads are, however, very short, (length of wing pad 2.9 mm.).

A Suction-Pump Collector.

By Frank J. Psota, Chicago, Illinois.

Up to the present time I have not been able to find any convenient apparatus for collecting small specimens of Coleoptera without harming them. It is true there are many devices for this purpose, but these are complicated and clumsy in design. I hope that the introduction of the simple contri-



Two longitudinal sections through suction-pump collector and (to the right, above) a cross-section through the same above the middle, looking upward.

vance here presented will do away with most such difficulties coleopterists experience. After the collector becomes acquainted with the apparatus, it will render itself indispensable to him. As everyone knows, collecting small Coleoptera is a difficult task because most of them are swift runners. Many rare specimens are lost for this reason, and even if captured are often injured. This suction-pump collector is especially adapted for class studies, because it is easily carried in the vest pocket and because it enables one to observe the specimens at the time of capture.

The apparatus is shown in the accompanying figures: *A* is a cork with center hole; *B*, a glass tube four inches long, one and one-eighth of an inch in diameter, and one-eighth of an inch thick; *C*, cork of type similar to *A*; *D*, glass tubing bent in S-shape; this curve is very important because it destroys a straight path for insects and dust; *E*, glass tubing one-fourth of an inch in diameter with enlarged edges on both sides of the cork; *F*, rubber tubing which is of the desired length, (usually 20 to 30 inches), with mouthpiece on one end, the other is slipped over the glass near the cork; *G*, short piece of rubber tubing which prevents the glass tube from breaking when insects are collected on or around solid objects and in crevices; *H*, silk netting which is stretched over the end of the tube and tied with thread sealed with wax in order to prevent it from fraying; this netting prevents the entrance of dust particles into the tube.

The end of the rubber tube *G* is placed near the objects desired, such as small beetles, shells, or any small specimens, which are then drawn into the main chamber through the glass tube *D*, by the suction which is created by a sharp inhalation at the end of the rubber tube *F*.

Specimens in the main chamber can be emptied into a cyanide jar by removing the bottom cork *C*, which is only partly pushed into the tube for about one-third of its length.

A Correction (Hym.).

Both specimens of *Mutilla slossonae* Fox mentioned by me, Ent. News, xxvi, p. 37, January, 1915, are males.—Geo. M. Greene, Philadelphia, Pa.

Phycitinae of San Diego, California, and Vicinity, with Descriptions of new Species (Lep.).

By W. S. Wright, San Diego, Cal.

San Diego lies in the extreme southwestern corner of the great "Southwest," which Mr. Hulst thought should produce many species of Phycits. That his ground was well taken is proven beyond a doubt by the many discoveries of recent years. In this paper I do not presume to have given all the species of this locality, as the field has as yet been but poorly covered, and there is little doubt but that as more careful and complete collections are made many new species will be added. Most of the species listed here were taken in the immediate neighborhood of San Diego, those taken elsewhere are noted in the text. La Puerta, which has produced some very interesting forms, is a small valley about one hundred miles from the coast on the edge of the desert, and it is rather to be expected that the fauna of that region will partake somewhat of the character of the Arizona fauna, lying, as it does, on the opposite side of the same desert. Also our proximity to the Mexican border is sure to discover many Mexican forms. Both of these facts suggest future studies when more extensive collections have been made.

This paper lists thirty-six species, two of which are described as new. No attempt is made to make the sequence logical, but it is hoped that the list, together with the notes, will be of interest to many who may be interested in this particular group.

In the preparation of the paper I have had access to the rather extensive collection of Mr. George Field, whose tireless work in gathering as complete a local collection as possible is commendable; in fact many of the species here named are not in my own collection at all. I also acknowledge help from Dr. Harrison G. Dyar.

1. **Myelois puertella** Dyar. One specimen, a cotype, Coll. Geo. H. Field, La Puerta, Cal., July. Type in National Museum. A very pretty and well marked species.

2. **M. culinginoidella** Dyar. Flies abundantly during June, July

and August. It frequents the low scrub oaks that are so plentiful in the canyons near the coast. It might easily be confused with *Alpheias denticulalis* Barnes and McDunnough as it has the same general color and habit; it is easily distinguished, however, in a large series.

3. **M. alatella** Hulst. Seven specimens in my cabinet. Six of these were taken in March and one, an exceptionally dark and well marked specimen, is labeled "Febr. 13." I do not find any note of this occurrence nor do I recall the circumstance, but it was probably captured, like all the rest, at light.

4. **Tacoma submedianella** Dyar. One specimen, a cotype, from La Puerta, Cal. The specimen is considerably worn but easily recognizable. It has the characteristic desert appearance. Taken at light in July. Type in National Museum.

5. **Salebria yumaella** Dyar. One specimen, Coll. Geo. H. Field, Jacumba (on the edge of the desert about ninety miles east from San Diego and near the Mexican border). The species is a decidedly interesting one. Type in National Museum.

6. **S. ochripunctella** Dyar. Four specimens, San Diego, October and November. A sombre-hued species that is conspicuous only for the ochre-colored dot that suggests its name. Types in National Museum.

7. **Pasadena constantella** Hulst. Four specimens collected at La Puerta in July. This seems to be a distinctly desert species.

8. **Elasmopalpus lignosellus** Zeller. Two specimens labeled October, 1907. San Diego, Cal. An interesting little species apparently quite local in habit. These four specimens are the only ones taken in ten years' collecting.

9. **Epischnia boisduvaliella** Guenée. Five specimens, San Diego, February to May. A beautiful, not very common species. A single specimen stood in my cabinet for several years and the other four were but recent captures.

10. **Megasis edwardsalis** Hulst. Eight specimens taken at light in January.

This is one of the largest species taken here. Its flight is limited to a few weeks, probably not more than three or four. It is quite variable as to expanse and color. Some specimens are light gray and others appear to be almost black. The ordinary marks are all very indistinct.

11. **Hypochalcia truncatella** n. sp.

Venation, typical. Expanse, 23 to 25 mm.

Primaries broad, termen rather squarish. Reddish ochreous at base of wing and in the outer field. Median area ochreous with a heavy

sprinkling of black scales. Pale ochreous streaks on vein 1, the median, and a broader streak on the costa, all dusted with black scales. Basal line distinct, pale ochreous, remote, perpendicular to inner margin, broadly toothed inwardly on vein 1 and on the median, a dark streak on the costa and a blackish spot on the angle of the tooth. Outer line concolorous, distinct, parallel to outer margin, subcrenulate, rather distant from margin, inwardly bordered by a narrow dark line more prominent on the costa. Terminal space gray, more or less suffused with reddish ochreous. Terminal line black. Blackish streak at apex. Discal dots distinct.

Hind wings fuscous, darker on outer margin and at the apex.

Fringes lustrous, concolorous with the wings.

Thorax reddish ochreous, palpi fuscous, darker at the tip. Abdomen gray and more or less distinctly annulate with lighter color.

Cotypes, 3 males, one of which is in Coll. Geo. H. Field, and two in my own. The right wings of one specimen are mounted in balsam as a microscopic slide and bear the number "12."

In general appearance the species is close to *Lipographis leoninella,* but may be distinguished by its broader wings and the squarish termen. The species seems to be not common, these three specimens being the total catch of two collectors in ten years.

12. **Lipographis leoninella** Packard.

Some years ago the late Mr. Frank Merrick labeled two specimens for me, one as *L. leoninella,* and the other as *L. humilis.* They stood thus in my cabinet until recently when I was led to make a close study of a series consisting of about 50 specimens. The result of this study has convinced me that *humilis* does not occur in San Diego. *Leoninella* is so plentiful that at times it becomes a nuisance, fairly clogging the traps. I have often taken as high as 60 specimens in a trap in a single night.

13. **Etiella schisticolor** Zeller. I have but one specimen of this fine species taken at Witch Creek, in the mountains, about forty miles back from the coast.

14. **Sarata umbrella** Dyar. I have two specimens, cotypes, neither in very good condition, and Mr. Field has three fine specimens in his collection. These five, with the two types in the National Museum, are all that have been captured in this vicinity to date.

The species flies only near the shore of the ocean and the larvae probably live on some of the "salt grasses" growing in the swampy places. It is an interesting species and quite conspicuous owing to the depth of color—deep reddish ochre with shades approaching white.

15. **Melitaria fernaldalis** Hulst (?). A single specimen in the collection of Geo. H. Field, San Diego, October.

I have never seen another specimen of this species. It is quite large and rather inconspicuously marked. This particular specimen looks much like the darker specimens of *M. edwardsalis*.

16. **Yosemitia graciella** Hulst. Three specimens in the collection of Geo. H. Field, La Puerta, Cal., July. A fine species and has the typical desert appearance.

17. **Yosemitia maculicula** Dyar. Four specimens in the collection of Geo. H. Field, one a cotype. March and June, San Diego. Seven specimens in my own collection. A rather neat little species. The earlier captures seem to be somewhat darker in color.

18. **Euzophora aeglaeella** Rag. Mr. Field has one fine specimen of this very interesting species which seems to be quite rare in this locality.

19. **Euzophora fuscomaculella** n. sp.

Venation typical.

Antennae but slightly bent above the base, lamellated tufts in the bend more or less appressed, beyond ciliate, outer one-third slightly setose on both sides.

Palpi. Labial palpi ascending, slender, scarcely exceeding the head, third member half the second, dark fuscous, white annulus at second joint. Maxillary palpi distinct, rather heavily scale-tufted at the tip.

Primaries.—Expanse, 28 mm., light gray, well sprinkled with fuscous scales on the disk and outer third, dusted with black scales on outer costal region, washed with fuscous along the inner margin, nearly straight on the costa, a large irregular dark fuscous spot near the base. Basal line moderately remote, white, a rather deep sinus outwardly near the middle, strongly bent inwardly on the median, narrowly margined with fuscous inwardly below, and a broad dark fuscous spot costally on the outer side. Outer line pale, indistinct, a sharp tooth inward on the subcostal vein, wavy dentate below. Discal spots coalescing to form a dark lunule, the lower limb extending towards the outer angle and becoming lost in a pale fuscous shade; a whitish streak in the middle field just above the discal fold. A terminal row of blackish dots.

Secondaries.—Shiny white, semi-transparent, immaculate save at the apex.

Beneath, primaries pale fuscous gray; secondaries as above.

Abdomen tufted, annulate with white at the joints.

Described from two males in my own collection. Taken at light, May, 1909, San Diego, Cal.

The species is quite different from anything I have ever seen, and since these are the only specimens I have taken in some ten year's collecting in this locality, I conclude that it is quite rare.

20. **Vitula edwardsii** Packard. Mr. Field has one specimen bearing this label; the condition of the specimen makes it quite impossible to tell whether it is correctly named without good comparative material, which is not at hand.

21. **Vitula serratilineella** Rag. Two specimens which I take to be this species were captured at light in June. A third specimen gave up its wings for a slide.

22. **Heterographis morrisonella** Rag. Two specimens from La Puerta collected by Mr. Field in July. A third specimen bearing a San Diego date label was identified for me some years ago by the late Mr. Frank Merrick. Its rubbed condition, however, makes it doubtful. It is kept here for the present and hopes for future captures still linger.

23. **Hulstia undulatella** Clem. Eleven specimens of this pretty little species grace my cabinet. It is awing from April to October and scarcely a night passes that the traps do not entertain at least one as a guest.

24. **Honora dotella** Dyar. I believe the types of this species are in the National Museum. My first capture was near the seashore among the dunes; later I took several specimens some miles back in the hills. March and July.

25. **Homeosoma striatellum** Dyar. Mr. Field's collection, San Diego, March.

26. **Homeosoma mucidellum** Rag. Something like *Lipographis leoninella* as to numbers and a nuisance in the traps. I have thrown away enough good specimens to stock several museums and still have a large drawer full.

27. **Ephestiodes gilvescentella** Rag. Five specimens which were compared with a specimen in Mr. Field's collection that was named by Dr. Dyar. My specimens were collected at La Puerta by Mr. Frank Stephens and as far as I can see they are identical with *E. nigrella* except in alar expanse, which might be easily due to the desert conditions.

28. **Ephestiodes nigrella** Hulst. This is a very common species near the coast and is awing most of the year.

29. **Ephestia nigrella** Hulst. The only specimen I have ever seen is one from La Puerta belonging to Mr. Field. Date of capture, July.

30. **Zophodia stigmatella** Dyar. Many specimens from San Diego. A cotype is in Mr. Field's collection. Types in the National Museum.

At first glance one might easily take this to be *Yosemitia maculicula* Dyar; the outer third of the costa, however, is less arched and the spots are more distinctly separate.

31. **Zophodia fieldiella** Dyar. Types in the National Museum. One cotype in Mr. Field's collection.

A fairly well marked species, but may be easily confused with *Yosemitia graciella* Hulst. It is smaller, however, and the dark discal streak is curved downward, also there is somewhat more whitish. La Puerta, Cal., July.

32. **Eurythmia lignidorsella** Rag. Have fourteen specimens which I take to be this species.

33. **Valdivia mirabellicornella** Dyar. Eight specimens of this fine species grace my cabinet. Two more are referred here but are doubtful. A cotype is in Mr. Field's collection and if the types are not much better specimens, it seems to me that a redescription from good material might be profitable.

The species is quite variable, one perfectly fresh specimen is almost devoid of all marks, another is so suffused with black scales as to appear quite gray, losing almost entirely its ochreous color; in others the spots and streaks are strongly accentuated. It was almost impossible for me to be sure from the original description that my identification was correct even with a cotype for comparison.

34. **Martia arizonella** Rag. Three fairly good specimens taken at La Puerta in July. The species, like all others from this locality, has the peculiar "desert look."

35. **Petaluma inspergella** Rag. Four specimens, of which two are labeled "Jacumba" and two "San Diego." Jacumba is close to the Desert and very near the Mexican line. Again we have the "desert look." The species is almost immaculate.

36. **Bandela cupidinella** Hulst. Another almost immaculate species of which I have but four specimens.

That more systematic collecting will produce many more spècies from this locality seems altogether probable. The hills about the city are covered with the *Adenostoma,* which seems to be the breeding ground for many species. The low growing oaks, the varieties of *Rhus* and of *Ceanothus* are also good producers. Farther back in the hills are to be found many other shrubs and undergrowth that seem to abound in members of this group. Then, too, the length of the season, January first to December thirty-first on the coast, and from March to December back in the higher altitudes away from the coast, together with the lack of local collectors, makes it quite reasonable to suppose that the Phycit student could spend many profitable hours in this neighborhood.

A New Dragonfly Genus of the Legion Protoneura (Odonata).

By E. B. Williamson, Bluffton, Indiana.

Recently, in sorting over the South American Agrionines collected by B. J. Rainey, L. A. Williamson and myself in 1912, I discovered two males unfortunately overlooked when I studied the genus *Protoneura* (sens. lat.).*

PHASMONEURA new genus.

Closely related to *Psaironeura.* Colors dull; abdomen long and slender. Runs out in key page 620*, to *Psaironeura.* For *Psaironeura,* following c^1 under b^2, read as follows:

M2 in front wing arising at seventh postnodal; in hind wing at fifth. *Phasmoneura*

M2 in front wing arising proximad to seventh postnodal, usually at the sixth or more proximad; in hind wing at the fourth or proximad ..... *Psaironeura*

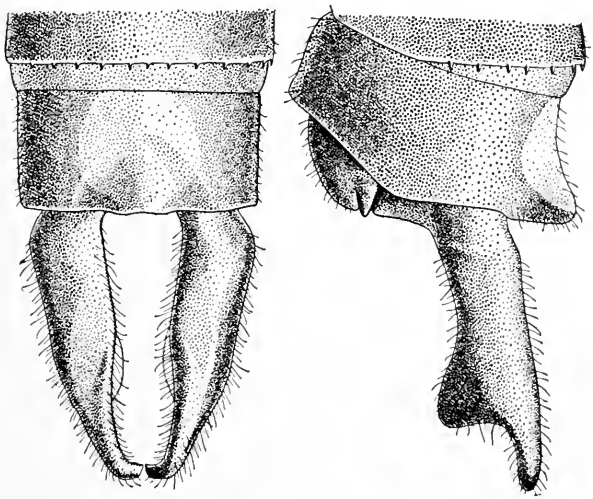
The subdivisions under c1 under b2 remain unchanged, all relating to species of *Psaironeura.*

Cu1 in the front wings is very close to the wing margin, terminating at the descending cross vein in three wings, while

*Notes on Neotropical dragonflies or Odonata, Proc. U. S. Nat. Mus., Vol. 48, May 12, 1915, pp. 616-636.

in one wing it meets the margin proximad to the cross vein about midlength of the second postquadrangular cell; in the hind wings, on the other hand, Cu1 is more widely separated from the wing margin and terminates against the descending cross vein which is angled at that point, with the posterior portion deflected apically.

R*s* is distal to the subnodus about the thickness of the vein or a little more; M3 proximal to the subnodus, the two (R*s* and M3) narrowly separated at their origin (as in *Psaironeura* and *Epipotoneura* as contrasted with *Protoneura* and *Epipleoneura*).



Apex of Abdomen, *Phasmoneura olmya* n. sp., ♂, dorsal and left profile views.

M2 in front wing at seventh postnodal; in hind wing at fifth; M1*a* in front wing at tenth postnodal; in hind wing at eighth. In both specimens there is no variation in the position of M2 and M1*a*. M3 ending distad to the level of the stigma; M4 under stigma.

Three antenodal costal spaces subequal. Second antenodal just proximal to the arculus. Cubito-anal cross vein distal to the first antenodal about one-third the second antenodal costal space. R*s* and M3 distinct but closely approximated at first

descending cross vein. Upper limb of arculus scarcely one-half length of lower limb.

Stigma black, regular, one and one-fourth times as long as wide, covering one cell or less (in one left front wing more than one cell, but no variation in the stigma itself).

Male appendages: Superiors long, slightly shorter than abdominal segment 9 and not quite twice as long as 10; inferiors short rounded tubercles, each with a short lateral spine.

Type, Phasmoneura olmyra, n. sp.

Phasmoneura olmyra n. sp.

Abdomen, 32 mm.; hind wing, 20 mm. Proportionate lengths of abdominal segments 1 to 10, as follows: ¾, 1¾, 6, 7½, 7½, 7, 5¼, 2¼, 1, ½, appendages 4-5.

Labium pale, middle lobe deeply and broadly divided for nearly one-half its length; rear of head pale.

Genae pale yellow; labrum pale yellow, basal half black, the lower margin of the black stippled; anteclypeus yellow, bilobed medianly with black which is continuous with the black postclypeus; frons narrowly in front and medianly pale, stippled with black, remainder black or dark brown, more or less stippled adjoining the eyes; antennae dark brown, the second joint darker at its apex; vertex black with slight bluish or greenish reflections.

Prothorax black or dark brown, laterally with some pruinescence, an indefinite trace of a narrow pale area on the anterior edge of the front lobe and of a small median spot on each side of the posterior lobe; propleuron pale yellow.

Dorsum of thorax entirely dark brown or dull black with indefinite narrow streaks of rust color, the dark area reaching the humeral suture and, below, slightly posterior to it, this posterior border rust-colored and obscure; mesepimeron and mesinfraepisternum pale, apparently dull (or pale) blue with considerable pruinescence (on one side of one specimen the mesepimeron has a black blotch on more than its upper half; this black has a pattern that suggests it is due entirely to postmortem discoloration but the black looks like pigment); metepisternum darker, clearer blue, almost black in certain lights; metinfraepisternum pale yellow; metepimeron very pale blue, some black strippling along its anterior suture above, and near the posterior suture near its midlength; metasternum almost white.

Coxae and legs pale yellow; femora with stippled narrow dorsal lines, broader apically, shading out basally; indefinite brown stippled areas give an impression of rings or bands on the femora and tibiae, the darkest area at the apices of the femora; all joints with slight

brown; spines brown, short and not numerous, 5 or 6 on tibiae and 4 on the second and third femora.

Abdomen above black, narrowed basally on 1 to form a nearly equilateral triangular area; basal two-thirds of 9 dark rich blue, apex of 9, all of 10 and appendages black (in one specimen blue is not evident on 9 which is pruinose with a large rounded median pruinose spot on 10); sides of 1 and 2 extensively pale, almost white; a small basal spot of same color on 3 and a longer, ill defined inferior pale area subapically on the same segment, or the entire side below except the extreme apex pale; 4-6 similar but with the spots successively less conspicuous posteriorly, the subapical spot disappearing on 6, or with the pale the full length of each segment below except the apex, narrowing progressively from 4 to 6; 7 narrowly pale at base, encircling the segment, pale the entire length below except at extreme apex; 8 pale blue or yellowish basally, not reaching the apex where the black of the dorsum extends over the sides for one-fourth the length of the segment, but the black does not reach the extreme lower border; 9 similar to 8 but distinctly blue, the apical black slightly less extended than on 8; 10 and appendages black.

Appendages as figured. They are peculiar in the long *Heteragrion*-like form of the superiors, and the so-called rudimentary inferiors, which in this case alone so far as I know, unless *tenuissima* is an exception also, have a minute lateral spine.

Described from 2 males, Rockstone, British Guiana, B. J. Rainey, L. A. and E. B. Williamson, Feb. 1, 1912; in the writer's collection.

Three new Species of Coccophagus, Family Encyrtidae (Hym.).

By A. A. Girault, Washington, D. C.

1. **Coccophagus magniclavus** new species.

Female.—Length, 1.00 mm. Deep orange yellow, the following parts black: Caudal half of parapsidal furrows, club, a small round spot in the middle of each parapside, apex (cephalad) of the much advanced axilla, suture along cephalic margin of scutellum, thorax transversely laterad of scutellum, propodeum except broadly across meson, immediate center of the occiput transversely and dorsal abdomen (but as the incisions sometimes show through, then the abdomen appears to be alternately striped white and black). Abdomen orange yellow at base transversely. Club blotched with yellowish. Pronotum black except laterad. Legs white; the fore wings hyaline; venation, pale yellow. Tip of abdomen above and ovipositor valves yellow.

Pedicel small, very slightly longer than wide, funicle 3 shortest of the funicle, somewhat longer than wide, 1 and 2 subequal, each about twice longer than wide, very much longer than the pedicel which is shorter than funicle 3; club twice wider than the funicle but shorter, its joints wider than long.

Stigmal vein linear, not long, more or less parallel with the marginal vein, without a distinct knob. Marginal vein a little longer than the submarginal. Marginal fringes of the fore wing short.

Scutum with many short black hairs, the scutellum with from four to six long ones.

The *male* is very similar. Ring-joint short.

Described from one male, six females reared from *Aleurochiton* species, Berlice, Demerara, British Guiana, March, 1913 (G. E. Bodkin).

Types. Catalogue No. 19343, United States National Museum, the above specimens on a slide.

2. **Coccophagus mexicanus** new species.

Female.—Length, 1.60 mm. In Howard's (1897) table of species runs to *californicus,* but differs in having the caudal tibiae black except at tip and the caudal coxae white, the middle tibiae lightly dusky above and so on. Differs from *albicoxa* Howard in having only the apex of scutellum lemon yellow, the abdomen coarsely scaly, the face sometimes yellow to the clypeus from a little below the vertex and between the eyes, the scape and pedicel yellowish (the pedicel dark above except at apex); from *howardi* Masi in the coloration of the legs.

Fore wings slightly stained along under the marginal vein, the stigmal vein minute. Tarsi white. Black with the apical border of scutellum lemon yellow and the hind coxae white (the other yellow markings as noted). Occipital border of vertex yellow.

Scutum with many minute setigerous punctures. Thorax microscopically scaly. Funicle 1 somewhat longer than wide, longer than the pedicel, 2 and 3 subequal, each a little longer than wide. Funicle subcompressed, the pedicel nearly as long as funicle 3. Club not enlarged, its joints not long.

Described from two females, labeled "Porto Bello, Panama, March 18, 1911. Busck. On a fig lecanium."

Type.—Catalogue No. 19344, United States National Museum, the two specimens on tags.

3. **Coccophagus coxalis** new species.

Female.—Like the preceding, but the head is all black, the funicle joints all somewhat longer, the apical half of the scutellum, the post-

scutellum and the propodeum (except along meson narrowly and the cephalic margin) lemon yellow, the black of the scutellum running a little farther caudad at lateral margins. Scape yellow, also the pedicel except above at proximal half. Fore wings slightly more infuscated. Abdomen compressed.

Described from one female taken with *mexicanus*.

Type.—Catalogue No. 19345, United States National Museum, the female on a tag.

The species *coxalis* is close to *albicoxa*, but the yellow on the propodeum and scape and the different form of that on the scutellum seem to be characters sufficient to require distinction.

Argynnis diana (Lep.).

Dr. Henry Skinner (Ent. News, vii, 318, 1896) calls attention to the fact that the females of this species vary considerably, some specimens being blue and some green.

Among a short series of specimens collected for me by Mr. C. Harvey Crabill in August, 1914, at Camp Craig, Virginia, is one female which differs in another, and very marked respect, from the typical form. W. H. Edwards' description of the female (Proc. Ent. Soc. of Phila., III, 431, 1864) says of the under side of the primaries, "apex and hind margin brown," and of the secondaries, "basal two-thirds dark red brown," "the outer third of the wing blackish brown."

The specimen in question has all these areas described as "brown" of a dark bluish black. Has this variation been noted previously?—Wm. C. Wood, New York City.

Accidental Color Variation (Lep.).

I have in my collection a specimen (♀) of *Sphinx jamaicensis*, form *geminatus*, in which the pink color of the discal area of the secondaries is replaced by lemon yellow. The primaries are rather light in tone, with the brown markings reddish. The pupa from which it emerged (May 12, 1905) was the only one of a batch to reach maturity, the box having been alternately too dry and too wet.

Mr. S. D. Nixon (Ent. News, xxiii, 127, 1912) describes from a single male specimen a variety of *"Smerinthus jamaicensis,"* which would seem to correspond very closely with my specimen, the chief point of variation from normal being the replacing of the pink of the secondaries by yellow.

In the collection of the National Museum in Washington there was, several years ago, a specimen (♀) of *"Smerinthus ocellatus* Linn." in which the pink of the secondaries was replaced by yellow, in precisely the same manner as in the foregoing instances. Also a specimen (♂) in which the pink was so reduced and faint as to make it an intergrade between the normal and the pale forms.

Is it not probable that this disappearance of the pink color is an accidental effect? The history of my bred specimen is at least suggestive. ——Wm. C. Wood, New York City.

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., JANUARY, 1916.

Remarks on Labelling.

The labeling of type specimens of new taxonomic forms, species, subspecies and varieties has become a recognized practice among all good students of entomology. It is not too much to say that this is obligatory, whether the types be pinned or be mounted as a microscopic slide.

It is probably much less common to mark material which, without being typical of new taxonomic forms, is the basis of published figures illustrating either whole structures or details of anatomy. Yet this also is very important and highly desirable, as it will enable a later investigator, examining that material, to explain, in many cases, why two writers on the same subject have reached divergent conclusions. The converse of this practice is also desirable, viz.: that the legends or explanations accompanying such published figures should indicate the exact place in a given lot of material from which the illustration has been made. For example, in connection with a drawing based on one section of a microtome series, it should be stated on which slide, in which row on the slide, and in what position (number) in that row that section is to be found. No honest and candid worker need have any fear of subjecting the evidence for his conclusions to the examination of his colaborers, contemporary or of later date.

One of the many good offices rendered by the late Professor John B. Smith to entomology was to mount in balsam the preparations of the mouth-parts illustrated on plates V to X accompanying Dr. George H. Horn's memoir "On the Genera of Carabidae." Horn had left these upon pinned cards labeled with the generic name. Smith transferred them to standard microscopic slides, each one of which is labeled in this style: "Carabus, Pl. V, f. 13, Coll. G. H. Horn." As long as these slides (now at the Academy of Natural Sciences of Philadelphia) are in existence, it will always be possible for the student of the ground beetles to comprehend Horn's results. It is to be hoped that all entomologists will follow the example set by the recent State Entomologist of New Jersey.

Euparyphus tetraspilus Loew (Diptera).

As an error occurs in the minutes of the June meeting of the American Entomological Society (Ent. News, xxvi, p. 376, October, 1915), I thought that, while correcting it, it would be appropriate to publish the available records of capture of this species. I captured the first and only New Jersey specimen of this species recorded at Boonton, Morris County, June 14, 1901 (Ins. N. J., p. 737, 1910). On June 2, 1908, the first recorded Pennsylvania specimen of this fly was caught by myself in Philadelphia, resting on a window pane—accidental of course. Mr. Harbeck and my brother, Chas. T. Greene, visited a small swamp near Thorp's Lane, upper Roxborough, Philadelphia, June 11, 1911, and found several specimens on the "arrow leaves." Later Mr. Harbeck, Mr. Haimbach and I visited this swamp, June 13 and 27, 1915, where I captured about twenty-five specimens on the same plant. I do not remember the exact circumstances under which the Boonton specimen was caught, but as most of my collecting was done along the Rockaway River and the "arrow leaves" were common there, it is almost certain that it was on these plants in which it probably breeds. Subsequently I visited the swamp alone July 6th and found none, but in their place *Odontomyia virgo* Wied. was numerous. The following records may be added: Danville, Pennsylvania, June 22, 1915, A. B. Champlain; Aweme, Manitoba, Canada, June 21, 1911, E. Criddle; Calgary, Alta., August 1, 1907, and Ottawa, Canada, July 2, 1907, Dr. Skinner; Beaver Dam, Wisconsin, June 4, 1908, and "N. Ill." in the collection of the American Entomological Society.—Geo. M. Greene, Philadelphia, Pa.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded. The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of systematic papers are all grouped at the end of each Order of which they treat, and are separated from the rest by a dash.

Unless mentioned in the title, the number of new species or forms are given at end of title, within brackets.

For records of Economic Literature, see the Experiment Station Record. Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London.

For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

4—The Canadian Entomologist. **5**—Psyche. **8**—The Entomologist's Monthly Magazine, London. **9**—The Entomologist, London. **11**—Annals and Magazine of Natural History, London. **12**—

Comptes Rendus, L'Academie des Sciences, Paris. **28**—Archives d'Anatomie Microscopique, Paris. **38**—Wiener Entomologische Zeitung. **40**—Societas Entomologica, Zurich. **46**—Tijdschrift voor Entomologie. **50**—Proceedings, U. S. National Museum. **59**—Sitzungsberichte, Gesellschaft der naturforschenden Freunde, Berlin. **63**—Science, New York. **74**—Naturwissenschaftliche Wochenschrift, Berlin. **84**—Entomologische Rundschau. **153**—Bulletin, The American Museum of Natural History, New York. **161**—Proceedings, The Biological Society of Washington. **164**—Science Bulletin, University of Kansas, Lawrence. **166**—Internationale Entomologische Zeitschrift, Guben. **184**—Journal of Experimental Zoology, Philadelphia. **190**—Deutsche Entomologische Zeitschrift "Iris," Dresden. **195**—Bulletin of the Museum of Comparative Zoology, Cambridge. **216**—Entomologische Zeitschrift, Frankfurt a. Main. **238**—Anales, Sociedad Cientifica Argentina, Buenos Aires. **324**—Journal of Animal Behavior, Cambridge. **344**—U. S. Department of Agriculture, Washington, D. C. **410**—Journal, Washington Academy of Sciences. **438**—Bulletin, Illinois State Laboratory of Natural History, Urbana. **457**—Memoirs of the Coleoptera by Thos. L. Casey, Washington. **490**—The Journal of Parasitology, Urbana, Illinois. **509**—Revue Generale des Sciences Pures et Appliquees, Paris. **517**—Pennsylvania Department of Forestry, Harrisburg. **518**—Tennessee, Agricultural Experiment Station of the University, Knoxville. **519**—The Scientific Monthly, Lancaster, Pa. **520**—Proceedings, British Columbia Entomological Society, Victoria.

GENERAL SUBJECT. Anderson, E. M.—Insects recorded in the Atlin district (Northern Br. Col.) during the summer of 1914, **520,** 1915, 122-32. **Apstein, C.**—Nomina conservanda, **59,** 1915, 119-202. **Athanasin & Dragoin**—La structure des muscles stries des insectes et leurs rapports avec les trachees aeriennes, **28,** xvi, 345-61. **Day, G. O.**—Nomenclature and classification, **520,** 1915, 99-110. **Fabre, J. H.**—Obituary notice, **216,** xxix, 62-4. Obituary by H. Rowland-Brown, **9,** 1915, 271-2. **Henderson, J.**—The publication of new species, **68,** xlii, 725-6. **Heyden, L. von**—Obituary notice, **84,** xxxii, 61. **Hollande, A. Ch.**—Coloration vitale par le "carmin soluble" chez les insectes, **12,** clxi, 578-80. **Mann, W. M.**—Some myrmecophilous insects from Hayti, **5,** xxii, 161-6. **Roeber, J.**—Gesichtssinn bei insekten, **40,** xxx, 60-1 (cont.). **Schirmer, C.**—Altweibersommer. Ein miniaturbild aus dem insektenleben, **216,** xxix, 53-4. **Studhalter & Ruggles**—Insects as carriers of the chestnut blight fungus, **517,** Bul. 12. **Turner, C. H.**—Literature for 1914 on the behavior of spiders and insects other than ants,

324, v, 415-45. **Weiss, H. B.**—Some old classifications of insects, **4,** 1915, 369-76.

PHYSIOLOGY AND EMBRYOLOGY. Mack, J. B.—A study of the dimensions of the chromosomes of the somatic cells of Amblystoma, **164,** ix, 119-27. **Stark, M. B.**—The occurrence of lethal factors in inbred and wild stocks of Drosophila, **184,** xix, 531-58. **Zeleny & Senay**—Variation in head length of spermatozoa in seven additional species of insects; The effect of selection upon the "bar eye" mutant of Drosophila, **184,** xix, 505-14; 515-30.

MEDICAL. Agramonte, A.—The inside history of a great medical discovery, **519,** i, 209-237.

ARACHNIDA, ETC. Cotton, E. C.—The N. American fever tick (Boophilus annulatus). Notes on life history, **518,** Bul. 113.

Chamberlin, R. V.—New Chilopods from Mexico and the West Indies, **195,** lix, 495-541. **Weidman, F. D.**—An arachnoid (Pneumonyssus foxi) parasitic in the lung of a monkey, **490,** ii, 37-45.

ORTHOPTERA. Mann, W. M.—(See under General.) **Walker, E. M.**—Notes on a collection of O. from Prince Edward Island and the Magdalen Islands, Queb., **4,** 1915, 339-44.

HEMIPTERA. Ball, E. D.—New genera and sps. of Acocephalinae [3 n. sps.], **161,** xxviii, 165-8. **Mann, W. M.**—(See under General.) **Parshley, H. M.**—Systematic papers on New England Hemiptera. II. Synopsis of the Pentatomidae, **5,** xxii, 170-77.

LEPIDOPTERA. Blackmore, E. H.—Further notes on the species of the genus Hydriomena occurring on Vancouver Island, B. C., **520,** 1915, 114-5. **Brunner, J.**—The Zimmerman pine moth, **344,** Bul. 295. **Chrystal, R. N.**—Notes on Lithocolletis gaulteriella, **520,** 1915, 111-14. **Hoffman, F.**—Ueber eine verdienstvolle tatigkeit beim kodern, **216,** xxix, 57-8. **Lyne, W. H.**—Comments on some peculiarities in connection with the life history of the codling-moth on the Pacific Coast, **520,** No. 7, 33-5.

Blackmore, E. H.—Notes on the changes in Geometrid nomenclature, with records of species new to the list of Geometridae found in Br. Columbia, **520,** 1915, 116-22. **Bowdler Sharpe, E. M.**—Descriptions of three new Neotropical butterflies, **11,** xvi, 411-12. **Fassl, A. H.**—Neue Pierieden aus Sud-Amerika, **190,** xxix, 176-81. **Fruhstorfer, H.**—Neue neotropische Nymphaliden, **40,** xxx, 66. **Giacomelli, E.**—Contribucion al estudio de los lepidopteros Argentinos, **238,** lxxviii, 161-175. **Niepelt, W.**—Neue formen sudamerikanischer tagfalter, **40,** xxx, 63.

DIPTERA. Chidester, F. E.—Sarcophagid larvae from the painted turtle, **490,** ii, 48-9. **Hutchinson, R. H.**—A maggot trap in practical use: an experiment in house-fly control, **344,** Bul. 200.

Banks, N.—Notes and descriptions of Pipunculidae [4 new], **5,** xxii, 166-70. **Cockerell, T. D. A.**—A new midge from Guatemala, **4,** 1915, 315-6. **Dietz, W. G.**—Two new Tipulidae from northern Alberta [2 new], **4,** 1915, 329-32. **Felt, E. P.**—New So. Am. gall midges, **5,** xxii, 152-7. **Malloch, J. R.**—Some additional records of Chironomidae for Illinois and notes on other Illinois D. [2 n. gen.; 12 n. sps.], **438,** xi, 305-63. **Mann, W. M.**—(See under General.) **Schmitz, H.**—Neue beitrage zur kenntnis der myrmecophilen und termitophilen Phoriden, **38,** xxxiv, 311-30. **Townsend, C. H. T.**—New neotropical muscoid flies, **50,** xlix, 405-40. A new generic name for the screw-worm fly, **410,** v, 644-6.

COLEOPTERA. Chapin, E. A.—Early stages of Staphylinidae. I. Xantholinus cephalus, **5,** xxii, 157-61. **Heikertinger, F.**—Ueber skulpturveranderungen auf kaeferflugeldecken hervorgerufen durch kochen, **38,** xxxiv, 377-9. **Muir, F.**—Notes on the ontogeny of the genital tubes in C., **5,** xxii, 147-52. **Netolitsky, F.**—Verbreitungskarten zur insektengeographie, **38,** xxxiv, 387-91. **Reitter, E.**—Festschrift zum siebzigsten geburtstag....am 22. Oktober 1915, **38,** xxiv, 215-87. **Stellwaag, Dr.**—Das springen der schnellkaefer (Elateriden), **74,** 1915, 635-7. **Wusthoff, A.**—Ueber das praparieren kleiner kaefer, **166,** ix, 75-6.

Casey, T. L.—A review of the American sps. of Rutelinae, Dynastinae and Cetoniinae [many new sps.]; Studies in some Staphylinid genera of No. Am. [many new], **457,** vi, 1-394; 395-450. **Leng, C. W.**—List of the Carabidae of Florida [3 new], **153,** xxxiv, 555-601. **Swaine, J. M.**—Descriptions of n. sps. of Ipidae [9 new], **4,** 1915, 355-69.

HYMENOPTERA. Cockerell, T. D. A.—New Mutillidae from California [3 new], **9,** 1915, 249-50. **Cosens, A.**—Notes on the strawberry leaf petiole gall (Diastrophus fragariae), **4,** 1915, 354-5. **Phillips & Demuth**—Outdoor wintering of bees, **344,** Farm. Bul. 695. **Willem, V.**—Comment les fleurs attirent les abeilles, **509,** xxvi, 539-43. **Wasmann, E.**—Viviparitat und entwicklung von Lomechusa und Atemeles, **38,** xxxiv, 382-93.

Beutenmuller, W.—A new Diastrophus on strawberry, **4,** 1915, 353-4. **Brethes, J.**—Prospalangia platensis (n. gen., n. sp.), **238,** lxxix, 314-20. **Mann, W. M.**—A gynandromorphous mutillid from Montana, **5,** xxii, 178-80. (See also under General.) **Smulyan,**

M. T.—Notes and descriptions of Tenthredella [4 new], **4**, 1915, 321-26. **Turner, R. E.**—On a new sp. of Pepsis [S. Am.], **8**, xvi, 413. **Wasmann, E.**—Eine neue Pseudomyrma aus der Ochsenhorn-dornakazie in Mexiko, **46**, lviii, 296-325.

THE EMBRYOLOGY OF THE HONEY BEE. By JAMES ALLEN NELSON, Ph.D., Expert, Bee Culture Investigations, Bureau of Entomology, U S. Department of Agriculture. Princeton University Press, Princeton, October, 1915, 12mo. Pp. vi, 282. 95 text figs., 6 plates. $2.00 net.—— The broad and comprehensive way in which the Bee Culture Investigations of the Bureau of Entomology have been considered and treated, since Dr. Everett Franklin Phillips was placed in charge of them in 1907, is strikingly illustrated by the publications which have emanated from the investigators concerned. Snodgrass has given us the results of a careful and original re-examination of the anatomy of the honey bee,[1] Casteel has corrected our notions of the manipulation of the wax scales[2] and the behavior of the bee in pollen collecting,[3] McIndoo has informed us on the olfactory sense[4] and on the scent-producing organ,[5] Phillips, C. A. Browne, B. N. Gates, G. F. White and G. S. Demuth, singly or in conjunction,[6] have dealt with various practical phases of apiculture and especially with bee diseases, while Phillips has summed up these and other researches and experiences in a recent volume[7] in *The Rural Science Series*. Now comes the still more esoteric volume on the embryology of the Honey bee. The keynote to all this work is in the first sentence of the preface contributed by Phillips to Nelson's book before us: "The good bee-keeper is he who is interested not only in those things which have to do directly with the production of honey, but to whom everything pertaining to honey bees has a deep interest." The conception that "everything pertaining to honey bees" should include an extensive and intimate knowledge of structure, physiology, behavior and embryology exhibits a breadth of view which it is a pleasure to em-

[1] Technical Series No. 18, Bureau of Ent., etc., May 28, 1910; 162 pp., 57 figs.

[2] Circular 161 of the same. Oct. 4, 1912. 13 pp., 7 figs.

[3] Bulletin 121 of the same. Dec. 31, 1912. 36 pp., 9 figs.

[4] Journal of Experimental Zoology, xvi, 265-346, 24 figs., April, 1914.

[5] Proceedings, Acad. Nat. Sci., Phila., 1914, 542-555, 1 text-fig., 2 pls., Aug. 21.

[6] Bulletins 75 (1907-1909) and 98 (1912) of the Bureau of Entomology Farmers' Bulletins 442 and 447 (1911) and Bulletins 92, 93 and 96 (1914) of the U. S. Dept. Agric.

[7] Beekeeping: A Discussion of the Life of the Honey Bee and of the Production of Honey, New York, The Macmillan Co. Aug., 1915.

phasize in a journal devoted rather to pure than to applied entomology.

Bütschli (1870), Kowalevski (1871), Grassi (1884), Blochmann (1889), Petrunkewitsch (1901, 1903), Dickel (1903) and Nachtsheim (1913) have described various phases of the development of the egg of the honey bee, but Nelson's work is more extensive and thorough-going than any of these, although it is devoted to the embryonic history of the workers and queens only, not of the drones.

The first chapter (3 pp.) gives an historical review of the embryology of the honey bee, the second (pp. 4-15) describes oviposition and the organization of the undeveloped egg. Chapters III-VII (pp. 16-112) treat of the development of the embryo as a whole from cleavage, through the formation of blastoderm and germ layers to acquirement of the external form of the larva. Chapters VIII-XIV (pp. 113-245) deal with the development of organ-systems, especially the nervous system (Chap. VIII, pp. 113-166), and the fate of the yolk and yolk cells.

Special efforts were made to determine the rate of development and as a result the seventy-six hours spent within the egg are divided into fifteen stages, designated by the numerals I-XV, whose several lengths extend from 2 to 22 hours. These are discussed (in Chapter XV), tabulated (p. 247) and illustrated on the plates which represent views of entire eggs fixed, stained and mounted in balsam. (Certain differences in the ages of these stages will be observed on comparing page 247 with pages 99-105).

The sixteenth chapter comprises a description of the technique employed and an excellent summary of the entire course of development (pp. 253-261). A list of abbreviations applying to all the figures, a bibliography on insect embryology (pp. 265-272) and an index (pp. 273-282) complete the text.

The book appears to us to be very clearly written and the figures excellent. Although there are nominally ninety-five text figures, their actual number is much greater, as many of them are two-, three-, or even five-fold. Dr. Nelson does not confine himself to his own careful study of embryos, but compares his findings with those of previous investigators of the embryonic development of the honey bee, of other Hymenoptera and of insects in general. These features will render his book of great use to all laboratories where any phase of insect embryology is touched on, however lightly.

Turning to a few of the special or novel features of this volume, we may note the useful summary of the conclusions of embryologists as to the origin of the mesenteron of insects (pp. 71-77). Dr. Nelson thinks that the relation of the mesenteron rudiments in the honey bee may be interpreted in either of two ways: they may be referred to the mesoderm, or considered as purely blastodermal in origin,

"but a final decision....seems premature" (p. 78). He believes it more appropriate to consider the premandibular, or second antennal, "appendages" "as exaggerated ganglionic swellings," with a diminished probability that they do represent appendages (p. 110). The supralingual head segment of Folsom is wanting (p. 111). Twenty-one embryonic segments (6 cephalic, 3 thoracic and 12 abdominal) and twenty neuromeres (11 abdominal) are recognized (pp. 110, 111, 137, 256-7). "The writer was never successful in finding anything which could be safely construed as abdominal appendages. They certainly occur, nevertheless, in certain Hymenoptera" (p. 112). In a comparison of nervous systems of different insects "a larval stage" is denied to the Orthoptera (p. 117). Previous investigators have not mentioned the degenerating cells within the embryonic nerve tissue, isolated and in small number in the ventral cord, but in the brain abundant and to a certain extent localized in definite regions; the significance of this degeneration is not apparent (pp. 164-166). A pair of tracheal invaginations on the second maxillary segment give rise to the anterior ends of the tracheal trunks; they had been over looked by Nelson's predecessors. On the basis of this discovery, the homology of the tentorial invaginations with those of tracheae "is made decidedly problematical" (pp. 172-175).

Comparatively little interest has been taken in insect embryology within the last decade, but this valuable book will unquestionably direct more attention to this highly important field of entomology.—P. P. C. (*Advt.*)

Mimicry in Butterflies. By Reginald Crundall Punnett, F. R. S., Fellow of Gonville and Caius College, Arthur Balfour Professor of Genetics in the University of Cambridge. G. P. Putnam's Sons, New York. 159 pages, 16 plates, in color. 15 shillings net.—This is is very interesting review of the whole subject of what is termed Batesian and Mullerian mimicry. The condensation from a vast amount of literature is efficiently accomplished. Mimicry in a number of North and South American species is treated and several plates are devoted to them. The author does not accept the usual explanation for the phenomenon. From the "Conclusion" we extract the following: "From the facts recorded in the preceding chapters it is clear that there are difficulties in the way of accepting the mimicry theory as an explanation for the remarkable resemblances which are often found between butterflies of distinct groups." . . . . "The simplicity of the explanation is in itself attractive. But when the facts come to be examined critically it is evident that there are grave, if not insuperable, difficulties in the way of its acceptance . . . . Nevertheless, the facts, as far as we at present know them, tell

definitely against the views generally held as to the part played by natural selection in the process of evolution."

For those who do not have time or opportunity to consult the original papers, this work will be of value, as it gives a comprehensive summary of them.—H. S. (*Advt.*)

Doings of Societies.

Feldman Collecting Social.

Meeting of September 15, 1915, at the home of H. W. Wenzel, 5614 Stewart St., Philadelphia. Eight members were present, President H. A. Wenzel in the chair.

Coleoptera.—Mr. H. W. Wenzel exhibited a specimen of *Calosoma sycophanta* Linn. collected by Elmer Wenzel, Philada., July 27, 1915. Dr. Castle said he had collected in the meadows at Ocean City, New Jersey, August 28, and found *Conotrachelus fissunguis* LeC. and *Bothrotes arundinus* LeC. in numbers. At Pine Beach collecting was poor, but at Seaside Park, September 5, he had found about 500 *Balaninus* in the "washup." Mr. Laurent said he had taken about sixteen hundred specimens last year which he considered a poor season, but this is still worse. He had taken a few good things in different orders; in the Coleoptera he considered among his best captures a male *Leptura mutabilis* Newm. on ironwood, and a male (August 18) and a female (August 14) *Scaphinotus viduus* Dej. All three specimens were collected at Chestnut Hill and were exhibited. Mr. Haimbach reported a clover weevil, *Phytonomus meles* Fabr. as common on his place in Roxborough, Pennsylvania, this summer. Mr. Geo. M. Greene exhibited a male *Malacorhinus tripunctatus* Jacoby collected by H. Mittendorf in New Braunfels, Texas, April 4, 1902, representing a Chrysomelid species new to the United States.

Diptera.—Mr. Daecke said that men cutting down trees at Rockville, Pennsylvania, had left behind a barrel used by the horses for drinking purposes. He had noticed mosquito wrigglers in this Aug. 15th and had taken them home and bred *Megarhinus septentrionalis* Dyar and Knab; this is the most northern record. Mr. Geo. M. Greene stated that he had caught a specimen of this species at Chain Bridge, Virginia, September 8, 1915.

Adjourned to the annex.

GEO. M. GREENE, *Secretary.*

American Entomological Society.

Meeting of October 28, 1915, at the Academy of Natural Sciences of Philadelphia. Dr. Philip P. Calvert, President, in the chair. Twelve persons present. The President announced the death of a member, C. Few Seiss, September 5, 1915.

Lepidoptera.—Dr. Skinner exhibited a living yucca plant brought from Enterprise, Florida, by Dr. D. M. Castle. The plant contained the boring larva of a *Megathymus* which had pupated; the pupa was in a tough silken cocoon protruding centrally among the leaves of the plant. The two species of *Megathymus* found in Florida are *yuccae* and *cofaqui*, and the present species cannot be known until the imago appears.

Hymenoptera.—Mr. Laurent exhibited *Sirex cressoni* var. *unicolor*, taken at Mt. Airy, Philadelphia, July 17th, and *Pristaulacus flavicrurus*, Chestnut Hill, Philadelphia, July 17th.

Coleoptera.—Dr. Calvert referred to previous discussions on the presumed antenna-cleaner on the fore leg of Carabidae (see Ent. News, xxv, 141, 142) and read an extract from Miall's *Aquatic Insects* (pp. 376-378), in which such structures and their function are described.

Orthoptera.—Mr. Laurent exhibited a green roach, *Nyctobora laevigata* Beauv. taken at Germantown, Philadelphia, by Mr. Thompson. It is a tropical species and probably arrived in a bunch of bananas. Mr. Morgan Hebard spoke of the value of a two per cent. solution of formaldehyde in fixing the delicate colors of the Orthoptera, particularly the greens. The specimens are allowed to remain in the solution for two hours.

Mr. Wm. T. Davis was elected a member.—Henry Skinner, *Rec. Secretary.*

Newark Entomological Society.

Meetings held in the Newark (New Jersey) Public Library on October 10 and November 14, 1915. Pres. Buchholz in the chair. Average attendance 12 members.

Lepidoptera.—Mr. Doll exhibited some southern and western species including *Papilio troilus* L., from Florida; *Pholus typhon* Klug., from Arizona, and *Samia rubra* Behr., from California. Mr. Herman H. Brehme showed some exceptionally fine *regalis* larvae from Morgan, New Jersey, which he had inflated and colored. Mr. Buchholz spoke of having reared *Crocota immaculata* Reak. and *Crocota trimaculosa* from eggs, getting a fine series, the majority of which were females. Mr. Brehme at the October meeting stated that *Atteva punctella* Cram. & Stoll was very abundant at Morgan, New Jersey, on goldenrod. This species is recorded in Smith's 1909 list only from southern New Jersey. At the November meeting, Mr. Rummel exhibited the following captures: *Apantesis nais* Dru., V, 12; *A. radians* Wlk., V, 18; *A. vittata* Fabr., V, 12, all from Upper Montclair, New Jersey, and *Apatura clyton* Bd., VII, 20; *Libythea bachmani* Kirtl., VII, 20, from North Arlington, New Jersey. Messrs. Buchholz and Lemmer reported the captures of *Xylina petrata* Grt.

and *Xylina capax* G. & R. at Lakehurst, New Jersey, October 17, and Messrs. Mayfield and Keller the capture of *Catocala serena* Edw. larva on shellbark hickory at Orange Mts. Reserve, New Jersey, during June. Mr. Weiss mentioned the occurrence of *Utetheisa bella* L. larvae in large numbers on *Lespedeza* at Jamesburg, New Jersey, September 2, and of *Evetria buoliana* Shiff. larvae in the tips of Mugho and Austrian pines at Rutherford, New Jersey, during the past summer. This last is the European pine shoot moth recently established in New Jersey. He also stated that *Melalopha inclusa* Hubn. larvae were more abundant than usual during the summer on poplar trees in different parts of New Jersey and recorded *Pinipestis zimmermanni* Grt. from Eatontown, New Jersey, August 5.

Orthoptera.—At the October meeting, Mr. Weiss exhibited eggs, nymphs and adults of the European mole cricket, *Gryllotalpa gryllotalpa* L., taken at Rutherford, New Jersey, and stated that the firm on whose premises they were found, claimed to have destroyed at least 20,000, including eggs. This is another European insect recently found inhabiting New Jersey.

Homoptera.—Mr. Rummel at the November meeting recorded the Periodical Cicada during May and June, 1915, from Garwood and Upper Montclair. Records of this brood in New Jersey are scarce.

Coleoptera.—Mr. Stortz commented on the scarcity of *Lixus concavus* on dock the past summer and exhibited specimens of this species. Specimens of *Corthylus punctatissimus* Zimm. and their work in rhododendron stems were shown by Mr. Weiss, who stated that this insect had recently become somewhat of a pest on a private estate at Somerville, New Jersey. He also showed *Eucactophagus graphipterus* Champ., a Calandrid whose larva lives in soft bulbed orchids. This species, which is a native of Central America, was taken in a New Jersey greenhouse. Mr. Weiss also showed *Plagiodera versicolora* Laich., a Chrysomelid common in Europe, which was found to be established in New Jersey at Arlington and Irvington, feeding on poplars and willows and doing considerable damage the past summer.

Hymenoptera.— *Pteronus hudsonii* Dyar, August, Rutherford, Trenton, New Jersey, larvae on poplar, were recorded by Mr. Weiss, who also remarked on the unusual abundance of saw flies the past season, especially such species as *Lophyrus abbottii* Leach and *L. lecontei* Fitch on pines.—Harry B. Weiss, *Rec. Secretary.*

OBITUARY.

Prof. Raphael Meldola, who was President of the Entomological Society of London in 1895 and 1896, died in that city on November 16, 1915, according to a despatch published

in the daily papers. He was born in London in 1849 and at the time of his death was professor of organic chemistry in the University of London. His work was mainly with the chemical structure of organic compounds containing nitrogen and devising synthetical methods for producing coloring matters, as from coal-tar, but he found time to devote to entomology, especially on its physiological and evolutionary sides. One of his earliest papers was *On the amount of substance-waste undergone by insects in the pupal state, with remarks on Papilio ajax* (1873), based in part on W. H. Edwards' tables, which led to a mild controversy with S. H. Scudder. At least eight papers, from 1872 to 1905, dealt with protective resemblance and mimicry, and he was one of the earliest exponents in England of Müllerian mimicry. His presidential addresses to the Entomological Society of London (which he joined in 1872) were on *The Speculative Method in Entomology* (1895) and *The Utility of Specific Characters and Physiological Correlation* (1896). On the one hand he translated and edited Weismann's *Studies in the Theory of Descent* (1882) and on the other indulged in local faunistics, as evidenced by *The Lepidoptera of Leyton and Neighbourhood: a contribution to the County Fauna* (1891) and *What has become of the British Satyridae?* (1911). He was a member of the Royal, chemical and other technical societies and had received several honorary degrees.

Dr. Frederick William Russell, for many years a practitioner in the town of Winchendon, Massachusetts, died at the residence of his son-in-law, Dr. Frank J. Hall, 4119 Cedar Springs Avenue, Dallas, Texas, November 20, 1915, aged seventy-one.

He graduated from Harvard College in the class of 1869, and from the Medical Department of New York University in the class of 1871. He was a hospital steward during the Civil War, and served in that capacity under his father, Dr. Ira Russell, who was commissioned by Abraham Lincoln to organize the hospital service in Tennessee, Missouri and Ar-

kansas, both father and son being in service at the close of the war at Prairie Grove, Arkansas.

After his graduation in medicine he associated himself in practice with his father in Winchendon, where father and son together conducted "The Highlands," a private institution for the treatment of mental and nervous invalids, established by Dr. Ira Russell, and one of the first of its kind.

After the death of his father, in 1888, Dr. F. W. Russell continued "The Highlands" up to three years ago, when from ill health he gave up active work to make his home (together with his wife, Mrs. Caroline Marvin Russell, who survives him) with his daughter, Mrs. Frank J. Hall, in Dallas. During his brief residence in Dallas, because of his genial nature and interest in all social and scientific bodies, he made many friends.

In connection with his medical studies, Dr. Russell made a lifetime study of entomology and formed a collection of moths.

His remains were taken by his son, Walter M. Russell, of Emporia, Kansas, to Winchendon, Mass., where they were laid to rest in the family lot.—F. J. H.

[Dr. Russell was a substantial friend of the NEWS in its early days and his interest in the journal was continued to the last. The number for April, 1915, contains an illustrated article from his pen: "A Remarkable Abdominal Structure in Certain Moths."]

A card from Mr. P. Wytsman, from Brussels (Belgium), informs me of the death of M. CHARLES KERREMANS, which occurred on the tenth of October, 1915, at the age of 68 years. M. Kerremans was a student of the Buprestids, and his great monograph of this family remains, unfortunately, unfinished with the first part of the seventh volume of this monumental work.—A. FENYES, Pasadena, Calif.

The number of ENTOMOLOGICAL NEWS for December, 1915, was mailed at the Philadelphia Post Office on December 3, 1915.

The first line on page ii, volume XXV, of the NEWS should read, "The several numbers of the NEWS for 1914," etc.

Vol. XXV, page 445, 13th line from bottom for "1892" read "1852."

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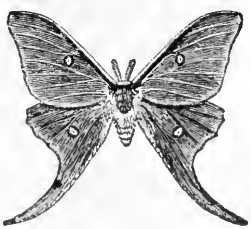

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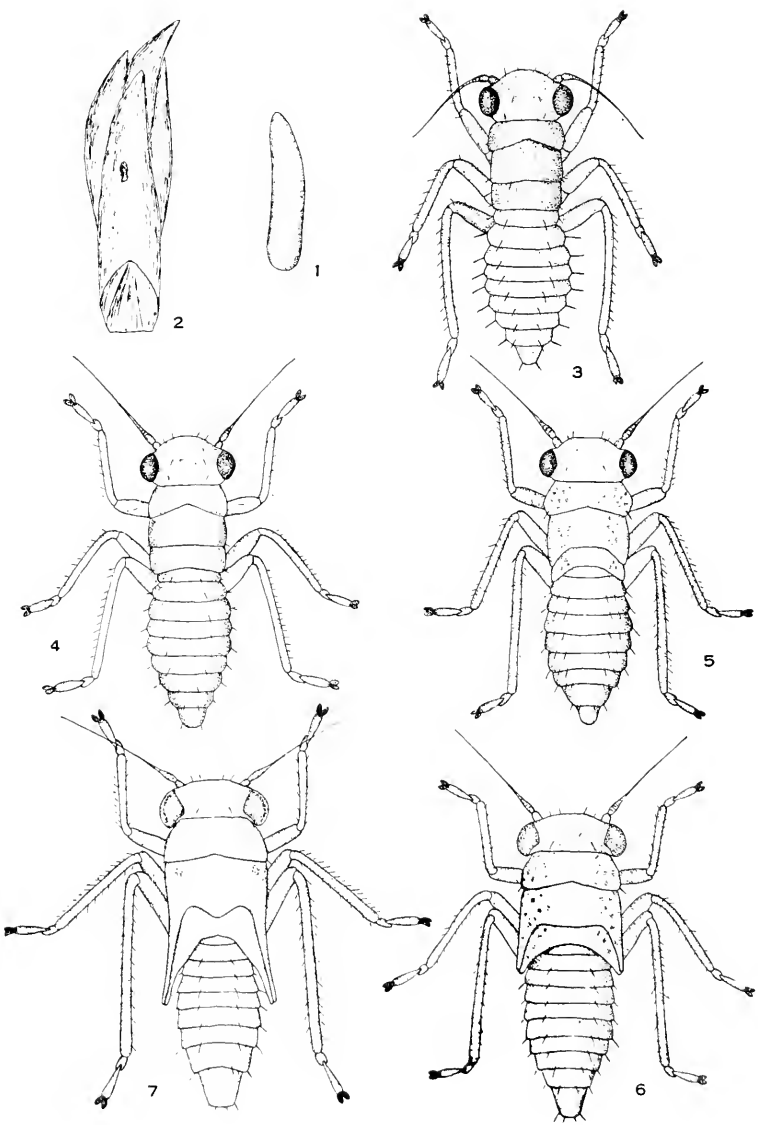

EMPOASCA OBTUSA—LEONARD.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XXVII. FEBRUARY, 1916. NO. 2.

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The Immature Stages of two Hemiptera—Empoasca obtusa Walsh (Typhlocybidae) and Lopidea robiniae Uhler (Capsidae).*

By M. D. LEONARD, Ithaca, N. Y.

(Plates II, III)

Empoasca obtusa Walsh (Plate II).

During the early spring of 1915 twigs of the common cottonwood, *Populus deltoides* Marsh, and of the Lombardy Poplar, *Populus nigra italica* Du Roi, were brought into the Cornell Insectary for the purpose of rearing a species of *Idiocerus* (*Bythoscopidae*) which was known to infest them. Four or five days before the nymphs of *Idiocerus* began to hatch, several small, greenish-yellow, first-stage nymphs were observed running actively about on the opening buds of the

* Contribution from the Department of Entomology of Cornell University.

Lombardy poplar. These greatly resembled nymphs of the apple leaf-hopper, *Empoasca mali* Le Baron. One of these first-stage nymphs was described on April 15, and the first fifth-stage nymph was observed on April 25. The trees from which the twigs were taken were not again examined until July 31. On the latter date one adult was found on each species of poplar. No egg pouches were observed.

The following descriptions of the nymphal stages are based on rearings made in the Cornell Insectary during the spring of 1915. The drawings were made by the writer. The adult was kindly determined for me by Prof. Herbert Osborn.

R. L. Webster (Ent. News, xxi, 265-266) states that "the young nymphs were characterized by dull, reddish tibiae and tarsi. The eyes and antennae were red brown." In the specimens which the writer reared the tibiae were entirely pale and the tip of the tarsi was dusky in stage I, more brownish in stage II. The eyes were dark reddish and the antennae dusky rather than red brown.

The Egg (Fig. 1). *Empoasca obtusa* spends the winter in the egg-stage. On April 17 egg-pouches of this insect were observed on the twigs in the Insectary. They resembled those of *Empoasca mali* Le Baron, and were situated on the outer side of the larger bud scales. (See Fig. 2. Tissue has been removed to show anterior end of egg.) This differs somewhat from the observations of R. L. Webster, who states that he found the egg-pouches placed "in wood two or three years old, which on poplar trees is comparatively soft wood." The buds at this time were just beginning to burst. Eggs are placed singly in the pouches.

Length of egg, 1.1 mm.; greatest width, 2.7 mm.; pale translucent, shining, cylindrical, rather strongly curved, bluntly rounded at posterior end, tapering somewhat and more sharply pointed at anterior end.

Stage I (Fig. 3). Length, 1 mm.; width of head, including eyes, .36 mm. General color pale greenish yellow or pale translucent slightly tinged with greenish. Thorax slightly suffused with dusky, eyes reddish. Antennae, except basal segment, dusky. Legs pale translucent tinged with dusky, tip of tarsi, and the claws darker.

Stage II (Fig. 4). Length, 1.44 mm.; width of head, including eyes, .414 mm.; general color pale greenish yellow. Eyes reddish. An-

tennae and legs as in preceding stage, tip of tarsi, and the claws brownish.

Stage III (Fig. 5). Length, 1.7 mm.; width of head, including the eyes, .558 mm.; general color pale greenish yellow. Thorax sparsely mottled with faint dusky spots. Eyes dusky. Antennae and legs as in preceding stage. Wing-pads becoming apparent.

Stage IV (Fig. 6). Length, 2.25 mm.; width of head, including eyes, .684 mm. General color pale greenish yellow. Thorax often faintly mottled on lateral margins with dusky spots as in preceding stage. Eyes pale, faintly tinged with dusky. Antennae pale, slightly tinged with dusky, except basal segment. Wing-pads extend back to second half of third abdominal segment.

Stage V (Fig, 7). Length, 2.61 mm.; width of head, including eyes, .846 mm. General color pale greenish, abdomen tinged with yellowish. Mesothorax often with a faint dusky spot on either side near cephalic margin. Wing-pads reach back nearly to sixth abdominal segment. Antennae pale yellowish. Eyes pale yellowish, slightly tinged with dusky at inner margin and with a reddish stripe near outer margin. Femora pale greenish; tibiae and tarsi pale yellowish, extreme tip of second tarsal segment, and the claws dusky.

Adult.—The original description of this species, as given by Walsh, Proc. Boston Soc. Nat. Hist., 9, 316 (1864), is as follows: "Pale grass green. Front of head forming a very obtuse angle with the apex rounded off. Each ocellus surrounded with a fuscous spot. Eyes and tips of the tarsal joints fuscous; elytra greenish-subhyaline; tips hyaline. Triangular cell peduncled. Wings hyaline. Length to tip of wings, three-sixteenth of an inch."

Lopidea robiniae Uhler (Plate III).

On June 10, 1915, a number of reddish, first-stage Capsid nymphs, with a white band at the base of the abdomen, were observed on the leaves of the common locust, *Robinia pseudo-acacia* L., at Honeoye Falls, New York. On June 21, third and fourth-stage nymphs were obtained, and on June 26, the first fifth-stage nymph was observed. July 7 fifth-stage nymphs were very common and on July 10 two adults were taken in company with the nymphs. These were kindly determined for me by Mr. H. H. Knight as *Lopidea robiniae* Uhler. A few fourth-stage nymphs were also present on this date. Although the younger nymphs were more commonly seen on the leaves, the older ones rested, for the most part, on the smaller twigs. When the hand was brought near they would run rapidly, keeping always on the opposite side. By July 31 most of the nymphs had transformed to adults.

It is possible that *Lopidea robiniae* is two-brooded, at least in New York State. Mr. H. H. Knight has kindly informed me that during 1915 at Wyoming, New York, most of the nymphs had matured by the latter part of July. No specimens were again taken until August 12, when 8 adults and 3 fifth-stage nymphs were collected on locust. These were apparently stragglers from the first brood. Although constant search was made for *Lopidea robiniae* no more specimens were found until September 14 at Wyoming, when adults were very abundant. Five or six fifth-stage nymphs were collected and about 163 adults, many of which were teneral.

If the species is one-brooded it is possible that the exceptionally cool, rainy weather which prevailed throughout western New York during June and July, 1915, delayed the hatching of many of the over-wintering eggs until the early part of August. This would give the nymphs about a month to produce such a large number of adults as was found by Mr. Knight on September 14.

The foliage of the trees on which the nymphs were most abundant was injured to a considerable extent by a characteristic yellow stippling and sometimes in addition the leaves were crumpled. When feeding, the nymphs remained mostly on the under side of the leaves.

Stage I (Fig. 1). Length, 1.35 mm.; greatest width of abdomen .576 mm. Head pinkish, a whitish, rather indefinite procurved line on vertex connecting the eyes. Each thoracic segment with two dusky spots as shown in the figure. Laterad of spots on pro- and mesothorax, whitish; whole of metathorax, median line on thorax and behind spots on the two thoracic segments, tomato red. Abdomen tomato red, except for second half of first segment, the whole of the second and a rather indefinite spot on lateral margin of segments 3-6 inclusive, white. Opening of dorsal gland indicated by a dusky spot. Antennae reddish, paler at joints; terminal segment covered with fine golden hairs; other segments more sparsely clothed with longer dark hairs. Legs pale brownish, tarsi dusky. Dorsum sparsely clothed with rather long black hairs.

Stage II (Fig. 2). Length, 1.8 mm.; greatest width of abdomen, .792 mm. General color tomato red. Head pale grayish or dusky, a white spot behind eyes. Dusky spots on thorax much larger than in preceding stage. As before, lateral margin of pro- and mesothorax

white, the metathorax, the hind margin of pro- and mesothorax and the median line of thorax, tomato red. The median line meets a procurved line on vertex of the same color which connects the eyes. Abdomen as in preceding stage. Eyes and antennae dark reddish. Legs darker than in stage I, almost dusky, femora sometimes slightly paler at tip, tarsi somewhat darker. Body more hairy than in preceding stage.

Stage III (Fig. 3). Length, 2.34 mm.; greatest width of abdomen, 1.00 mm. General color a little darker than in preceding stage. Head and thorax washed strongly with dark grayish or dusky, except for narrow median line and the narrow hind border of the pro- and mesothorax which are tomato red. Head marked as before. Abdomen as in preceding stage. Eyes very dark reddish. Antennae dark reddish to dark brownish gray. Legs dark brownish gray, femora sometimes slightly paler at tip. Wing-pads just beginning to show. Body more hairy than in preceding stage.

Stage IV (Fig. 4). Length, 3.12 mm.; greatest width, across wing-pads, 1.1 mm. More elongate than in preceding stage. Head and thorax entirely overlaid with dusky except for the white spot behind the eyes and the narrow tomato red median line which meets the procurved line of the same color on the vertex. Abdomen as before except that hind margin of first segment and second half of second segment are whitish; seventh segment also has a white spot on lateral margin. Eyes very dark reddish. Legs and antennae almost black. Dorsum now thickly clothed with fine blackish hairs, more abundant than before. Wing-pads reach back nearly to third abdominal segment.

Stage V (Fig. 5). Length, 4.00 mm.; greatest width, across wing-pads, 1.62 mm. Head similar to preceding stage. Ground color of thorax red, strongly washed with dusky except for narrow pinkish median line. Two large, more or less distinct, subquadrate dusky spots on prothorax. Wing-pads are blackish and reach about to second half of fifth abdominal segment. Abdomen with first and second segments marked with pinkish rather than whitish as before; the spots on segments 3-7 also pinkish. Eyes blackish. Legs and antennae more slender and slightly longer than in preceding stages and almost black. Dorsum and legs still thickly clothed with hairs as before.

The individuals of this stage seem to vary in size and color somewhat more than those which I have examined of the other stages. Some are slightly longer than 4.00 mm., others somewhat smaller. Also some specimens are considerably darker, especially on the thorax, than others.

Adult, female (Fig. 6). Length, 6.25-6.50 mm.; width, 2.0-2.5 mm. Orange, with a broad black stripe which extends the whole length of

the insect. Head orange or brownish-yellow with a broad blackish stripe either side of the median line and a small black dot behind the antennal tubercle. In front of the antennae the two stripes fuse into one which runs to the base of the beak. Eyes dark red. Beak, antennae and legs black; coxae and trochanters pale-translucent; venter pinkish.

Male.—Slightly smaller and narrower than female.

Explanation of Plates.

Plate II—*Empoasca obtusa* Walsh.

Fig. 1. Egg.
Fig. 2. Bursting poplar bud with egg-pouch. Tissue removed to expose anterior half of egg.
Fig. 3. Stage one.
Fig. 4. Stage two.
Fig. 5. Stage three.
Fig. 6. Stage four.
Fig. 7. Stage five.

Plate III—*Lopidea robiniae* Uhler.

Fig. 1. Stage one.
Fig. 2. Stage two.
Fig. 3. Stage three.
Fig. 4. Stage four.
Fig. 5. Stage five.
Fig. 6. Adult.

Lycaena piasus et rhaea (Lep.).

Je crois que les *Lycaena piasus* Boisduval et *rhaea* Boisduval dont j'ai donné les figures sous les Nos. 1950 de la Pl. ccxxxvii et 2078 et 2079 de la Pl. ccxxxix des *Etudes de Lepidopterologie Comparée* appartiennent à une seule et même espèce.

Le nom *rhaea* doit être supprimé, comme faisant double emploi avec *piasus* plus ancien. Veuillez remarquer ce que j'ai écrit à la page 43 du Volume IX, 1ere partie: "Il est étonnant que Boisduval ait oublié l'espèce qu'il avait appelée *piasus* losqu'il a décrit *rhaea*." J'indiquais ainsi mon opinion relativement à *rhaea* synonyme de *piasus*.

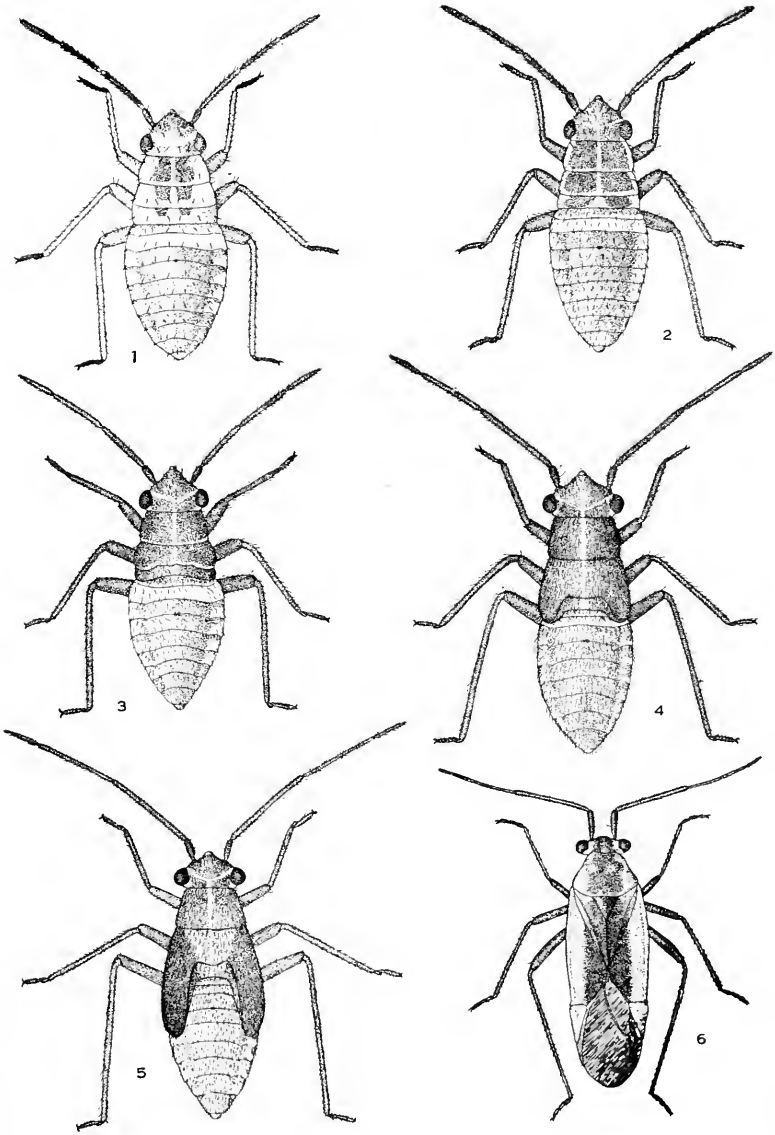
Dans la collection Boisduval le type *piasus* n'est pas bien frais.

Sagittifera Felder (Novara; tab. xxxv, fig. 20, 21) est également synonyme de *piasus*.

Donc le synonymie doit être ainsi établie:

piasus Bdv.
sagittifera Felder,
rhaea Bdv.

Charles Oberthür, Rennes, France, 30 Octobre, 1915.



LOPIDEA ROBINIAE—LEONARD.

Hunting Butterflies in the Ozarks (Lep.).

By R. A. Sell, Houston, Texas.

Southern Missouri embraces the only highland region of the Mississippi Valley. These highlands can almost be regarded as one of Nature's scrap heaps, since they contain so many features that are both striking and unique. Being well supplied with water and a diversity of food plants the protected coves and glades and brushy weed patches form an inviting refuge for the butterflies that feed in the open fields of the adjoining states.

Most entomologists are aware of the fact that the Ozark region offers exceptional opportunities for collecting butterflies—especially in the adult stage—but it may astonish some of them to see the unusual range of this list taken in five days. There were three of us in the party and we tramped over the brakes, heavily wooded knobs and the open fields of a district extending from about forty miles northeast of Springfield in a rather wide circle to a little south of east. The start was made on August 22 and the weather was fairly satisfactory. This being the real harvest season, apples, melons and other dainties were very plentiful. Many wild flowers, especially of the composite family, were in bloom. In little coves near the open fields many widely different varieties of butterflies took shelter together. A fifty mile walk in this country will include various kinds of scenery and there are some very prosperous farms in close proximity to scrub-oak wastes and rocky knolls.

The people, mostly of the friendly, easy-going independent small farmer type, are not over curious and are not given to sentiment. "What are you goin' to do with them things?" and "How much do you get for one?" are typical questions. Every one seemed to have plenty of time to stop and talk to us.

Our list is as follows:

Basilarchia disippus
Basilarchia weidemeyeri
Basilarchia astyanax
Basilarchia arthemis
Chlorippe celtis
Pyrrhanaea andria
Debis portlandia
Satyrodes cantlus

Neonympha gemma
Neonympha eurytus
Coenonympha ochracea
Satyrus alope
Satyrus charon
Calephelis borealis
Thecla halesus
Thecla autolycus
Thecla melinus
Thecla cecrops
Chrysophanus thoe
Lycaena lygdamas
Lycaena comyntas
Anosia plexippus
Euptoieta claudia
Argynnis idalia
Argynnis diana
Argynnis cybele
Argynnis alcestis
Brenthis myrina
Brenthis boisduvali
Melitaea harrisi
Phyciodes nycteis
Phyciodes ismeria
Phyciodes phaon
Phyciodes tharos
Grapta comma
Grapta satyrus
Vanessa antiopa
Pyrameis atalanta
Pyrameis huntera
Pyrameis cardui
Junonia coenia
Nathalis iole
Pieris protodice
Pieris rapae
Catopsilia eubule
Meganostoma caesonia
Colias eurytheme
Colias philodice
Papilio marcellus
Papilio turnus
Papilio cresphontes
Papilio asterias
Papilio troilus
Papilio palamedes
Papilio philenor
Epargyreus tityrus
Eudamus proteus
Thorybes bathyllus
Alchalarus lycidas
Hesperia tessellata
Hesperia centaureae
Pholisora catullus
Pholisora hayhursti
Thanaos lucilius
Thanaos persius
Amblyscirtes vialis
Erynnis ottoe
Thymelicus aetna
Atalopedes huron
Polites peckius
Limochroes taumas
Limochroes pontiac
Euphyes verna
Euphyes metacomet
Poanes massasoit
Phycanassa viator

Nepticula rhamnicola nom. nov. (Lepid.).

The name *Nepticula rhamnella*, used by me in describing a new species of *Nepticula* in the Journal of the Cincinnati Society of Natural History, xxi, 96, 1912, is preoccupied by *Nepticula rhamnella* H. S. of the European fauna.

I propose the name *Nepticula rhamnicola* for the American species. —Annette F. Braun, Cincinnati, Ohio.

A New Descriptive Formula.

By C. W. Woodworth, University of California, Berkeley, Calif.

The writer has used in his classes for a number of years certain methods for pointing out features of structure which are very evident to the eye, but not easily expressed in simple descriptions.

One of these, which has been particularly helpful, is presented below. It consists in the use of shape formulae for Hemiptera and Coleoptera. It has been found possible to thus describe the structure in question so well that a student can reproduce a recognizable picture from a line of numbers with more accuracy in detail than found in many published illustrations.

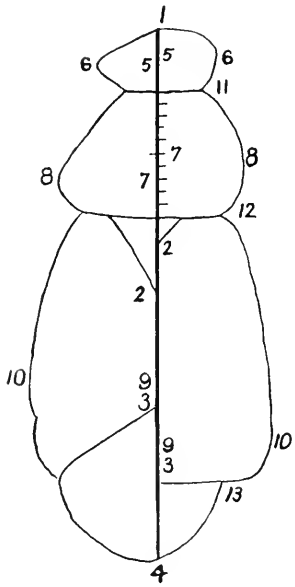
The plan in these formulae has been to determine the measurements a careful artist would make when laying out a drawing and by always arranging the numbers in the same order avoid the necessity of specifying what each measurement indicated. Instead of making these measurements in fractions of inches or millimeters, it was found better to use a portion of the body as a unit and the dimension finally adopted was a tenth of the length of the prothorax. This proved sufficiently accurate for the purpose and not too minute.

The sequence of taking the measurements is indicated on the accompanying figure. The head measurements are taken from measurements from the front edge of the thorax, and the thoracic and abdominal measurements from the hind edge of the thorax. The widths 6, 8, 10, 11, 12 and 13 are measured from side to side, the others along the middle line parallel with the axis of the part. Where the axis of the body bends there should be added (14) the number of degrees bend at the head and thorax articulation and (15) the angle at the pro- and mesothorax articulation. When the pygidium is wanting 3 and 4 would be given as the same size and 13 would read 0, and if the thorax is widest at the hind angles then 7 would be 0 and must be included to avoid the necessity of explaining its absence. The formulae for the bug and beetle

shown on the two sides of the middle line in the figure, are respectively:

5	2	21	27	3	9	5	14	18	18	7	10	10
5	6	15	27	2	8	3	16	13	20	6	12	16

The first measurement is the length of the head which is 5, that is 5/10 the length of the prothorax in both cases, the second the length of the scutellum, 2 and 6 respectively, the third to the ends of the corium (21) or elytron (15), the fourth the total length behind the prothorax which in both cases figured is 27/10 of the length of the prothorax.



The next three pairs of measurements give the location of the widest part and the width of each of the three regions of the body. Thus the beetle, at its widest point, is as wide as 18/10 of the length of the prothorax and this point is 18/10 behind the hind edge of the prothorax, while the bug is 20 wide at its maximum width, but this point is further forward, being only 13 back of thorax. The last three numbers are the widths at the three constrictions.

In using these numbers the length of the prothorax, according to size desired, is measured along a line which will serve as the middle line of the insect; then, in order lay off the other dimensions, finally connecting up these points in the way an artist calls "blocking in," giving a sketch very accurate in proportions.

Mr. E. A. Schwarz, Honorary President.

A note in *Science* for Jan. 21, 1916, states that the Entomological Society of Washington has created the office of Honorary President of the society and has elected Mr. E. A. Schwarz thereto. We tender our congratulations to His Honor and to the Society. It is intended that this position will "be tendered only to active members who have been especially prominent in the affairs of the society and to convey with it expressions of gratitude, respect and honor."

Hermetia illucens Breeding in a Human Cadaver (Dipt.).*

By L. H. Dunn, Board of Health Laboratory, Ancon, Canal Zone.

The flies of the Stratiomyidae, or "soldier flies" family, seem to have a great variety of breeding places, especially those of the species that are terrestrial, some being carnivorous, while other nearly allied species will only deposit their eggs on decaying vegetable matter. *Hermetia illucens,* the species so common in both North and South America, shows a considerable variation in the selection of food material for the larvae, but in the literature at hand I have been unable to find any record of their breeding in a human cadaver as in the case which came under my observation, and which may be of interest to those who are engaged in making observations on this family.

A few months ago the body of a man was found lying in the jungle about three miles from one of the settlements in the Canal Zone. It was evidently a case of suicide and death had occurred as the result of a gunshot wound in the head. The body was identified by the metal check and other articles found in the pockets of the clothing as being that of a man who had been missing for more than a month, and evidently had been lying on the ground exposed to the elements for that length of time, and was badly decomposed; the clothing, bones, and a little flesh remaining.

When found, the remains were covered with the long dark larvae of *H. illucens.* They were in such great numbers that some parts of the body, and even places on the sodden clothing, were covered with crawling masses of larvae almost half an inch deep. There must have been several thousands of the larvae on the body upon its arrival at the morgue (which is a building connected with the laboratory), and these were but a part of the numbers covering it when first discovered.

* Read before The Medical Association of the Isthmian Canal Zone, October 16, 1915.

Several hundred of the larvae were collected and placed in a glass jar having about two inches of damp sand in the bottom. Within twenty-four hours all of the larvae had burrowed beneath the surface of the sand, but not deep enough to be seen on the bottom of the jar. None afterwards went to the bottom. They apparently remained just out of sight below the surface. The sand was not kept moist and in a few days became very dry. No food was placed in the jar until the seventh day after the larvae had been placed in it, and then a small piece of decomposed beef, about one inch square, was placed on top of the sand to determine whether the larvae were ready to pupate or whether they would continue to feed. At the end of twenty-four hours all that remained of the beef was the damp place which represented its former position on the sand. No other food was placed in the jar.

The larvae did not cast their skins while pupating but passed the pupal period within the larval skins, which remained unbroken and but very little changed in appearance, until time for the adult flies to emerge. The first adult emerged twenty-three days after the larvae were placed in the jar and they continued to emerge as late as eighty-one days. It was impossible to make a correct estimate of the pupal period as they did not all begin to pupate at anywhere near the same date and the period of emergence was so long.

All of the several hundred larvae collected and bred out were *H. illucens*, no other species being present. No larvae of any other dipterous families were found in the cadaver. This, by the way, is remarkable, considering the number of *Chrysomyia macellaria*, and other flies whose larvae are carnivorous, that are found in this region and which are always ready to deposit their eggs in decaying animal matter. A decomposed body, either human or animal, is a favorite breeding place for *C. macellaria*, but not a single larva of this species was found. It is not improbable that the larvae of *H. illucens* in such numbers were sufficiently predaceous to

destroy all other larvae that attempted to live in such close proximity with them.

Howard states: "There are observations on record which seem to show that the larvae of the curious American genus *Hermetia* may live in bee hives, and in the nests of wild bees. At all events, *H. illucens* has been seen hovering about bee hives and thrusting its eggs through cracks in the hives."* The dissimilarity of breeding places as mentioned by Howard and the case which came under my observation would seem to show a considerable diversity in this species in the selection of breeding places.

I wish to express my thanks to Mr. Frederick Knab, of Washington, D. C., for his kindness in identifying the flies for me.

The Bee-genus Halictoides in North America (Hym.).

By T. D. A. Cockerell, University of Colorado, Boulder, Col.

The genus *Halictoides*, as the name indicates, consists of more or less *Halictus*-like bees, which however belong to the Panurgine series. The species are not very numerous, but are often remarkable for their secondary sexual characters. One of the most extraordinary, with the male legs elaborately produced into spines and angles, has been separated by Viereck as a distinct genus, *Cryptohalictoides*. This species, *C. spiniferus* Vier. comes from Nevada. Several subgenera have also been recognized. Cockerell and Porter (Ann. Mag. Nat. Hist., Dec. 1899, p. 420), after investigating the mouth-parts of a number of species, concluded that typical *Halictoides* (type *H. dentiventris* Nyl.) was not represented in America, and placed the American species then available in a new subgenus *Parahalictoides;* with the exception of *H. marginatus*, which fell in another subgenus, *Epihalictoides*. A third American subgenus is *Conohalictoides* Viereck, based on *H. novacangliae*

* Howard, L. O.—"The Insect Book," Page 128. Doubleday, Page & Company, New York, 1912.

(*lovelli* Vier.). *Neohalictoides* Vier. cannot be separated from *Parahalictoides*, the type of the former (*maurus*) being closely related to that of the latter (*campanulae.*).

The following table separates the known species. *Halictoides oryx* Viereck is confirmed as a valid species by the discovery of the female. I find I have a female taken by Mr. S. A. Rohwer in the Canadian Zone on North Boulder Creek, Colorado, at flowers of *Grindelia crecta*, Aug. 21, 1907. It is larger than *H. tinsleyi*, and is readily separated by the distinctly green mesothorax, and greenish tints on middle of abdomen. The head is very broad, and the mesothorax very hairy.

Stigma clear amber color; wings perfectly hyaline 1
Stigma dusky or dark; wings usually brownish, or at least not quite clear 2
1. Area of metathorax dull, minutely sculptured (late summer and autumn species) .....*marginatus* Cress.
Area of metathorax shining (spring species) ..*pulchricornis* n. sp.
2. Face narrow, facial quadrangle conspicuously longer than broad, (species of N. E. States) .....*novaeangliae* Rob.
Face not thus narrow, usually quite broad, (species of W. States).3
3. Face covered with stiff black hairs, especially dense and abundant between antennae .....*maurus* Cress.
Face not thus covered with black hair 4
4. Mandibles with an extremely long curled tuft of tawny hair beneath; hind tibiae fringed with extremely long white hair, (S. Calif.) .....*davidsoni* Ckll., ♂
Mandibles with no such tuft 5
5. Middle basitarsi expanded into a large flat lamina (S. Calif.) .....*virgatus* Ckll., ♂
Middle basitarsi not thus modified 6
6. Hind tibiae enormous, claviform; hind tarsi very short, the basitarsi expanded into a flat lamina (S. Calif.)..*mulleri* Ckll., ♂
Hind legs not thus modified 7
7. Male abdomen with a large tuft of dark fuscous hair subapically beneath, (species from Washington State, allied to *maurus*) .....*campanulae* Ckll.
Male abdomen without such a dark tuft 8
8. Males; clypeus densely covered with long hair 9
Females 11

9. Mesothorax distinctly green, rather closely punctured all over; antennae very long (New Mexico) ..... *oryx* Vier.
Mesothorax shining black 10
10. Disc of mesothorax sparsely and weakly punctured..*harveyi* Ckll.
Mesothorax with strong well separated punctures.*saundersi* Ckll.
11. Clypeus polished, hardly punctured, with a projecting lobe at each lower corner (New Mexico)..... *fallugiae* Ckll.
Clypeus roughened or conspicuously punctured 12
12. Mesothorax entirely dull; small *Halictus*-like species (New Mexico) ..... *tinsleyi* Ckll.
Mesothorax shining 13
13. Front and vertex bluish; abdomen with white hair-band on third and fourth segments ..... *mulleri* Ckll.
No blue tints 14
14. Abdomen with conspicuous white hair-bands..... *virgatus* Ckll.
Abdomen without hair-bands 15
15. First four segments of abdomen with very broad and conspicuous testaceous hind margins, (S. Calif.) ..... *saundersi* Ckll.
Abdominal segments not thus margined (N. M.) ..*harveyi* Ckll.

Halictoides pulchricornis n. sp.

♂. Length about 7 mm., slender, black, shining; head and thorax with long white hair, dense and pure white on face; head broad, facial quadrangle broader than long; mandibles black, dark red at apex; labial palpi with first joint about 270 microns long, the other three together about 400, the second joint about 170; joints of maxillary palpi subequal, the shortest much more than half length of longest; antennae long, the flagellum, except at base, bright orange-fulvous, dusky above.

Mesothorax polished, hardly punctured; area of metathorax depressed, shining, the basal half with fine plicae; tegulae rufotestaceous; wings hyaline, stigma amber color, nervures darker; b. n. falling short of t. m.; legs black with white hair; middle femora short and deep; hind tibiae large.

Abdomen with hind margins of segments broadly ferruginous, bases of segments with thin white hair-bands; apical plate small, spatulate.

♀. More robust; clypeus shining, with rather large shallow punctures; flagellum very short, bright orange-fulvous, except at base; face very broad; vertex depressed on each side of ocelli; abdomen broad.

Hab.—Mesilla Park, New Mexico, at flowers of plum, April 14 (*Cockerell*). Allied to *H. saundersi* Ckll., but easily separated by the clear wings with amber stigma, and the very feeble, evanescent punctures.

Type in my collection.

Two New Species of Cerceris (Hym., Philanthidae).

By Nathan Banks, East Falls Church, Virginia.

Cerceris posticata n. sp.

♂. Black, with yellow marks. Face, most of the mandibles, two spots on pronotum, tegulae, postscutellum, bands near hind border of abdominal segments, that on first narrowly interrupted, that on second segment very broad and not narrowed in the middle, the others narrow, but widened on sides, lateral spots on second, third and fourth ventral segments, all yellow.

Antennae rufous, except blackish toward tip above; last joint of antennae barely longer than the preceding, but little curved, third joint plainly longer than the fourth joint. Legs yellow, a black spot on posterior side of each femur. Wings dark, stigma yellowish, marginal cell reaches barely beyond the third submarginal cell.

Clypeus convex, lower edge black, and with three small blunt teeth; hair-lobes one and one-half times their breadth apart. Enclosure obliquely striate on the sides, middle area smooth, elevated, and with a median groove.

Abdomen rather broad, basal segment much broader than long; pygidial area about one and one-third times longer than broad, the sides parallel, except converging close to base, tip truncate. Body moderately coarsely punctate.

Length 11 mm.

From Jemez Mountains, New Mexico, 11 July (Woodgate).

Cerceris stigmosalis n. sp.

♂. Black, with white marks. Face, under side of basal joint of antennae, base of mandibles, two spots on pronotum, outer part of tegulae, postscutellum, band near posterior margin of abdominal segments (except first), that on the second segment broad, barely narrowed in middle, the other bands very narrow, all yellow. Venter without spots, or very small ones. First segment of abdomen sometimes with small spot each side.

Last joint of antennae no longer than preceding, but little curved, third joint slightly longer than fourth.

Wings dark, stigma still darker, marginal cell extends plainly beyond the third submarginal cell. Legs pale yellowish, femur of front and middle pairs mostly black, the hind femora black on apical half or two-thirds; hind tibia black near tip; all tarsi mostly rufous.

Clypeus slightly convex, lower edge truncate, black, and with three small blunt teeth; hair-lobes about twice their breadth apart. Enclosure obliquely striate on the sides, a median groove.

Abdomen moderately broad, first segment a little broader than long; pygidium about one and two-thirds as long as broad, sides parallel,

tip truncate; sides of last ventral segment with rufous hair. Body moderately coarsely punctate, about as in *C. nigrescens*.

Length 12 mm.

From Fargo, North Dakota, September, on *Solidago* (Stevens).

Differs from *C. nigrescens* in absence of large ventral spots, in the dark stigma, and in the longer marginal cell.

The types of both species are in the writer's collection.

A new Species of the Genus Gammarotettix from California (Orthoptera, Tettigoniidae).

By Morgan Hebard, Philadelphia, Pa.

Gammarotettix cyclocercus new species.

Closely related to the genotype, *G. bilobatus* (Thomas), differing in the somewhat more slender form and strikingly different male cerci, which in *bilobatus* are awl-like, but in the present species are longer and strongly incurved. In *cyclocercus* the male supra-anal plate is similar, but somewhat more decidedly produced. The somewhat more slender form appears to be the only character available in separating females of the two species.

All previously definitely recorded material of *bilobatus*, as well as other specimens of that species before us, were taken in the coastal region and coast ranges of California, while the present species is known from a locality on the lower western slopes of the Sierras.

Type: ♂ ; Placerville, Eldorado County, California. May 20, 1913. (E. O. Essig). [Hebard Collection Type No. 407.]

Description of Type. Size small for the group; form compact and robust, but not as stout as *bilobatus*. Body cask-shaped; narrowing cephalad and caudad, truncate. Vertex strongly declivent; fastigium with two small tubercles, deplanate between and briefly below these. Eyes small, suborbicular. Maxillary palpi short; first and second joints subequal in length, the two slightly longer than third joint; fourth slightly longer than second; fifth or ultimate joint nearly as long as third and fourth joints taken together, gently and evenly expanding to the truncate, very slightly oblique, apex. Pronotum expanding slightly caudad, cephalic and caudal margins transverse, lateral lobes with ventral margin very weakly convex, ventro-cephalic angle sharply rounded obtuse-angulate, ventro-caudal angle broadly

rounded acute-angulate. Coxae unarmed. Femora short with margins smooth. Cephalic and median tibiae with margins smooth, each supplied distad with four minute spines; caudal tibiae with dorsal margins supplied with alternating brief and very brief spines, armed distad with two pairs of short spurs, the dorsal pair being slightly the longer. Caudal metatarsus supplied with a sharp dorso-distal spine. Supra-anal plate produced between the cerci in two large lobes with apices external, these lobes forming a deep cleft mesad, this continued as a medio-longitudinal suture to the base of the plate. Cerci stout, curving inward mesad above the supra-anal plate, with thornlike apex directed at a right angle to the proximal portion of the cercal shaft. Subgenital plate large and full, surface slightly depressed meso-distad, distal margin subsinuate, transverse.

Fig 1.—*Gammarotettix cyclocercus* n. sp. Dorsal view of supra-anal plate and cerci of type, male. (Greatly enlarged.)

Allotype: ♀ ; same data as type. [Hebard Collection.]

Description of Allotype. Agrees with type except in the following features. Supra-anal plate short, bilobate; beneath produced in a shield-shaped plate. Cerci small, awl-like. Ovipositor short, curved weakly upward; dorsal valves bearing on distal half of dorsal margin a number of irregular, moderately broad, transverse teeth, which increase in size to the apex which is formed by a longer, heavy, upward-curved tooth; ventral valves supplied in distal third of ventral margin with five heavy, broad, transverse teeth, the surface of the valves concave between the bases of these. Subgenital plate produced in three long acute projections, of which mesal is slightly the longest, the space between these deeply and narrowly acute-angulate emarginate.

Measurements (in millimeters).

	♂ ♂		♀ ♀	
	Type	Paratypes	*Allotype*	Paratypes
Length of body	11.	11.-13.	12.	10.-13.
Width of body	4.4	4.3-4.5	4.6	4.3-4.7
Length of pronotum	3.	2.9-3.3	3.6	3.4-3.6
Length of caudal femur	7.6	7.4-8.	7.8	7.4-7.9
Length of ovipositor	....	.....	4.3	4.1-4.6

Color Notes. General coloration prouts brown to buckthorn brown, slightly speckled with a darker shade. Mesonotum and metanotum marked laterad with two heavy bands of dark mummy brown, which diverge regularly and strongly but become gradually weaker, caudad. Outer faces of caudal femora with numerous minute interrupted streaks of dark brown. Subgenital plate of male, as in *bilobatus*, bears a striking dark transverse bar near its proximal margin.

In addition to the type and allotype, we have before us a series of six males and twelve females, bearing the same data, which may be considered paratypes.

Observations on the Habits of Catocala titania Dodge (Lepid.).

By Ernst Schwarz, St. Louis, Mo.

July, 1913, offered me the first chance to see *Catocala titania* in its natural environment. It was on the 4th and 5th of that month when I was so fortunate as to take four specimens of this species. All were quite worn, which would indicate that they must have been on the wing for some time.

On June 7th, 1914, I happened upon a tract of woods, of about 20 acres, located in the Mississippi bottom, consisting chiefly of water elm, hawthorn and honey locust, with no underbrush. As the place was used for pasturage the lower branches of the hawthorn, *Crataegus crus-galli*, had been trimmed a few years ago, so as not to interfere with the grazing of the cattle. It occurred to me that such a place was the proper environment for *titania*. After a careful search that day I was disappointed, but I captured a fresh specimen of *C. insolabilis*.

The next day, June 8th, 9 A. M., found me in the same place. The weather conditions were not promising, as the night had been cool with a northern breeze. Searching every hawthorn, I at last succeeded in locating a specimen; however, not in plain view, but below the surface of the ground, on the trunk of a hawthorn where the dry weather had contracted the gumbo soil, leaving a crack of about an inch and a half. Blocking off with paper both sides of the crack, then placing the cyanide jar above the space left open, I expected the specimen to become alarmed, but it gave no sign of life. After a few minutes' impatient waiting I tickled it with a blade of grass, when suddenly the moth responded, full of life, trying to escape, but it was mine, for I had successfully covered the jar when it had entered. Thus I made my first capture of a perfect *Catocala titania*.

On June 10th I captured four, on the 11th five, in a similar manner. The night from the 11th to the 12th was warm with a southern breeze. On this day *titania* was to be

found resting up to seven feet above the ground. All specimens taken so far were males. On the 15th with similar weather conditions to those of the 12th I took five males and my first female. It is a beauty, about one-fourth larger than the males. All males taken this day were resting from two to six feet high, and the female on a branch about seven feet from the ground. The 14th and 15th brought me nine more males and two females. This closed the season for *titania,* as rain set in, with a north wind, which means here much cooler weather. Only a few battered specimens were seen after this. The two females taken on June 15th I placed in a paper bag with the object of procuring eggs from them. This proved a failure—both died the second day of captivity.

On June 25th, 1915, I took two females and one male. Arriving home I placed them in a glass globe, such as is used to cover street gas lights, about 18 inches high by 16 inches in diameter. In this I put a one inch twig of *Crataegus crus-galli* to which I pinned some bark of the trunk. The bark of *crus-galli* is quite shaggy and, I considered, would be an ideal thing for *titania's* egg depository.

At 8.30 that evening I observed the male courting the female, much like a sparrow, trying to make itself attractive by many peculiar antics, such as running from one side of the female to the other with wings half extended, exposing the beautiful color of the hind wings. In all these performances the wings were vibrated violently.

In searching for a suitable place to deposit her eggs the female runs about head up or down but oviposition takes place head up. The eggs, from one to sixteen in a batch, are placed beneath the outer layer of the bark.

These observations were made with the aid of an electric light, which was turned on and off at short intervals.

Summary.—Catocala titania always rests with head down on *Crataegus crus-galli,* in cool weather very low, often sheltered by weeds or grasses. In warm weather they rest up to seven feet high, always in plain view; there is no need to hide themselves from sight as their color harmonizes with that of

the resting place. They are not easily disturbed and not at all by any kind of sound. Only when coming in direct contact with foreign material are they on the alert at once. When so disturbed they sometimes alight on the ground, keeping themselves perfectly motionless.

C. titania is confined to a single species of tree, *C. crus-galli*, on which it deposits its eggs, feeds and rests. This tree grows in clusters in rich soil along the margins of swamps or near streams, which clusters are widely scattered, often having great distances between them. It is this which prevents, to some extent, the migration of *C. titania* from one cluster of *C. crus-galli* to another. Also it explains Mr. Dodge's and Prof. Rowley's futile search for the species in the type locality between 1900 and 1915 inclusive. Mr. Dodge had, undoubtedly, exterminated it in the cluster of *C. crus-galli* where he first found it.

Two New Mymaridae from the Eastern United States (Hym.).

By A. A. Girault, Washington, D. C.

The following species are the first of the genus *Ooctonus* Haliday to be described from North America.

1. **Ooctonus americanus** new species.

Female. Length, 1.15 mm. Black, the wings hyaline, venation dusky, the abdominal petiole and legs reddish brown, but the femora and tibiae suffused slightly with dusky. Incisions of abdominal segments white.

Fore-wings with fine discal ciliation as in *Polynema striaticorne*, the marginal cilia short, not more than a seventh of the greatest wing width, distinctly shorter than the caudal marginal cilia of the caudal wing, the latter with six lines of discal cilia. Fore-wing with about 22 lines of discal cilia where broadest.

Distal tarsal joint black, the proximal joint of the tarsi of moderate length only.

Flagellum slender; funicle 1 subequal to 2, longest, a little longer than the usual pedicel, the latter pale at tip; funicle 1 about thrice longer than wide; funicle 3 somewhat shorter than 2, 4 considerably shorter than 3; 5 and 6 subequal, shortest, not quite two-thirds longer than

wide; 7 and 8 stouter than the others, subequal, each as long as 3; club stouter than the funicle, equal in length to the three preceding joints or more. Club obliquely truncate from beyond the middle.

Mandibles with three equal, acute teeth.

Described from one female captured April 26, 1915, in the forest at Rock Creek Park, District of Columbia, by sweeping.

Type:—Catalogue No. 19353, U. S. National Museum, the specimen on a slide.

2. **Ooctonus silvensis** new species.

Female: Differs from the preceding in having the legs, except the yellowish hind coxae and whitish proximal three tarsal joints, jet black, and the following antennal differences: Funicle 1 is distinctly longer than 2, which is only somewhat longer than wide, no longer than 3; 6 is globular and shortest, shorter than 5, which is subequal to 4; the marginal vein is distinctly longer; otherwise the same as far as could be seen. Mandibles tridentate in both species. In this species the sculpture is coarsely scaly except distad of a convex line on the scutellum proximad of the middle, where it is glabrous. The propodeum has a median carina, which diverges widely a little out from the base and also strong lateral carinae.

Described from one female captured with the preceding.

Type:—Catalogue No. 19375, U. S. National Museum, the female on a slide.

Pink Katy-Dids and the Inheritance of Pink Coloration (Orth.).

(Part One)

By Dr. Joseph L. Hancock, Chicago, Illinois.

In 1907 Wheeler published a paper on "Pink Insect Mutants," in which he brought together the various recorded instances of the finding of pink katy-dids in the United States.[1] Moreover, in this resumé some data gathered from personal observations were presented in attempting to disprove the earlier supposition that environmental conditions are responsible for pink coloration in katy-dids. The assumption was taken that the pink coloration could not result from temperature acting on the normal green pigment. Katy-dids were

[1]American Naturalist, Vol. xli, Dec., 1907, pp. 778-780.

found by Wheeler while sweeping the low vegetation in the prairies of Wisconsin and Illinois, and on one or two occasions he found in his net a few pink larvae and nymphs. It was these young katy-dids that gave him the clew as to the heredity of pink coloration, for the young insects were colored like the adults, and they occurred in the same sweepings with many specimens of the common green form of *Amblycorypha oblongifolia*. Under these circumstances the only interpretation that could be drawn was that the pink katy-did is pink throughout life; the pinkness is therefore congenital or germinal in character, and not the result of environmental conditions. Following upon this supposition it was assumed that the pink form of katy-did was a mutant.

In addition to the normal green form of *Amblycorypha* there are known to be pink, brown or tan, and yellow forms of katy-did, though in the case of the latter only one specimen appears to have been reported.

Wheeler seems to agree with Scudder and Shull in supposing that the pink and probably the brown individuals also represent sports or mutants. The various phases of color above noted with the exception of the green have been regarded as analogous to those of albino animals and certain white flowering plants.

In considering the subject of "Color Sports Among Insects," Grossbeck[1] seems to regard the pink coloration of various insects as indicating sports or mutants, and he does not regard the color as the result of environment.

On the other hand Knab[2] draws attention to pink and green caterpillars of the same species as being analogous to green and pink coloration of katy-dids, drawing therefrom the conclusion that in all probability the difference in pigmentation is due to absorbtion of the coloring matter of the leaves of food plants on which the insects feed.

In regard to the latter theory as to the cause of pink coloring, the evidence which I have acquired from my breeding

[1]Science N. S. xxvi, pp. 639-640, 1907.
[2]Science N. S. xxvi, pp. 595-597, 1907.

experiments in crossing and rearing pink katy-dids, as will be noted in the sequence, is in direct refutation. The color of the hybrids confirms the view that the pink coloration is undoubtedly hereditary and obviously of germinal origin. It would follow from this that the color is in no way dependent on the food taken in the body by the individual.

More recently a number of pink katy-dids have been found.[3] Mr. Gray of Woods Hole, Massachusetts, found a male pink katy-did in the early part of the summer of 1912, and several years ago a yellow form was taken.

According to Glaser[4] who reported the latter specimens, a speculative suggestion was made to him by Prof. Morgan, that two factors may be involved, the presence of both of which produced the pink form, the absence of one the yellow, and the absence of both factors the ordinary green form.

Up to the present time but one attempt has been recorded to mate a female pink katy-did, *Amblycorypha oblongifolia*, with a male of the green form. This experiment was attempted by Wheeler, but failed completely. The reason of this negative result was attributed to the fact that it was tried too late in the season, or because the male may have been moribund, or exhausted, before it was placed in the jar with the female. The eggs laid by this insect a few days before her death were thought to have been unfertilized.

Glaser mentions in connection with the live male pink katy-did found at Woods Hole, previously cited, that he intended to cross it with a normal green female to find out what the mendelizing characters are. But no record of the outcome of this proposed experiment has appeared.

Experiments in Crossing Pink With Green Katy-dids.

The preliminary results of my experiments in crossing pink katy-dids and rearing the hybrids are set forth in the following account. In the course of this investigation I have noted

[3]Jour. New York Ent. Soc. xxi, pp. 74-75, 1913.—Davis reports specimens of *Amblycorypha oblongifolia* found on Long Island, and Grossbeck thought the allied species unusually abundant in New Jersey during 1912.

[4]Psyche, October, 1912, p. 159.

a number of facts relative to the life history of *Amblycorypha oblongifolia* which were apparently not recorded in the literature. It is expected that with the further breeding experiments now contemplated, the factors of heredity, or gametogenesis, can be more definitely suggested, in spite of the remarkably long period required in hatching the eggs.

Source of Material For Experiment; The Original Pink Female.

In the summer of 1910 Miss Nettie Isom, a resident of Kenilworth, Illinois, offered her assistance in obtaining a live pink katy-did for crossing and study, and it was due to her two years' vigilance that she finally succeeded in capturing one of these insects for me on July 14, 1912.[1] I received the living insect two days later, July 16, at my summer quarters at Lakeside, Michigan. Miss Isom reported in a letter that the pink katy-did was found on a currant bush at Kenilworth, and in the two days she had it in captivity "it had grown and changed remarkably," and I infer from this statement that the insect probably molted. On its arrival it was immature, in fact it was a nymph in the instar just preceding the adult stage, and it belonged to the species known as *Amblycorypha oblongifolia*. It was colored an exquisite rose-pink or diluted crimson above, with the underside of the body much paler. After the seventeenth day of its confinement in the cage, it molted August 2, during the night, transforming into an adult. Immediately after molting it was quite pale or blanched, as is the case with molting insects, but by the next day it was nearly the same beautiful shade of pink that it was before the final ecdysis, excepting that in addition to the pink some small dark spots appeared in the adult stage on the now unfolded first pair of wings. The hind tibiae were shaded dark, and slight traces of lines of pigment occurred on each side of the thorax. It is this female pink katy-did that forms the basis of the following experiments.

[1]The idea of crossing a pink katy-did with the ordinary green form presented itself as long ago as 1893. In the autumn of that year I found an adult pink female oblong-winged katy-did at Kenilworth while looking for Orthoptera, but it was unfortunately lost.

First Successful Experiment in Crossing This Original 1912 Female Pink Katy-did With a Male of the Normal Green Form.

On August 9, 1912, a normal green male was introduced in the same cage with the female pink katy-did. Two days later the male was seen making advances to the female, and on the fourteenth conjugation was effected, and the female was noticed with a semi-transparent spermatophore attached to her body. She carried the latter about for a number of hours, when finally I saw her devour about half of the capsular mass, the remaining part dropping to a leaf below the point where she was standing among the leaves of mint growing in her cage. Several times subsequently, notably on August 19 and 21, I saw her with a spermatophore attached to her body, thus establishing the fact that fertilization of the eggs had doubtless occurred, and especially as her abdomen became distended with eggs by the last of August.

Eggs Laid in the Ground.

It was not until August 28th that I actually saw her oviposit, though on the 26th, I saw her searching about on the earth in the bottom of the cage. Near six o'clock in the afternoon of the 28th, I saw her slowly walking about on the wet ground, having come down from her usual abode among the sun-exposed leaves of the mint and goldenrod. At the roots of the latter she nibbled at the soft covering of earth. Then she brought her large ovipositor forward under her body, and with the aid of her mandibles she guided the end to a chosen point on the ground. She was only a few minutes forcing a hole with her ovipositor and laying her eggs in the soft earth. Immediately afterwards I again saw her go about in a similar manner searching the ground, and only a slight distance away she oviposited a second and a third time, apparently only laying a few eggs at a time. Similarly at six o'clock in the afternoon of September 9 and 10, she was seen laying eggs in the vegetable mold. In all probability she laid eggs occasionally in the interval between these dates, as she was incidentally noted from time to time on the ground.

It was about this time that the normal green male began to languish and show signs of enfeeblement in his movements from loss of vitality, and I introduced another wild green male in the cage on September 10. This second male was a fresh-appearing vigorous individual, caught in the vicinity of Lakeside, and he superseded the first male which died two days after this second male was placed in the cage. These two males were distinguishable by the hind tibiae. In the first male they were brownish, while in the second one they were green, otherwise they were quite alike in color. The second male lived until October 17. In the meantime the female proceeded to lay her eggs on the morning of September 15, and also on the 16th and 27th.

At intervals the cold weather affected the pink katy-did, but she showed much more vitality than either of the males. On November 1, a frost occurring in the night so paralyzed her movements that I decided to remove her indoors to another small cage; the original breeding cage bearing the eggs being placed at the same time within my large screened insectary, where it was secure from molestation. After the female was put in the new cage she again oviposited on the evening of November 3, at Lakeside, also once more after I removed her to Chicago on the 8th, so that between the latter date and November 14, the time of her death, she had not been with the male since October 17th. During the entire time, she probably laid in all about thirty eggs, almost all of which I verified by marking the sites.

Unexpected Time Required in Hatching These 1912 Eggs; Some of This Batch Two Years, Others Three Years in Hatching.

These katy-did eggs were, of course, subjected to open outdoor conditions. It was natural to expect that as they were laid in the autumn, they would hatch the coming spring, such as occurs in Acridiidae for instance. At least, I first went on this assumption as there was no literature on the subject. I looked in vain in my insectary for the young katy-dids to emerge from these eggs laid in 1912, throughout the following

spring, summer, and fall months of 1913. I began to wonder if ants or spiders had eaten either the eggs or the prospective newly hatched. To satisfy myself on this point I dug up several of the eggs for examination. I found their outer coverings intact, and they appeared unscathed, with no evidence of having hatched. Between the idea that they were not fertilized, or that they were alive, but that they had not sufficient time to hatch, I adopted the latter view, and fortunately placed the eggs I had examined back in the cage, covered them carefully, and securely closed the insectary for the winter of 1913-1914.

The Pink and the Green Hybrid Progeny of 1914; More Pinks Than Greens; Alternative Inheritance.

It was not until the second year, or June 14, 1914, that I found the first evidence of hatching. In the insectary a small living pink katy-did was discovered clinging to the wire screen, and after making an inventory of the family I counted ten of the living progeny in vigorous condition scattered among the foliage of the numerous growing plants, and on the ground. When the eggs hatched the young crawled out of the hatching cage and sought the freedom of the larger area in the insectary for foraging. This progeny consisted of eight pink and two green individuals. The bodies of these insects ranged from ten to twelve millimeters in length; they had evidently undergone one molt. At this time they were in the second instar, and of course all were the same age. On June 26, one of the green katy-dids molted, and rudimentary wings became visible, and on the next day two of the pink individuals molted, entering the third instar. It is an interesting fact that out of this 1914 progeny of ten, the sexes turned out to be evenly divided into five pairs, including one pair of greens, and four pairs of pinks. As they went on maturing these insects maintained the same pink or green coloring; beginning with the larvae shortly after hatching the color remained the same throughout the different instars. With the addition of three retarded katy-dids hatched a year later, 1915, and which is really a part of this progeny, the proportion of pink to green is modified to give a ratio of nine pinks to four greens.

Inbreeding the Pink and Green Hybrid 1914 Progeny.

I was able to definitely determine the sexes by June 27, and by this time I had erected a series of cages for pairing purposes containing growing plants. Into these cages was placed the pair of greens, and four pairs of pinks, each pair being given a separate apartment, where they were allowed to mature and inbreed.

At this time, June 28, these insects were placed in charge of Mr. Charles Brewer, of Lakeside, who supervised their care during my absence in California during July and August. On my return to Lakeside, September 1st, I found the mortality confined to one pair of the pink individuals. This male and female were in the same cage and had met with death through becoming entangled in the wire netting. I found the dead female's abdomen full of eggs, and though her body was partly decayed I removed by dissection thirty normally formed eggs, besides two which were not fully formed. These eggs were placed in the ground, simulating the method of the mother, with the expectation that in the case they were fertilized they might possibly hatch. The other four pairs of katy-dids making up the remainder of the progeny flourished, and all four females oviposited during August, September and October. The expectation is that some of these eggs will hatch in 1916, others in 1917. Or, it is barely possible a few may remain until 1918 before they hatch.

Color of the 1914 Hybrid Progeny: Greater Individual Differences in the Males.

The four mature pink females were nearly all the same shade of pink or diluted crimson, varying somewhat in the degree of dilution, two being very nearly identical with the beautiful figures given by Scudder in Entomological News, May, 1901. These insects were all paler on the underside of the body. In the males there was a more striking difference in the color among the individuals, and this was evident in the early stages, though not so pronounced as in the adults with fully developed wings. One of the males was a deep conspicuous

crimson on the wings and exposed areas of the body, excepting the dark stridulating portion of the wings. Another male was decidedly paler with pinkish flesh-yellow on the upper parts and wings, while a third was purer pink like the females.

That these variations of color signify some differences in their gametic constitution remains to be determined. All these shades of color were seemingly influenced somewhat by humidity, becoming deeper-hued in rainy weather, and returning to lighter shade in hot dry weather. All of this progeny, that is the remaining eight, died between October 25 and 29, from the effects of lowering temperature and resulting frosts. They are all preserved for record.

The Belated 1915 Progeny; Hatching from 1912 Eggs Which Passed Through the Rigors of Three Winters.

What seemed to me to be the most remarkable feature in the life history of pink katy-dids was my discovery that some of their eggs may pass through three winters in the ground before the young emerge. I have already shown that some of these original pink katy-did eggs had skipped a year and passed two winters before hatching, but that the eggs could withstand the rigors of three winters and then hatch showed a most remarkable endurance to physical conditions.

In regard to this 1915 progeny, I first noticed in my insectary three newly hatched katy-dids from the original 1912 eggs on the 15th of May, 1915. Two of these insects were green and one was pink. This small brood of course was the belated part of the same progeny that hatched in the spring of 1914. These three larval katy-dids were very small, and at the time I found them they had been hatched only a few hours or possibly a day or two. Two of these delicate insects in the first instar, one pink and one green, were later unfortunately killed and eaten by an agalenid spider. I succeeded, however, in rearing the remaining green female, and she came to maturity August 22, 1915. A normal green male was placed in the same cage with this green female on September 3rd. This male was found the previous day in my yard at Lakeside, and, of course, the female is the hybrid offspring of the original

pink female which was crossed with a normal green male. On September 11, and again on the 18th, I saw on each occasion that she carried a spermatophore attached to the end of her abdomen, showing that union of the sexes had occurred, and it is reasonable to suppose her eggs had been fertilized. I saw the green female on the ground several times, her body at this time being fully distended with eggs, and while I did not see her oviposit, she doubtless laid most of her eggs. Proof of this fact was shown by a post-mortem examination following her death, November 1, 1915. I found at this time on dissection only eight eggs in her body, and as the usual complement is about thirty-two, she had doubtless laid in the ground the larger portion. I supplemented these by placing in the ground the eight eggs I recovered from her body.

Habits of Pink Katy-dids: Their Eggs and How They are Laid.

In reviewing the habits of pink katy-dids, I find that they do not differ from those of the ordinary green form. However, in the course of my investigation, I have observed some points relative to the behavior of *Amblycorypha oblongifolia* which are of general interest, and seem worthy of record. These insects enjoy the sunshine, seeking sunny exposures when possible; are slow and cautious in their movements, and they feed on a variety of leaves of plants, as well as the petals and pollen of flowers. They are especially fond of the leaves of some mints, and the flowers of some of the goldenrods. The adults of the ordinary green form more often frequent the edges of woods and thickets in damp situations. They live above ground among the leaves in preference to the ground, except when laying their eggs. The young emerge during late May or early June, and mature about the first week in August. From the time immediately after they hatch, throughout their lives they remain the same color, showing that this is a character which is hereditary, though as I have noted, the color may be temporarily intensified or may become paler through the action of humidity and temperature. These color fluctuations were determined in my pink katy-dids by comparison with a scale

made in Japanese colors, and making the examinations under different weather conditions.

As in many of the Locustidae during courtship, the male makes advances to the female. Raising his wings at an angle to the body, and lowering his abdomen, he backs toward her to effect conjugation and transfer a spermatophore. After this courtship the female often carries the spermatophore containing the spermatozoa, attached to her body for a period of several hours; this is done in order to give the spermatozoa time to enter the vagina. She finally rids herself of this apparent incumbrance by arching the abdomen downward and forward so she can reach it with her mouth. She then proceeds to pull it off and eat it. The eggs to the number of about thirty develop in the body during the first week in August, and gradually maturing, a few at a time are laid during August, September, October and early November, when conditions are favorable.

There is a noticeable difference between the manner in which the members of *Amblycorypha* lay their eggs from that exhibited in the allied genera *Scudderia* and *Microcentrum*. When the pink or green mother *Amblycorypha oblongifolia* is ready to oviposit she usually comes down to the ground from the vegetation which she frequents. She then searches about on the ground, often among the dead leaves, to find a suitable place to deposit her eggs. She does this very deliberately and slowly feeling her way with her palpi, often nibbling the surface as if testing a suitable place. At times she appears to be quite exacting in her choice of location when at liberty, one of these requisites being a certain amount of dampness of soil, as well as certain surface conditions. When she finds a suitable spot, she curves her abdomen, which is now distended with eggs, forward underneath her body and at the same time seizes the end of the large ovipositor in her mandibles. In this way she directs its point to the desired place in the ground. Then she forces or drills a hole in the earth for the reception of each egg or cluster of eggs. Sometimes they are laid at such a shallow depth in the ground that the rains splash away the dirt covering, fully exposing them to the air.

The Eggs.

The eggs of this species are distinctly compressed and oval in form, with one side strongly arcuate, and the other much more flattened. They are rather large for the size of the insect, as they are slightly more than five millimeters in length, and average two and a half millimeters across the middle. When the young hatch they make a vertical rent at the larger pole of the egg, the vertical slit turning transversely part way across on one side near the middle of the egg. About thirty-two eggs may be laid by a single female.

Contrasting with the habit of laying the eggs in the ground by *Amblycorypha,* we find in the genus *Scudderia* that members lay their eggs under the epidermis of a green leaf. The insect seizes the leaf with her legs and using her ovipositor as a lance at the edge, she slits a pocket receptacle for holding each egg. The leaf containing the eggs usually falls to the ground later, and there remains through the winter. In *Microcentrum* the eggs are fastened to a twig in two rows, the female preparing the place where they are to be deposited by roughening the surface with her jaws. In the process of laying her eggs, one egg is laid under the other in forming the rows by the use of the saw-like end of the ovipositor.

In the late afternoon of September 27, 1914, I heard a male pink katy-did stridulating. In the sounds made by this insect and two others I heard, I could not detect any differences in the notes from those made by the ordinary green form. Stridulation was indulged in more vigorously on hot nights.

Conclusions.

1.—I have shown that the pink katy-did crosses freely with the normal green form.

2.—A virgin pink female was mated with a normal green male. Some of the hybrid progeny F1 which hatched two years and others three years later, respectively, showed in the total progeny two types as follows: Nine bearing the pink coloration like the mother, and four green like the male parent. The sexes were about evenly divided in both the pink

and the green forms. The inbreeding of these hybrid F1 types have thus far been carried to the stage of crossing, their eggs secured in 1914-1915 which are expected to hatch F2 generation in 1916-1917.

3.—The pink and the green color which appeared soon after the first molt in the individuals of the progeny F1 remained practically the same throughout their lives. The pink color as well as the green is hereditary and is undoubtedly of germinal origin as surmised by Wheeler. This precludes the idea of these colors in katy-dids being dependent on absorbtion of coloring matter taken in with the food as supposed by Knab.

4.—The eggs of *Amblycorypha* are laid in the ground, this habit being materially different from the egg-laying habits exhibited in other katy-dids.

5.—The time required in hatching the eggs is two or three years, showing remarkable endurance to physical conditions.[1]

Notes on Lithocolletis with Descriptions of new species (Lep.).

By Annette F. Braun, Cincinnati, Ohio.

Lithocolletis insignis Wlsm.

A number of mines of this species were found on the underside of leaves of deer-brush, *Ceanothus integerrimus* H. & A. in Yosemite National Park, California, July 26, 1915.

The mine occupies a comparatively small area in which the leaf substance is almost entirely eaten out, and the lower epidermis is closely wrinkled at maturity. The unenclosed pupa is formed at one end of the mine.

The single specimen reared (imago, Aug. 15) is somewhat paler than the usual form of the species and lacks some of the dark margins. The basal streak is connected with the dorsal streak merely by a broken line of white scales. A slight indication of the saffron ground color toward the outer edge of the basal white patch places it somewhat intermediate between the extreme forms described by Lord Walsingham.

In connection with the variations just mentioned in *L. insignis* it is interesting to note that similar modifications in color and pattern occur in *L. hageni*, its nearest relative. In pale specimens of *L. hageni*, the dorso-basal white patch often ex-

[1]The distribution in the United States of pink katy-dids, *Amblycorypha oblongifolia* and the allied species will be presented in a second contribution.

tends to the costa, so that the configuration of the basal part of the wing is essentially that of *L. arbutuscella,* unmarked however by the line of dark scales which limits the outer margin of the costal portion of the white area in that species. Such specimens always lack the apical spot and some of the dark margins.

Lithocolletis leucothorax Wlsm.

Mines of this species were collected August 8, 1915, on the lower side of leaves of scrub tan oak, *Quercus densiflora* var. *echinoides* Sargent, growing at Rocky Point, Upper Klamath Lake, Oregon. The larva consumes the entire leaf substance within the mine and at maturity throws the lower epidermis into several folds between which are numerous fine wrinkles. The pupa is suspended by a few silken threads.

Lithocolletis diversella n. sp.

I recently reared two specimens of an undescribed species of *Lithocolletis*: One was a miner on huckleberry, *Gaylussacia baccata* (Wang.) C. Koch and the imago appeared August 31, 1914; the other a miner on sorrel tree, *Oxydendrum arboreum* (L.) DC., and the imago appeared May 10 of the following year. Both were collected in the "Sugar Grove Region" near Lancaster, Fairfield County, Ohio.

While the two specimens are identical as regards the configuration of the color markings, there is a very striking difference in the degree of specialization of the scales, and the resulting brilliancy of markings; the metallic luster is found in the specimen from the overwintering pupa only (which is a female). The more brilliant specimen is regarded as the type; absence of the specialized characters in the other specimen (a male) is noted in the description of the species which follows:

Palpi whitish, face metallic golden, tuft dark brown; antennae dark gray, with the eight or nine segments preceding the apex whitish; terminal segment dark. (In the other specimen the tuft is reddish ocherous; antennae pale gray throughout.)

Thorax deep metallic golden, this color extending onto the extreme base of the fore-wings, which elsewhere are golden or reddish brown, but not metallic. The coloring is identical with that of *L. ostensackenella.* (In the other specimen, the scales of the thorax and fore-wings are identical in structure; the color is a little paler and more ocherous.) The markings of the fore-wings, which are lustrous white in one specimen, scarcely shining in the other, are placed as follows: A very short basal streak just above the fold, margined with dark brown toward the costa; an almost straight fascia at one-third dark margined internally; two posterior costal and two dorsal spots, internally margined; the first

dorsal spot with its apex projecting a little beyond the corresponding but smaller costal spot; second pair of spots curved and almost meeting. A dark brown irregular apical spot, preceded and encroached upon by a streak of white scales. Cilia golden, gray toward the tornus; terminal line of scales dark brown.

Hind wings gray, tinged with red. Legs dark brown, spurs and terminal segments of tarsi whitish or silvery. Abdomen dark brown, whitish or silvery beneath.

Expanse: 5 mm. (male); 7 mm. (female).

The mines on *Gaylussacia* were collected at Lancaster, Ohio, August 21; those on *Oxydendrum* at Sugar Grove (about seven miles distant) and southward, August 20. The mine is of the usual tentiform type on the lower side of the leaf; except for an occasional patch in the center, the leaf substance in the mined area is entirely consumed. One-half of the mine is partitioned off to form a pupal chamber.

Lithocolletis picturatella n. sp.

Palpi whitish, dark on the sides; face and tuft reddish ocherous, the latter with some whitish scales; antennae dark brown above with paler bands.

Thorax and fore-wings brownish ocherous. There are four costal and three dorsal white spots, the second pair uniting to form an outwardly angulated fascia; all are dark margined externally. Of the first pair of streaks, the dorsal is the longer and in some specimens almost meets the costal streak; it is parallel to the dorsal arm of the fascia. The external dark margin of the fascia is continued outwardly at the angle, usually as a dark shade, rather than as dusting; this dark shade sometimes extends between the third pair of spots almost to the apex. Third pair of spots small and opposite. Scattered dusting in the apex is preceded by a small curved costal streak.

Hind wings and cilia gray, brownish tinged. Fore-legs almost black on the upper surface, tarsi white, conspicuously spotted with black above; middle and hind legs ocherous, with some darker shading, tarsi white, with black spots near the ends of the segments above.

Expanse: 6.5-7. mm.

Described from eighteen specimens bred from mines on bayberry, *Myrica carolinensis* Mill. collected in July at East River, Connecticut, by Dr. Chas. R. Ely. Mines of this species have been found in a number of other localities in New Jersey and New York where the food plant occurs.

Types in Dr. Ely's collection, the United States National Museum, and in my collection.

The mine is a brownish blotch on the upper side of the leaf. At the time of pupation, a single prominent ridge extends across the mine.

The nearest relative of this species is *L. bethunella* Cham., from which it can be most easily distinguished by the conspicuous black spots on the upper side of the white tarsi.

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., FEBRUARY, 1916.

A Source of Annoyance and Trouble.

A large amount of material is received each year at museums that is not mounted, and if it is to be made available for study it must be in condition to go into the cabinet with exact data. The collector knows where he captured the specimens, but must often think his correspondents are mind readers, as he frequently fails to properly convey this information to those to whom the specimens are sent. Dates are not legibly written on the containers and frequently it is impossible to determine whether figures represent the month or the day of the month. Places not on the map are written on envelopes and the county, state or country omitted. Often names of places are scribbled in such a way as to make translation a difficult and irritating procedure. All data should be written or printed in such a way as to never leave any doubt in the mind of the recipient as to what is meant.

It is a pleasure to receive material from persons who exercise care and good judgment in matters of this kind. From our experience there are many entomologists that should take this to heart and make their specimens of more scientific value and add to the comfort and peace of mind of their correspondents.—H. S.

Rarities (Hym., Neur., Odon.).

It may be worth while to put on record the fact that I once took *Rhinopsis caniculata* Say at Maywood, Cook County, Illinois. I passed the rare insect over to Mr. Ashmead, then busily engaged at Washington in the study of the Hymenoptera, and no doubt it now reposes in some one of the Washington collections.

More than two-score years ago I took in Wickford, Rhode Island, a specimen of *Ululodes quadripunctata* Burm. I have never been so fortunate as to see a second one.

In August, 1889, on the island of Hawaii, I took the female of *Anax strenuus* Hagen. It is the largest of my Odonata. I was on my way from Hilo to Mt. Kilauea, and it may be superfluous to mention that its capture was effected in the midst of a driving rain, since those familiar with Hilo are aware that the rainfall there is measured not in inches,

but in feet. The female of *Anax strenuus* was described by Hagen from a specimen taken on the island of Oahu and preserved at the Copenhagen Museum.

My *Anax strenuus* is still in perfect condition. My *Rhinopsis caniculata*, I trust, is equally so. My *Ululodes*, alas! is possessed of only a thorax, four perfect wings and one antenna. Accidents always happen to uniques, and there was more truth than poetry in the student's answer to the question,—how many legs has an insect? Some have three, some five, some two, but none ever have six.—O. S. WESTCOTT, Oak Park, Illinois.

The Change of Color in the Winter Eggs of Myzus rosarum and Macrosiphum rosae (Hem. Hom.).

There is a city park near the Entomological Laboratory of the State College of Forestry. Here the writer found this fall two species of rose aphis, *Myzus rosarum* and *Macrosiphum rosae*, on *Rosa rugosa*. They were abundant November 1st. November 4th the winged females were first observed ovipositing. The eggs on deposition were a vivid emerald green, some of which by November 5th had turned to the characteristic black of winter aphid eggs. On the stems at this date were taken all intermediate colors, varying from a bright green, a greenish-tan, deep olive-brown to a black.

It was observed that fresh aphid eggs from these species remained of a greenish hue much longer in the warm laboratory than out of doors. It would be interesting to definitely determine whether the change from green to black is essential; whether or no the change to black keeps the eggs during the winter months at a higher temperature than the temperature of the surrounding medium. A number of factors might be responsible for this color change, such as light, temperature, the presence of an enzyme in the egg.—W. O. ELLIS, Entomological Laboratory, State College of Forestry, Syracuse, N. Y.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded. The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of systematic papers are all grouped at the end of each Order of which they treat, and are separated from the rest by a dash.

Unless mentioned in the title, the number of new species or forms are given at end of title, within brackets.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London.

For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

1—Proceedings, The Academy of Natural Sciences of Philadelphia. **4**—The Canadian Entomologist. **8**—The Entomologist's Monthly Magazine, London. **10**—Nature, London. **11**—Annals and Magazine of Natural History, London. **14**—Proceedings of

the Zoological Society of London. **21**—The Entomologist's Record, London. **42**—Journal of the Linnean Society (Zoology), London. **66**—Die Naturwissenschaften, Berlin. **68**—Science, New York. **92**—Zeitschrift fur wissenschaftliche Insektenbiologie. **97**—Zeitschrift fur wissenschaftliche Zoologie, Leipzig. **141**—Proceedings, Indiana Academy of Sciences, Indianapolis. **143**—Ohio Journal of Science, Columbus, Ohio. **153**—Bulletin, The American Museum of Natural History, New York. **179**—Journal of Economic Entomology. **191**—Natur. Halbmonatschrift fur alle Naturfreunde. **198**—Biological Bulletin, Marine Biological Laboratory, Woods Hole, Mass. **204**—New York State Museum, Albany. **216**—Entomologische Zeitschrift, Frankfurt a. Main. **218**—Mikrokosmos. Zeitschrift fur die praktische Betatigung aller Naturfreunde, Stuttgart. **249**—Journal, Biological Chemistry, Baltimore. **313**—Bulletin of Entomological Research, London. **344**—U. S. Department of Agriculture, Washington, D. C. **409**—Journal of the Academy of Natural Sciences of Philadelphia, 2nd Series. **411**—Bulletin, The Brooklyn Entomological Society. **447**—Journal of Agricultural Research, Washington. **477**—The American Journal of Tropical Diseases and Preventive Medicine, New Orleans. **482**—"Bios" Rivista di Biologia Sperimentale e Generale, Genova. **485**—Journal of the Royal Microscopical Society, London. **491**—Transactions, American Microscopical Society, Decatur, Illinois. **505**—Agricultural News, Barbados.

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PHYSIOLOGY AND EMBRYOLOGY. Boring & Fogler—Further notes on the chromosomes of the Cercopidae, **198,** xxix,

312-15. **Foot & Strobell**—Results of crossing two hemipterous species, with reference to the inheritance of two exclusively male characters, **42,** xxxii, 457-93. **Lutz, F. E.**—Experiments with Drosophila ampelophila concerning natural selection, **153,** xxxiv, 605-24. **Nelson, J. A.**—The embryology of the honey bee, 282 pp. (Princeton Univ. Press).

MEDICAL. Hewitt, C. G.—An early reference to the relation of insects to disease, **4,** 1915, 396-99. **Townsend, C. H. T.**—Two years' investigation in Peru of Verruga and its insect transmission, **477,** iii, 16-32.

ARACHNIDA, ETC. Barrows, W. M.—The reactions of an orb-weaving spider, Epeira sclopetaria, to rhythmic vibrations of its web, **198,** xxix, 316-332. **Wells, B. W.**—(See under Diptera.)

Banks, N.—The Acarina or mites. A review of the group for the use of Economic Entomologists, **344,** Of. Secretary, Rept. 108.

NEUROPTERA, ETC. Folsom, J. W.—Directions for collecting Collembola, **411,** x, 91-4. **McAtee, W. L.**—A remarkable flight of caddis flies and chironomids, **68,** xlii, 694-5. **Turner, C. H.**—Notes on the behavior of the ant-lion with emphasis on the feeding activities and letisimulation, **198,** xxix, 277-307. **Wasmann, E.**—(See under Coleoptera.)

Bagnall, R. S.—On a collection of Thysanoptera from the West Indies, with descriptions of new genera and species, **42,** xxxii, 495-508. **Engelhardt, G. P.**—Mecaptera of the northeastern U. S., **411,** x, 106-112. **Walker, E. M.**—Notes on Staurophlebia reticulata [2 new subsps.], **4,** 1915, 387-95.

ORTHOPTERA. Ball, E. D.—Estimating the number of grasshoppers, **179,** viii, 525-7. **Burr, M.**—On the male genital armature of the Dermaptera. Part II: Psalidae, **485,** 1915, 521-46. **Fox, H.**—Notes on O. and Orthopteran habitats in the vicinity of Lafayette, Indiana, **141,** 1914, 287-322.

HEMIPTERA. Hartman, F. T.—List of the Coccidae in the collection of the N. Y. State Museum, **204,** Bul. 180, 92-109.

Funkhouser, W. D.—A new membracid from Trinidad, **411,** x, 103-5. **Leonard & Crosby**—(See under Hymenoptera.) **Van der Goot**—Beitrage zur kenntnis der Hollandischen Blattlause. Ein morphologisch-systematische studie, 600 pp. (Berlin, R. Friedlander & Sohn).

LEPIDOPTERA. Alfaro, A.—La mariposa de la pacaya, 3 pp. (Revista de Educacion, organo de la Escuella Normal, San Jose,

Costa Rica). **Braun, A. F.**—Evolution of the color pattern in Microlepidopterous genus Lithocolletis, **409,** xvi, 105-166 (1914). **Cleare, L. D.**—A butterfly injurious to cocoanut palms in Br. Guiana, **313,** vi, 273-78. **Punnett, R. C.**—Mimicry in butterflies, 159 pp. (Cambridge Univ. Press). **Stephan, J.**—Die spinnkunst der raupen, **191,** 1915, 427-30. **Webster, F. M.**—Migrating notes on the milkweed butterfly, **4,** 1915, 406.

Grinnell, F., Jr.—Some observations on the butterflies of King River Canyon, Sierra Nevada Mts., California, **411,** x, 100-2. **Oberthür, C.**—Etudes de Lepidopterologie comparee, Fasc. X, 457 pp. **Seitz**—Die grossschmetterlinge der Erde. Fauna Americana. Lief. 67-74.

DIPTERA. Felt, E. P.—Gall midges in an orchard, **179,** viii, 550. **Howlett, F. M.**—Chemical reactions of fruit-flies, **313,** vi, 297-306. **McAtee, W. L.**—(See under Neuroptera.) **Macfie, J. W. S.**—Observations on the bionomics of Stegomyia fasciata, **313,** vi, 205-30. **Valenti, A. L.**—Sulla determinazione del sesso nelle mosche, **482,** ii, 265-91.

Alexander, C. P.—New or little-known crane-flies from U. S. and Canada. Part 2. Designation of the single-type (lectotypic) specimen of N. A. species of Tipula described by H. Loew. [21 new], **1,** 1915, 458-514. **Edwards, F. W.**—Three n. sps. of the dipterous genus Olbiogaster, O. S. in the Br. Mus. collection, **11,** xvi, 502-5. **Felt, E. P.**—A study of gall midges, III [many new], **204,** Bul. 180, 127-288. **Knab, F.**—Some new Neotropical Simuliidae, **313,** vi, 279-82. **King, W. V.**—Anopheles pseudopunctipennis, **68,** xlii, 934-5. **Wells, B. W.**—A survey of the zoocecidia on species of Hicoria caused by parasites belonging to the Eriophyidae and the Itonididae, **143,** xvi, 37-59. **Whitney, C. P.**—A new Tabanus, **4,** 1915, 380-1.

COLEOPTERA. Ellis, W. O.—Leptinotarsa decemlineata, **179,** viii, 520-1. **Haddon, K.**—On the methods of feeding and the mouthparts of the larva of the glow-worm (Lampyris noctiluca), **14,** 1915, 77-85. **Lamson, G. H.**—The poisonous effects of the rose chafer upon chickens, **179,** viii, 547-8. **Shelford, V. E.**—Elytral tracheation of the tiger beetles, **491,** xxxiv, 241-52. **Sell, R. A.**—Some notes on the Western Twelve-spotted and the Western Striped Cucumber beetles, **179,** viii, 515-20. **Wasmann, E.**—Neue beitrage zur biologie von Lomechusa und Atemeles,....Beitrag zur kenntnis der myrmekophilen und termitophilen, **97,** cxiv, 233-402.

HYMENOPTERA. Ballou, H. A.—West Indian wasps, **505,** xiv, 298. **Parrott & Fulton**—Cherry and hawthorn sawfly leaf

miner (Profenusa collaris), **447,** v, 519-28. **Wasmann & Valkenburg**—Ein neues buch ueber das leben und wesen der bienen, **66,** xxxviii, 485-8; 497-500.

Banks, N.—New Fossorial H. [13 new], **4,** 1915, 400-6. **Cockerell, T. D. A.**—Descriptions and records of bees (cont.), [3 new], **11,** xvi, 482-89 (cont.). **Donisthorpe, H.**—Descriptions of a Pterergate and two gynandromorphs of Myrmica scabrinodis, with a list of all the known cases of the latter, **21,** 1915, 258-60. **Leonard & Crosby**—A n. sp. of Gonatocerus (Mymaridae) parasitic on the eggs of a n. sp. of Idiocerus (Bythoscopidae) feeding on poplar, **179,** viii, 541-47.

The NEWS has received a copy of Part I, Volume I of ECTOPARASITES, edited by DR. K. JORDAN and the HON. N. CHARLES ROTHSCHILD, M. A. It measures 11 x 7¾ inches, consists of pages 1-60 with text figures 1-64, and is dated as "Issued December 30th, 1915. Price, Four Shillings. Printed by Hazell, Watson & Viney, Ld., London and Aylesbury." The second page of the cover states: "This publication will be issued at irregular intervals. Each part can be obtained direct or from booksellers at the price stated on the cover. All communications referring to this publication to be addressed to Dr. K. Jordan, Zoological Museum, Tring (Herts)." The contents of Part I are four papers as follows: K. Jordan and N. C. Rothschild, On some Siphonaptera collected by W. Rückbeil in East Turkestan and Contribution to our Knowledge of American Siphonaptera; N. C. Rothschild, Further Notes on Siphonaptera Fracticipita with descriptions of new genera and species, and On *Neopsylla* and some allied genera of Siphonaptera.

It is of interest to American readers, although perhaps already known to them, to note that Mr. C. F. Baker's collection of fleas has been acquired by the Museum at Tring (p. 54).

The *Revista Chilena de Historia Natural* announces in the first issue of its nineteenth year (dated Enero-Abril de 1915), that, in consequence of the European war, the subvention which it has received from the Chilean Government has been reduced and that the volume will suffer a corresponding diminution in number of pages. Nevertheless, it commences "con el entusiasmo de los primeros dias," and numbers 1 and 2 (combined) include a description of *Acrotrichtyx porteri,* a new genus and species of Ptiliidae (Trichopterygidae, Coleoptera) by Jean Brethes and an announcement of *Trichotaphe tangolias* Kl. v. G. as a Microlepidopter new to Chili, whose larva was found attacking potatoes, by Carlos Silva Figuera. Both articles are illustrated.

The indefatigable editor of the *Revista*, Prof. Carlos E. Porter, founded in 1914, the *Anales de Zoologia Aplicada*, as an international American publication devoted principally to the biological and systematic study of zooparasites of the Neotropical Region. Among its entomological contents thus far are papers by F. Knab on Simuliidae of Northern Chili (3 pp., 1 new), C. Bruch and J. Brethes on a new Ipid (Scolytid) and a new Encyrtid, respectively, both from Chili, E. Molina on a formula for destruction of scales and other insects, C. H. T. Townsend, Resumé of the work in Peru on *Phlebotomus verrucarum* and its agency in transmitting verruga, and Prof. Porter himself on materials for the economic entomology of Chili (Coccidae). All these articles are well illustrated and, with the exception of M. Brethes', which is in French, are in Spanish.

Both journals are published in Santiago de Chile, printed on good paper, and both contain sections on Scientific News, Chronicle, Correspondence and Bibliography. (*Advt.*)

Doings of Societies.

The Convocation Week Meetings.

The entomological societies announced in the News for December, 1915, (pages 456 and 474), held meetings during the week December 27-31, 1915, at Columbus, Ohio, in affiliation with the American Association for the Advancement of Science and other scientific bodies. Forty-one papers were listed on the program of the American Association of Economic Entomologists (excluding the section of Horticultural Inspection), twenty-seven papers and exhibits on that of the Entomological Society of America, sixteen relating to insects or to problems of general science (and hence, including entomology) on the programs of the American Society of Zoologists, the Botanical Society of America, the A. A. A. S. in general and its sections B and F, and are mentioned in the accompanying list. The total is 84, as compared with the convocation week figures of 1912, Cleveland (85), 1913, Atlanta (74), and 1914, Philadelphia (96), respectively. If we subtract 13 papers (of the Section of Horticultural Inspection, Am. Ass. Econ. Ent.) from the total for 1914, we have 83, comparable with the figures given for 1915, 1912 and 1913.

In the following list of papers presented at Columbus, classified by subjects, those unmarked are from the program of the Economic Entomologists, those starred (*) from that of the Entomological Society; others are designated by the names, or abbreviations of the names, of the respective societies hearing them.

GENERAL SUBJECTS.—Dr. Charles William Eliot, retiring President of the American Association for the Advancement of Sci-

ence, The Fruits, Prospects, and Lessons of Recent Biological Science. —GLENN W. HERRICK, Ithaca, N. Y., annual address of the President of the Amer. Ass. Econ. Ent., The Need of a Broad Liberal Training for the Economic Entomologist.—ANTHONY ZELENY, University of Minnesota, The Dependence of Progress in Science upon the Development of Instruments. (Vice-Presidential Address before Section B.)—Symposium on *The Basis of Individuality in Organisms,* C. M. CHILD, E. G. CONKLIN, O. C. GLASER, C. E. MCCLUNG and H. V. NEAL (Amer. Soc. Zool.)—F. E. CLEMENTS, Climaxes and climates of Western North America (Bot. Soc. Amer.).—DR. C. GORDON HEWITT, Dominion Entomologist, Ottawa, Canada, A Review of Applied Entomology in the British Empire.*—W. H. LONGLEY, Goucher College, The Doubtful Validity of the Hypothesis of Warning and Immunity Color (Amer. Soc. Zool.).—F. M. WEBSTER, U. S. Bureau of Entomology, Ethnoentomology.*

CYTOLOGY.—DR. FRANK R. LILLIE, The History of the Fertilization Problem. (Address as president of the Naturalists and as vice-president of Section F, A. A. A. S.)—F. PAYNE, Indiana University, The Mitochondria in the Germ Cells of the Male of *Gryllotalpa borealis.* (Amer. Soc. Zool.)—CHAS. W. METZ, Carnegie Institution of Washington, Pairing of Chromosomes in the Diptera, and Sections Showing Pairing of Chromosomes in the Diptera. (Exhibit, Amer. Soc. Zool.)

PHYSIOLOGY.—WM. L. DOLLEY, JR., Randolph Macon College. Negative Orientation in *Vanessa antiopa.* (Amer. Soc. Zool.)—BRADLEY M. PATTON, Western Reserve Medical School, The Change of the Blowfly Larva's Photosensitivity with Age. (Amer. Soc. Zool.)—C. H. RICHARDSON, New Jersey Agricultural Experiment Station, The Attraction of Diptera to Ammonia.*—N. E. MCINDOO, U. S. Bureau of Entomology, The Olfactory-Gustatory Sense of the Honey Bee,* and The Olfactory Organs of Lepidoptera. (Amer. Soc. Zool.)—F. E. CHIDESTER, New Jersey Agric. Exper. Station, The Influence of Salinity upon the Development of the Salt Marsh Mosquito.*—E. P. FELT, Albany, N. Y., Climate and Variations in the Habits of the Codling Moth. (This paper is concerned chiefly in recording variations observed in New York State and attempts to explain these by local variations in temperature.)—A. FRANKLIN SHULL, University of Michigan, Parthenogenesis and Sex in *Anthothrips verbasci.*—W. MOORE, University of Minnesota, How Gases enter Insects.*—S. I. KORNHAUSER, Northwestern University, Changes in *Thelia bimaculata* (Fabricius) Induced by Insect Parasites. (Amer. Soc. Zool.)—A. C. BURRILL, University of Wisconsin, House-Ant Trails and Their Bearing on Economic Control.*—RALPH R. PARKER, Bozeman, Mont., Dispersion of *Musca domestica* Linnaeus Under City Conditions. (An account of dispersion experiments conducted on a large scale.)

GENETICS.—Joint session of the American Society of Zoologists with the American Society of Naturalists for Symposium on Recent Advances in the Fundamental Problems of Genetics.—E. CARLTON MACDOWELL, Carnegie Institution of Washington, The Influence of Selection on the Number of Extra Bristles in *Drosophila*. (Amer. Soc. Zool.)—ROBERT K. NABOURS, Kansas State Agricultural College, Elementary Color Patterns and Their Hybrid Combinations in Grouse Locusts. (Amer. Soc. Zool.)

INSECTS INJURIOUS TO PLANTS.—W. E. BRITTON, Connecticut Agricultural Experiment Station, Notes on Certain European and Other Foreign Insects Occurring in Connecticut* and Further Notes on *Diprion simile* Hartig. (Notes on the distribution, injury, number of generations and parasites of this European sawfly in Connecticut.)—L. HASEMAN, Columbia, Mo., An Investigation of the Supposed Immunity of Some Varieties of Wheat to the Attack of Hessian Fly. (Brief summary of the first year's work, including data collected from plots of different varieties of wheat grown side by side, together with notes on some chemical and physiological variations in the different varieties.)—GEORGE A. DEAN, Manhattan, Kansas, The Hessian Fly Train. (Brief account of the Hessian fly infestation in the State; the organization of the special train; how the train was conducted and the results accomplished.)—H. A. GOSSARD, Wooster, Ohio, County Co-operation to Prevent Hessian Fly Damage. (Describes a method by which an entire county was kept solidly in line, almost no one sowing until advised by the county agent and Station Entomologist to do so.)—H. C. SEVERIN, South Dakota State College of Agriculture, The Life History, Economic Importance and Control of the Carpenter Moth in South Dakota.*—S. B. FRACKER, Asst. State Entomologist of Wisconsin, The Immature Stages of *Schroeckensteinia*, a new raspberry pest.*—M. P. SOMES, Mountain Grove, Mo., Some Insects of *Solanum carolinense* L., and their Economic Relations. (Review of life history of certain insects found on this weed and their development when transferred to related economic plants.)—GEORGE G. AINSLIE, Nashville, Tenn., Notes on Crambidae. (Brief outline of the economic significance of Crambidae and notes on the work carried on at Nashville.)—WM. P. HAYES, Manhattan, Kans., A Study of the Life History of the Maize Bill Bug. (Distribution in Kansas, economic importance, life history and habits, and methods of control.)—R. W. HARNED, Agricultural College, Miss., The Small Pink Corn Worm, *Batrachedra rileyi*, in Mississippi. (Brief notes on occurrence of this insect in Mississippi. It must be ranked as a pest of considerable importance.)—W. J. SCHOENE, Blacksburg, Va., The Economic Status of the Seed Corn Maggot, *Pegomyia fusciceps*. (Discussion of the food plants and the condition of the food attacked.)—J. G. SANDERS, Madison, Wis., Records of *Lachnosterna* in Wiscon-

sin. (Report on the results of using trap lanterns for capturing May beetles.)—JOHN J. DAVIS, West Lafayette, Ind., A Progress Report on White Grub Investigations. (Summary of *Lachnosterna* investigations to date.)—E. N. CORY, College Park, Md., The Columbine Leaf Miner. (Life and seasonal history. Control.)—F. B. PADDOCK, College Station, Texas, Observations on the Turnip Louse. (Bionomical observations made upon this insect in Texas during two years' study of the pest.)—S. W. BILSING, College Station, Texas, Life History of the Pecan Twig Girdler. (Life history of the pecan twig girdler, *Oncideres texana;* methods of control; injury done; food plants, etc.)—H. A. GOSSARD, Wooster, Ohio, The Clover Leaf Tyer, *Ancylis angulifasciana.* (Life history, character of damage and control.)—J. S. HOUSER, Wooster, Ohio, *Dasyneura ulmea* Felt, an Elm Pest. (Causes malformations in the terminal twigs of elm), and A New Method of Subterranean Fumigation.—T. J. HEADLEE, New Brunswick, N. J., Sulphur-Arsenical Dusts Against the Strawberry Weevil. (Among the fifteen different treatments given the plants just as the weevils began their work, the sulphur-arsenical dusts gave the best results and afforded a high degree of protection.)—C. L. METCALF, Columbus, Ohio, The Effect of Contact Insecticides on the Larvae of Syrphidae.—V. I. SAFRO, Louisville, Ky., The Accurate Determination of the Nicotine Content of Spraying Solutions—WALTER C. O'KANE, Durham, N. H., Arsenic on Fruit and Forage Following Spraying. (Sheep poisoning; loss of lead arsenate residues on hay; maximum residues on fruit; conclusions as to factors determining amount of residues.)—W. H. GOODWIN, Wooster, Ohio, The Control of the Grape Berry Worm, *Polychrosis viticana.* (Deals with the life history in Northern Ohio and the development of control methods for the berry worm.)—J. L. KING, Cleveland, Ohio, Notes on the Control of Lesser Peach-tree Borer. (Cultural methods such as pruning and cultivation; also time to "worm the trees.")—See also under "Physiology," "Parasites of Insects" below.

INSECTS INJURIOUS TO MAN AND DOMESTIC ANIMALS.—WILLIAM MOORE, University Farm, St. Paul, Minn., Fumigation of Animals to Destroy their External Parasites. (An account of a new material which can be used to fumigate animals and destroy their parasites without injury to the animal.)—DON C. MOTE, Ohio Agricultural Experiment Station, Warble-Fly Injury.* (Exhibit.)—See also under "Physiology."

APICULTURE.—MORELY PETTIT, Guelph, Ontario, Outline of Apiary Inspection in Ontario.—H. A. SURFACE, Harrisburg, Penn., Suggestions for Efficiency and Economy in Apiary Inspection Service.—E. R. ROOT, Medina, Ohio, The Desirability of Inspection Work from the Standpoint of Queen Breeders.—A. H. MCCRAY, Washington, D. C.,

Some Difficulties in Cross Diagnosis of Disease.—H. A. Gossard, Wooster, Ohio, Honey as a Carrier of Pear Blight Germs.

PARASITES OF INSECTS.—L. O. Howard, Washington, D. C., An Appreciation of the Hawaiian Parasite Introduction Work. (Brief account of observations made and facts learned on a visit to Oahu in August, 1915—an effort to show more emphatically than has hitherto been done, the importance of the results accomplished.)—Joseph H. Merrill, Manhattan, Kansas, Life History and Habits of Two New Nematodes Parasitic on Insects. (One of these nematodes is parasitic upon *Saperda tridentata* and the other upon *Leucotermes lucifugus*.)—J. W. Chapman and R. W. Glaser, Forest Hills, Mass., Some Non-bacterial Insect Diseases. (Methods of diagnosis, distribution and etiological investigations.)—E. W. Berger, Entomologist of Florida State Plant Board, Fungus Parasites of Scale-Insects and White-Flies in Florida.* (Exhibit.)

ARANEINA.—J. H. Emerton, Boston, Massachusetts, Circulating Collection of Spiders.* (Exhibit.)

ORTHOPTERA.—See under "Cytology" and "Genetics" above.

ODONATA. Philip Garman, University of Illinois, Specific and Individual Variation in the Gills of the Nymphs of Zygoptera.*

COLEOPTERA.—V. E. Shelford, University of Illinois, An Analysis of the Color-Patterns of Cicindela.*—C. C. Hamilton, University of Illinois, Notes on a Twig-dwelling Cicindelid.*—See also under "Insects Injurious to Plants" and "Parasites of Insects" above.

LEPIDOPTERA.—J. R. Watson, Florida Agricultural Experiment Station, Life History of *Anticarsia gemmatilis*.* (Exhibit.)—Paul S. Welch, Kansas Agricultural College, Contribution to the Biology of Certain Aquatic Lepidoptera.*—See also under "Physiology" and "Insects Injurious to Plants" above.

HYMENOPTERA.—J. W. McColloch, Manhattan, Kans., A Preliminary Report on the Life Economy of *Solenopsis molesta* Say. (Data thus far obtained on the life history of the kafir ant.)—W. R. McConnell, U. S. Bureau of Entomology, Notes on the Biology of *Paraphelinus speciosissimus* Girault.*—See also under "Physiology," "Insects Injurious to Plants" and "Apiculture" above.

DIPTERA.—Alvah Peterson, University of Illinois, The Epipharynx and Hypopharynx of the Diptera.*—J. L. King, University of Illinois, The Life History of Pterodontia.—C. L. Metcalf, Ohio State University, Metamorphosis of Syrphidae.*—E. N. Cory, College Park, Md., Notes on *Pegomyia hyoscyami* Panz. (Life and seasonal history.)—W. J. Schoene, Blacksburg, Va., Notes on the Biology of *Pegomyia brassicae* Bouche. (The more important observations on the life history of the species.)—See also under "Cytology," "Physiology," "Genetics," "Insects Injurious to Plants" and "Insects Injurious to Man," etc., above.

HEMIPTERA.—E. S. Cogan, Ohio State University, The Homopterous Mouth.*—H. A. Gossard, Wooster, Ohio, Distribution of Periodical Cicada in Ohio for the years 1906, 1914 and 1915. (Maps of the areas in which they appeared and remarks thereon.)—D. M. Delong, Ohio State University, Notes on the Jassoidea of Tennessee.*—R. D. Whitmarsh, Wooster, Ohio, Life History Notes on *Apeteticus cynicus* and *maculiventris*.—Edith M. Patch, Maine Agricultural Experiment Station, Host Plant Outlines of a Few Aphids Based Upon Original Observations in Maine* (Exhibit) and Concerning Problems in Aphid Ecology. (An outline indicating certain phases of aphid study with especial reference to life cycle work with migratory species.)—R. W. Coleman and W. A. Riley, Cornell University, Wax Model of Repugnatorial Glands and their Muscles in Anasa Nymph.—See also under "Physiology," "Insects Injurious to Man," etc., and "Parasites of Insects" above.

THYSANOPTERA.—See under "Physiology" above.

OBITUARY.

Professor Francis Marion Webster died of pneumonia in a hospital at Columbus, Ohio, at 4 a. m. of January 3, 1916, and was buried in Illinois on January 5th. His death removes an active and familiar figure from the annual entomological meetings and from the Federal Bureau of Entomology. Previous to assuming charge of grain- and forage-insect investigations for the United States Department of Agriculture in 1904, he was connected with State entomological work in Illinois, Indiana and Ohio, his title of Professor being derived from the chair of Applied Entomology at Purdue University, which he held from 1884 to 1888. He visited Australia and New Zealand in 1888-89 on a mission from the Federal departments of State and Agriculture.

Professor Webster was the son of J. S. and Betsey A. (Riddle) Webster and was born at Lebanon, New Hampshire, August 8, 1849. He married Maria A. Potter, of Sandwich, Illinois, August 21, 1870.

Extended notices of his life and work are in course of preparation for the *Journal of Economic Entomology*, *Science* and the *Proceedings of the Entomological Society of Washington*.

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MARCH, 1916.

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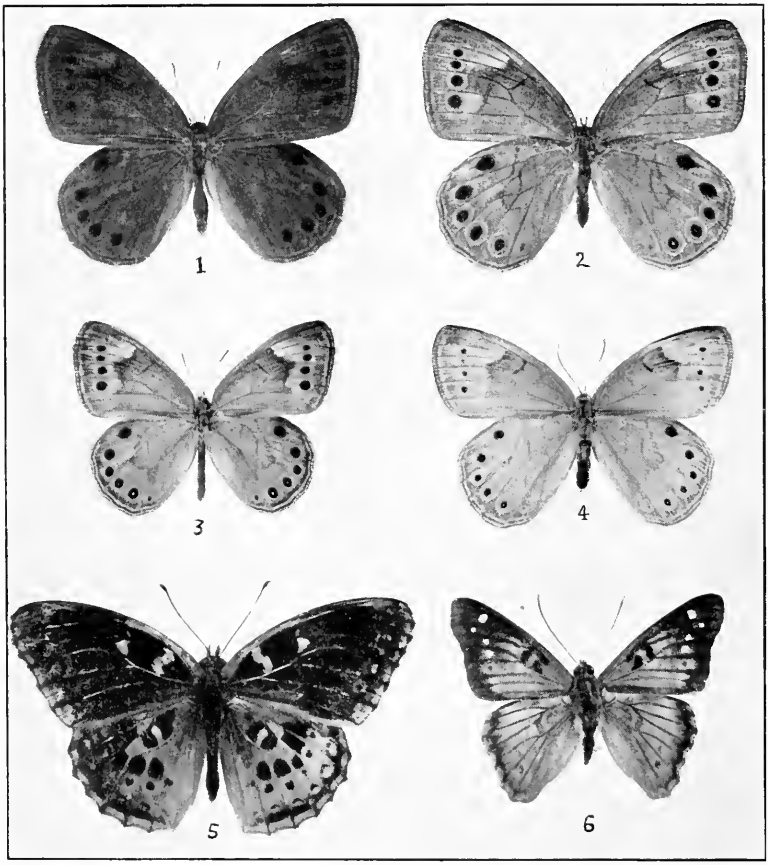

1, 2, SATYRODES CANTHUS, N. VAR. FUMOSUS ♂, ♀; 3, 4, SATYRODES CANTHUS—LEUSSLER.

5, ARGYNNIS ALCESTIS, N. ABERR. SUFFUSA; 6, CHLORIPPE CELTIS N. ABERR. INORNATA—WOLCOTT.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

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Description of two Hitherto Undescribed Aberrations, the one of Argynnis alcestis, the other of Chlorippe celtis (Lep.).

By ROBERT H. WOLCOTT, University of Nebraska, Lincoln, Nebr.

(Plate IV, figs. 5 and 6)

There exists a lack of agreement among entomologists as to the degree to which the various forms of an insect shall be recognized by name, especially when the form in question is in the nature of an aberration. Nevertheless the writer ventures to describe two such aberrations, believing that the recording of all such marked departures from the type which may occur in nature is desirable from the point of view of the student of variation, and that reference to all such departures is facilitated and rendered definite by the bestowal of a name.

The first of these aberrations is a form of *Argynnis alcestis* Edw. which may be appropriately called

Argynnis alcestis n. aberr. **suffusa** (Plate IV, fig. 5).

The whole surface of the fore wings is suffused with black, except for a narrow strip along each margin. Two fulvous spots remain in the discal cell and faint indications of the fulvous spots just within the submarginal line, which is very broad. On the hind wings the submarginal line is also very broad and a black suffusion covers the greater part of the discal cell. In the usual form there is an area beyond each of the median row of black lunules which is of a slightly paler tint than the rest of the wing but in this specimen these areas are largely suffused by black, causing this row of narrow lunules to be replaced by a band of conspicuous black spots. Beneath, the black suffusion on the fore wings ceases abruptly along a line extending from a point two-thirds of the way out from the body on the inner margin to one three-fourths of the way out on the costal margin and parallel to the outer margin. The apical silvered spots are almost obliterated. On the under side of the hind wings the silvered spots of the submarginal row are to a considerable extent suffused with black; the silvered spots of the median row are largely black; and much black appears about and between the silvered spots on the basal portion of the wing, these spots themselves being slightly larger than in the ordinary form. The black, silver, and cinnamon brown of this surface of the hind wings produces a lively contrast which is quite pleasing.

This form is described from one male specimen collected in a bog south of Grand Rapids, Michigan, in August, 1897. It has the appearance of showing the effect of cold, but if that factor was the only one involved in its production it seems strange that such an aberration is so rarely met with among the species of this genus.

The second form is one of *Chlorippe celtis* Bd.-Lec.

Chlorippe celtis n. aberr. **inornata** (Plate IV, fig. 6).

In this form the ground color of all the wings above is of a browner tone than the average specimen. The median band of white spots on the fore wing is gone and the olive-brown ground color extends out over the discal portion of the wing, leaving only an apical black patch with four white spots, and a black border along the outer margin. No trace of submarginal pale lunules is present and the eye spot between the first and second median nervules is represented by only a small dot. On the upper surface of the hind wing all markings are obliterated except a faint trace of the two eye spots next the anal angle and the faint markings in the discal cell. An irregular submarginal blackish band extends across the wing and is broadest toward the costal margin. On the under surface, the wings show the same tendency to

obliteration of the markings, only the spots in the discal cells of both wings being clearly defined as in the ordinary form. However, very faint traces of the rest of the eye spots on the hind wings can be seen and the markings near the inner angle of the fore wings, including the spot between the first and second median nervules, are very faintly indicated, as in the usual type.

This form also is described from a single male specimen collected near Ashland, Nebraska, June 14, 1913. The name *inornata* very naturally suggests itself as appropriate.

The types of both of these aberrations are in the writer's collection.

DESCRIPTION OF PLATE IV.

Fig. 1. *Satyrodes canthus* Linn., n. var. *fumosus.* Male.
Fig. 2. *Satyrodes canthus* Linn., n. var. *fumosus.* Female.
Fig. 3. *Satyrodes canthus* Linn. Male.
Fig. 4. *Satyrodes canthus* Linn. Female.
Fig. 5. *Argynnis alcestis Edw.*, n. aberr. *suffusa.* Male.
Fig. 6. *Chlorippe celtis* Bd.-Lec., n. aberr. *inornata.* Male.
(Photograph by Ralph W. Dawson.)

A new Variety of Satyrodes canthus from Nebraska (Lep.)

By R. A. LEUSSLER, Omaha, Nebr.

(Plate IV, figs. 1-4)

Satyrodes canthus Linn., n. v. **fumosus** (Plate IV, figs. 1, 2).

This is a variety of *canthus,* very large in size and extremely dark in color, with the spots on the upper surface of secondaries enlarged, elongated and intensified.

♂. Measures 27 to 31 mm. from centre of thorax to apex of wing, most of the specimens examined measuring 31 mm.

Upperside: Ground color a very dark smoky grey instead of the pale mouse brown of the typical form, fresh specimens having even a blackish appearance. Number and arrangement of spots the same as in the typical form but the spots on the secondaries larger, blacker and more or less elongated. Submarginal line like that in the typical form. Lighter area in outer half of primaries generally less pronounced than in typical *canthus.*

Underside: The same darkening of tone prevails, *i. e.*, var. *fumosus* is as much darker than typical *canthus* on the under surface as it is on the upper. The spots are large and well ringed with yellow and pupilled

with white, making them stand out prominently. The various other markings are the same as in the typical form.

♀. Measures 28 to 32 mm., in most of the specimens examined 31 or 32.

Upperside: Somewhat lighter in tone than the males, yet of the same smoky grey. Spots larger than in the males but with the same characteristics. Other markings same as in the males. Lighter area on primaries more pronounced.

Underside: Also lighter than in the males and in the limbal area there is a distinct light patch, most pronounced in the spaces on either side of the third median nervule. The spots are prominent, as in the males.

Described from 17 males and 8 females, collected in 1912, 1913, 1914 and 1915, of which one male is designated the type and one female the allotype. The type and allotype are in the collection of R. A. Leussler at Omaha, Neb.

The habitat of this variety is a spring-fed marsh in Sarpy County, Nebraska, a few miles south of Omaha, where wild rice, rushes and tall coarse grasses flourish.

It seems quite probable that this form of *canthus* has been developed as a result of geographical isolation.

A striking character of this variety is its very large size. Holland in his Butterfly Book gives the expanse of *canthus* as from 1.65 to 1.90 inches. A number of Michigan specimens examined vary from 21 mm. to 25 mm. in the dimension corresponding to that given above. Minnesota specimens average slightly larger, and apparently the species tends to become still larger farther west.

Edwards figures a dark *canthus* in Vol. III of his Butterflies of North America (fig. 5, Pl. 1, Satyrids) which he designates "var." and in the text refers to some large Colorado examples, which he states exceed any eastern ones, the males being 2.2 in. and the females 2.4 in. in expanse. Then he adds "but they do not differ in other respects from their congeners." The variety here described besides being of very large size differs very materially from its congeners.

For purposes of comparison specimens of typical *canthus* from Michigan are shown in Figs. 3 and 4 in the plate.

Phenacaspis spinicola n. sp.; an apparently new Coccid from Indiana (Hem., Hom.).

By Harry F. Dietz and Harold Morrison,* Indianapolis, Indiana.

The following description of what seems to be a new species of Diaspinae is published as a preliminary to a systematic paper on the Coccidae of Indiana, which is now completed and will be issued about the first of April.

We have had some difficulty in deciding the generic position of this species, but after a careful study of related species, including the type of *Phenacaspis* and eight species of *Chionaspis,* have concluded that it should be included in *Phenacaspis* Cooley.

Phenacaspis spinicola new species.

Scale of Female: Length 1.5-2 mm.; strongly broadened behind, widest behind the middle, apex broadly rounded, sometimes more irregular in shape, thin, somewhat convex, color normally white but often gray or dirty gray; exuviae large, occupying fully one-third of the total length of the scale, the first pale brown and shiny, the second very light yellow and dull; ventral scale well developed along the edges, very thin or wanting in the centre, often remaining attached to the dorsal scale.

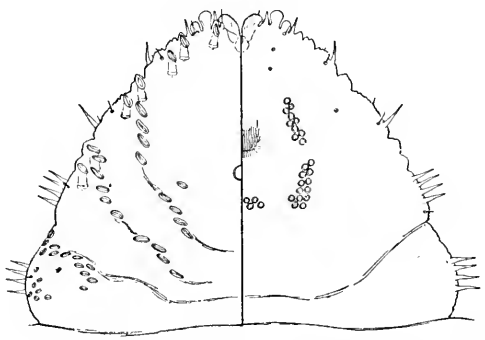
Scale of Male: Length about .8 mm.; elongate, narrow, sides approximately parallel or slightly curved; white, more or less distinctly tricarinate, roughened above; exuvia, pale yellow, occupying fully two-fifths of the total length of the scale.

Body of Female: Elongate, narrow, broader just in front of the pygidium, distinctly segmented, cephalic segment almost triangular, apex rounded, the two segments preceding the penultimate segment more or less distinctly constricted at the sutures.

Pygidium of Female: Rather large, parabolic in shape; deeply incised at apex by the sunken median lobes; median lobes large, deeply sunken into the pygidium, broad, the outer margins nearly straight, then angularly curved to the median chitinous thickenings, inner margins strongly curved from base to apex, close together and parallel for a short distance at base, distinctly crenulate, second lobes distinctly divided into spatulate lobules, the inner more prominent than the median lobes, inner lobule of third lobes well developed, but broad, only slightly projecting, with serrate margin; no incisions in the margin of the pygidium; with a more or less distinctly hexagonal thickening on the median line at the base of the median lobes, this deeply notched caudally; no plates present, gland spines as follows: one just outside

*The arrangement of the authors' names is alphabetical and indicates neither seniority nor precedence.

median lobe, one just outside of the outer lobule of the second lobe, one beyond the rudimentary outer lobule of the third lobe, one about half-way between this and the base of the pygidium and a group of two to four just caudad of the base of the pygidium; spines as shown in figure; anal opening circular, slightly nearer to base than to apex of pygidium; circumgenital gland openings arranged in five groups, median 8-9, anterior laterals 10-15, posterior laterals 7-10; marginal gland openings as follows: one between the first and second lobes on a slight prominence, one on a slight prominence between second gland spine and inner lobule of third lobe, one just beyond this, opening at the outer angle of the inner lobule of the third lobe, one, the first of a row, on a



Phenacaspis spinicola n. sp.—Pygidium of female, dorsal surface to right, ventral surface to left. (R. E. Snodgrass, del.)

slight prominence a little beyond the third gland spine, one a little beyond this, a little inside of the margin, apparently opening into a pocket, one on a slight protuberance beyond the fourth gland spine and the last a little beyond this; dorsal gland openings somewhat variable, but about as shown in figure; micropores so far as observed as follows: two, one in front of the other, cephalad of the outer lobule of the second lobes, one close to the second gland opening of the first row of dorsal gland openings.

Types deposited in the writers' collections, co-types in the U. S. N. M. Coll., Cornell University collection, collection of Prof. R. A. Cooley, Ohio State University collection, Stanford University collection and Academy of Natural Sciences of Philadelphia collection.

This species has been found in two places just outside of Indianapolis, Indiana, September 15, 1915, and in two places east of Vincennes, Indiana, August 31, 1915, in all cases on the honey locust (*Gleditsia triacanthos*), infesting especially the green spines on the trunk of the tree, but also to some extent the bark, twigs and leaves. In all cases it was scarce, and cannot be considered as being of economic importance.

New and Noteworthy Hemiptera from New England.[1]

By H. M. Parshley, Bussey Institution, Harvard University.

During the past two years I have examined a large number of New England Hemiptera, among which I have found several new forms and numerous species not hitherto supposed to occur in this region. The records noted herewith are of special interest, and in several cases the known range of the species is materially extended. Such results show clearly how inadequate is our present knowledge as a basis for generalizations on the distribution of the Hemiptera, and they emphasize the importance of intensive investigations restricted to limited areas.

Gerridae.

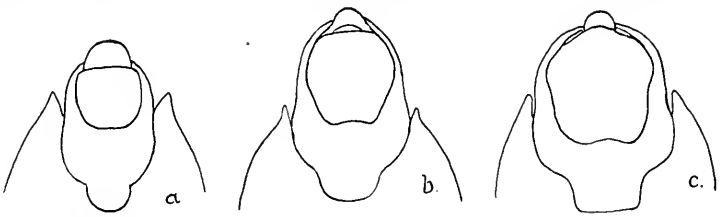
Gerris argenticollis sp. nov. (Fig. *a*).

Dark velvety brown above with fine sericeous pubescence. Anterior lobe of the pronotum with median and marginal yellow stripes, the former faint, the latter clothed with thick silvery pubescence; posterior lobe with yellow margins. Inner margins of hemielytra marked at base with white between the veins. Under surface black or silvery depending on the direction of the light; acetabula, bases of anterior legs and margins of abdomen marked conspicuously with yellow; omphalium and legs variable, black to pale brown.

Relative proportions: of antennal segments, 1st 26, 2nd 13, 3rd 12, 4th 10; of intermediate legs, femur 50, tibia 43, 1st tarsal segment 20, 2nd 10.

Thorax comparatively robust; abdominal spines not reaching apex of abdomen.

♂. Fifth abdominal sternite notched at middle of posterior margin; sixth abdominal sternite not carinate, ventral surface of abdomen not



Male genitalia of *Gerris*, ventral view; *a*, *G. argenticollis* n. sp.; *b*, *G. marginatus* Say; *c*, G. *buenoi* Kirk.

[1] Contributions from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 109.

distinctly depressed just anterior to genital segment (as it is in *buenoi*), median ventral (second) emargination narrow, semicircular; genital segment narrow, Fig. *a*.

♀. Lateral plates of genital segment together very slightly wider than long, widest at middle, carinate ventrally.

Length from tip of tylus to apex of abdominal spines, ♂ 7.5-8 mm.; ♀ 8-8.5 mm.

Holotype (♂) and allotype (taken in copulation) in my collection; paratypes in the Museum of Comparative Zoology, Cambridge; Boston Society of Natural History; United States National Museum; and the Academy of Natural Sciences, Philadelphia.

Described from 10 males and 16 females taken at Forest Hills, Massachusetts, 26 April, 4 May, 20 May, 1915, from a woodland pond where it was associated with *G. marginatus* Say and *G. buenoi* Kirk. A female specimen from Southern Pines, North Carolina, 15 March, 1915 (Manee) belongs to this species. This form pertains to the subgenus *Gerris*. It is distinguished from *G. buenoi* and *G. marginatus* by the white markings at the base of the hemielytra, the form of the genitalia, Figs. *a-c*, and the marginal stripes of the anterior lobe of the pronotum which are not silvery in the former and lacking in the latter.

MIRIDAE.

Heterocordylus malinus Reut. Durham, New Hampshire (No. 2485, W. & F.).

This is the most northern record for the species, and the first indication of its occurrence in New England. It is seriously destructive in New York, where it is known as the "apple red-bug."

Pithanus maerkeli H. S. Eastport, Maine, 15 July, 1909 (C. W. Johnson).

In going over some unmounted material belonging to the Boston Society of Natural History, I recently came across seven brachypterous specimens of this European species, which were taken by sweeping in a field. This record, the first for New England, indicates the establishment of the species in this country. It was first recorded by Olsen, from

Long Island, and I have lately seen a specimen from Truro, Nova Scotia, taken by Mr. W. H. Brittain.

HEBRIDAE OR NAEOGEIDAE.

Hebrus (or **Naeogeus**) **burmeisteri** Leth et Sev. Edgartown, Martha's Vineyard, Massachusetts, 28 June, 1912. (C. W. Johnson).

One specimen only of this species has been present in the material which I have thus far examined.

REDUVIIDAE.

Apiomerus ventralis Say. Monmouth, Maine, 26 June, 1906, Framingham, Massachusetts, 12 June, 1904.

One of several unusually interesting Hemiptera collected by Mr. C. A. Frost, the coleopterist. It has been considered a southern and western species.

Zelus socius Uhl. Monmouth, Maine, 18 July, 1914 (Frost), Hopkinton, Massachusetts, 14 June, 1914 (Frost), Portland, Connecticut, 10 August, 1913 (Walden).

These I believe to be the first New England records for this species.

TINGITIDAE.

Galeatus peckhami Ashm. Mt. Washington (Glen House, Osgood Trail), New Hampshire, 20 July, 1915 (C. W. Johnson).

This curious Tingitid is a notable addition to the New England fauna.

CORIZIDAE.

Corizus hyalinus Fab. Woods Hole, Massachusetts, 2 July, 1905 (J. A. Cushman).

This species inhabits the warmer regions of the Old and New Worlds and is an addition to the rather long list of more typically southern forms occasionally found along the southern coast of New England.

COREIDAE.

Anasa repetita Heid. Wallingford, Connecticut, 1911 (D. J. Caffrey), Boston (near Chestnut Hill), Massachusetts, 24 Sept., 1914 (Parshley).

The first New England records for this species were published by Mr. C. W. Johnson, Psyche, 1914, p. 82. I took the specimen noted above while sweeping underbrush in open woods, together with *A. armigera*.

Anasa armigera Say. Boston, Massachusetts, 24 Sept., 1914; 13 Oct., 1915 (Parshley).

I believe that these are the first New England records for this species. The two specimens were taken at almost the same spot in two successive years. The individual captured in 1914 differs in some details from typical western specimens in my collection, but the other is so distinctly intermediate as to forbid even racial separation from typical *armigera*.

PENTATOMIDAE.

Zicrona caerulea Linn. Newbury Neck (near Surrey), Maine, 22-24 June, 1904 (F. A. Eddy).

This cosmopolite is widely distributed in the West, but there is only one other record of its occurrence in New England, (Mt. Washington, New Hampshire). I have compared the specimen with others in my collection from the Caucasus and Java and note but slight differences apart from size.

A New Species of Heterothrips (Thysanoptera) from Eastern United States.

By J. DOUGLAS HOOD, U. S. Biological Survey, Washington, D. C.

Heterothrips vitis sp. nov.

1913—*Heterothrips arisaemae* Morgan, Proc. U. S. Nat. Mus., Vol. 46, p. 44. (Appomatox, Virginia; on wild grape). (A misidentification, nec Hood, 1908).

Female (*macropterous*).—Length about 1 mm. Color dark blackish brown, with tarsi and distal ends of all tibiae very pale yellow; basal portions of antennal segments 3 and 4 more or less yellowish, the remainder of antenna grayish brown.

Head about 1.6 times as long as median dorsal length and about 0.7 as long as prothorax, widest near base, cheeks tapering roundly anteriorly; surface closely transversely striate and with a few minute spines, impressed in the region of the anterior ocellus; frontal costa with deep, U-shaped emargination; ocellar area not delimited by chitinous lines. Eyes setose, about two-thirds as long as head, slightly wider than their dorsal interval, not bounded behind by a chitinous line. Ocelli of posterior pair twice the diameter of anterior ocellus, about half as wide as their interval. Antennae about 2.8 times as long as head; segment 3 more or less conical and about 2.8 times as long as

wide; 4 much shorter than 3, about twice as long as wide, sides broadly rounded in basal fourth, nearly straight beyond; 5-8 more or less barrel shaped, with sense cones, 5 narrowed at base; 9 about three times as long as wide, obliquely truncate at base, its axis tipped more or less outward from that of rest of antenna; segment 1 slightly lighter than head, 2 about concolorous with it, very slightly, if at all, paler at apex; 3 and 4 pale yellowish, with orange pigment apically, 3 narrowly and 4 widely, darkened with gray at apex; 5-9 grayish brown, 5 paler subbasally.

Prothorax about 1.4 times as long as head and about 1.6 times as wide as long, broader behind, sides and posterior margin rounded, anterior margin nearly straight; notum with a few inconspicuous bristles, its surface closely transversely striate with anastomosing lines. Wings of fore pair nearly half as wide at middle as near base, the greatest sub-basal width (exclusive of scale), about one-ninth the length of wing; costal margin, anterior vein, and posterior vein with about 30, 26, and 16 spines, respectively.

Abdomen stout, pubescence dense, disposed on close, anastomosing striae; posterior margins of abdominal tergites 1-5 fringed at sides with numerous slender spines which are not at all coalesced at base to form plates or scales; tergites 6-8 and sternites 2-6 with their entire posterior margins similarly produced.

Measurements of holotype: Head, length 0.090 mm., width 0.144 mm.; prothorax, length 0.126 mm., width 0.206 mm.; prothorax, width 0.269 mm.; fore-wing, length 0.780 mm., width near base 0.084 mm.; width at middle 0.045 mm.; abdomen, width 0.319 mm.

Antennal segments:	1	2	3	4	5	6	7	8	9
Length in microns	20	35	61	44	32	29	14	15	14
Width in microns	28	25	22	21	18	15	12	10	5

Total length of antenna, 0.264 mm.

Male (*macropterous*).—Length about .7 mm. Color and structure essentially as in female. Tergite of abdominal segment 9 with a pair of heavy, fingerlike, chitinous processes between the usual two pairs of long bristles behind middle.

Measurements of allotype: Head, length 0.076 mm., width 0.125 mm.; prothorax, length 0.102 mm., width (inclusive of coxae) 0.172 mm.; pterothorax, width 0.209 mm.; fore-wing, length 0.552 mm., width near base 0.072 mm., width at middle 0.039 mm.; abdomen, width 0.166 mm.

Antennal segments:	1	2	3	4	5	6	7	8	9
Length in microns	18	33	53	37	32	29	14	14	11
Width in microns	24	21	19	18	16	14	11	9	5

Total length of antenna, 0.241 mm.

Described from 49 females and 15 males, as follows:

Maryland: Plummer Island (type locality), May 23, 1915 (W. L. McAtee, L. O. Jackson, J. D. Hood), on flowers of wild grape, 10 females, 3 males; Great Falls, May 23, 1915 (W. L. McAtee, L. O. Jackson, J. D. Hood), on flowers of wild grape, *Smilax* and *Rhus toxicodendron,* 31 females, 8 males.

District of Columbia: Washington, June 6, 1915 (V. A. Lawrence and J. D. Hood), on flowers of wild grape, 7 females, 2 males.

Virginia: Great Falls, May 19, 1915 (L. O. Jackson), on flowers of wild grape, 1 female, 2 males.

The *types* are now in my collection.

The specimens here described are very uniform in most of the characters used in the differentiation of the species. Other individuals, particularly males, taken at the same time and possibly in company with them, exhibit variations in the proportionate lengths of the antennal segments, the sculpture of the pronotum, and the abdominal armature; but more material of these forms is needed before their proper status can be decided.

This species is allied by the simple, spinose fringe of the lateral, posterior margins of the abdominal tergites, to *minor, sericatus* and *analis.* The transversely striate pronotum separates it readily from *minor,* which was described from Panama; and *sericatus,* a Porto Rican species, differs radically in that the legs of the female are yellow and the body of the male orange yellow. Its affinities, then, are with *analis,* known only from Maryland. This is the only species of the genus with which it agrees in the male sex in having the ninth abdominal tergite produced in a pair of converging, fringe-like processes. In *analis,* however, the third antennal segment is very long, being about 3.6 times as long as its greatest width; the middle portion of the antenna, from segments 3-5, inclusive, is a very pale grayish yellow; and the mid and hind tibiae are annulate at both ends with pale yellow.

Additional Records of New Jersey Acarina.

By Harry B. Weiss, New Brunswick, New Jersey.

For a preliminary list of New Jersey mites, see Entomological News, Vol. xxvi, 149-151.

Linopodes antennaepes Banks. Fort Lee (Trans. Amer. Ent. Soc., Vol. xxi, p. 221). Common under pieces of wood, bark, etc., that have been on the ground for some time.

Bdella cardinalis Banks. Fort Lee. Under leaves, in moss, under rotten wood. (Trans. Amer. Ent. Soc., Vol. xxi, p. 219.)

Bdella marina Pack. New Jersey seashore. (Trans. Amer. Ent. Soc., Vol. xxi, p. 219.)

Anystis agilis Banks. Fort Lee, on grass, trees, bushes. (Trans. Amer. Ent. Soc., Vol. xxi, p. 211.)

Tetranychus mytilaspidis Riley. Occurs on citrus stock growing in greenhouses in New Jersey. H. B. Weiss.

Trombidium granulatum Banks. Fort Lee. (Canad. Ent., 1902, p. 171.)

Tetranobia clavispinis Bks. Pemberton, May 20, on unidentified grass in cranberry bog. H. B. Scammell.

Galumna octo-punctata Ewing. Pemberton, Feb. 21, under loose bark of catalpa. H. B. Scammell.

Galumna depressa Bks. Whitesbog, Sept. 27, on *Vaccinium corymbosum* (blueberry). H. K. Plank.

Galumna armipes Banks. Fort Lee. (Proc. Acad. Nat. Sci., Phila., 1906, p. 492.)

Galumna robusta Banks. Fort Lee. (Trans. Amer. Ent. Soc., Vol. xxii, p. 7.)

Oribatula pallida Banks. Fort Lee. (Proc. Acad. Nat. Sci., Phila., 1906, p. 494.)

Eremaeus pilosus Banks. Fort Lee. Common in crevices of the bark of trees. (Trans. Amer. Ent. Soc., Vol. xxii, p. 11.)

Liacarus nitidus Banks. Fort Lee. Common on ground under wood, bark, stones. (Trans. Amer. Ent. Soc., Vol. xxii, p. 10.)

Oribata minuta Banks. Fort Lee. Common in decaying animal substances; also occurs in moss, under bark on the ground. (Trans. Amer. Ent. Soc., Vol. xxii, p. 12.)

Oribatella signata Bks. Medford, May 29, on foliage of cranberry beneath the surface of the water. H. B. Scammell.

Oribatella formosa Bks. Pemberton, May 8, on laurel. H. B. Scammell.

Rhizoglyphus hyacinthi Boisd. Newark, October, injuring hyacinth bulbs. H. B. Weiss.

Eriophyes cephalanthi Cook. Riverton, July, August. Elizabeth,

Aug. 10. On *Cephalanthus occidentalis* (button bush). H. B. Weiss.

Eriophyes cornutus Banks. New Jersey. Causes silver sheen on peach leaves. (Proc. Wash. Ent. Soc., Vol. vii, p. 141.)

Eriophyes eucricotes Nalepa. Kingston, Elizabeth, Riverton, Rutherford, Springfield, on *Lycium barbatum* (matrimony vine). H. B. Weiss.

Eriophyes fraxini Garm. Springfield, July. Galls on ash leaves.

Eriophyes oleivorus Ashm. Occurs on lemons and oranges growing in greenhouses in New Jersey. H. B. Weiss.

Eriophyes rosea Schult. Plainfield, on sugar maple. Red frost gall of maple. H. B. Weiss.

Eriophyes tristriatus Nalepa. Elizabeth. Felt mite gall on walnut. H. B. W.

Eriophyes vitis Landois. Chester, Sept. 28. Felt mite gall on wild grape. H. B. Weiss.

Eriophyes sp. Trenton, Springfield, Riverton, August. On pearl bush (*Exochordia*). H. B. Weiss.

Eriophyes sp. Rutherford, on *Sambucus canadensis*. Margins of leaves involute.

Eriophyes sp. Rutherford. Brown warts on upper surface of alder leaves.

South Carolina Ants (Hym.).

By M. R. Smith and W. A. Morrison, Entomological Laboratory, Clemson Agricultural College, South Carolina.

The following represents a list of ants collected from various localities in South Carolina during the fall of 1915. Where no locality is given the species was collected in the vicinity of Clemson College. The identifications were made by Dr. W. M. Wheeler, to whom the writers are greatly indebted:

Subfamily Dorylinae.

Eciton opacithorax Emery.

Subfamily Myrmicinae.

Solenopsis geminata Fabr.—Marion.
Solenopsis pergandei Forel.
Solenopsis molesta Say—Marion.
Pheidole morrisi Forel.—Marion.
Pheidole dentata Mayr.—Marion.
Pheidole crassicornis Emery.
Pheidole vinelandica Forel.
Cremastogaster lineolata Say.
Cremastogaster lineolata Say, var. *lutescens* Emery.
Cremastogaster victima Smith.

Aphaenogaster treatae Forel.
Aphaenogaster lamellidens Mayr.
Aphaenogaster texana Roger, var. *carolinensis* Emery.
Pogonomyrmex badius Latr.
Leptothorax curvispinosus Mayr.
Trachymyrmex septentrionalis McCook.

Subfamily Dolichoderinae.

Dolichoderus (Hypoclinea) mariae Forel.
Dolichoderus (Hypoclinea) taschenbergi Mayr. var. *aterima* Whlr.
Dolichoderus (Hypoclinea) plagiata Mayr.
Dorymyrmex pyramicus Roger.
Dorymyrmex pyramicus Roger, var. *flavus* Pergande.
Dorymyrmex pyramicus Roger, var. *niger* Pergande—Marion.
Tapinoma sessile Say.
Iridomyrmex pruinosus Roger, var. *analis* André.
Iridomyrmex pruinosus Roger, var. *humilis* Mayr.—Charleston.

Subfamily Camponotinae.

Prenolepis imparis Say, var. *minuta* Emery.
Prenolepis imparis Say, var. *testacea* Emery.
Lasius niger Linn., var. *americanus* Emery.
Lasius (Acanthomyops) claviger Roger.
Lasius (Acanthomyops) interjectus Mayr.
Formica pallide-fulva Latr. subsp. *schaufussi* Mayr.
Formica fusca Linn., var. *subsericea* Emery.
Camponotus castaneus Lat., subsp. *americanus* Mayr.
Camponotus castaneus Latr.
Camponotus herculeanus Latr., subsp. *pennsylvanicus* DeGeer.
Camponotus fallax Nyl., var. *nearcticus* Emery.
Camponotus fallax Nyl., var. *decipiens* Emery.

The species here given were found attending *Aphis-maidiradicis*, the corn and cotton root louse, by Prof. W. A. Thomas of this Division.

Cremastogaster lineolata Say, var.
Dorymyrmex pyramicus Roger, var. *niger* Pergande.
Solenopsis molesta Say, var.
Solenopsis geminata Fabr.
Pheidole dentata Mayr.
Pheidole morrisi Forel.
Prenolepis sp. Emery.
Pheidole vinelandica Forel.

In this section *Prenolepis imparis* appears to be one of the most numerous and hardiest of ants, as it has been active all winter, though the winter here has not been severe.

Additions to the Coleoptera of Meriden, Connecticut.

By Harry L. Johnson, South Meriden, Conn.

In my first list of the Coleoptera of Connecticut published in the issue of Entomological News for July, 1915, I made the statement that it was my intention to add further species to this list as they came into my hands. Since I now have some 275 specimens which are additions to the list, together with several corrections, I think it is advisable to publish them.

I am greatly indebted to the following entomologists for the identification of many species and without whose help this list would have been necessarily incomplete and uncertain: Mr. A. B. Champlain and Mr. Charles Leng, of New York, have identified most of the Carabidae; Mr. Schwarz, of the National Museum, together with Mr. C. A. Frost, of Framingham, Mass., have determined the bulk of the material, while Mr. Fisher, of Washington, D. C., is responsible for most of the Cerambycid determinations; Mr. E. D. Harris, of New York, Mr. N. S. Easton, of Fall River, Mass., and Mr. W. E. Snyder, of Beaver Dam, Wis., have also helped in determinations of species, while Mr. Britton and Mr. Walden, of the Connecticut Agricultural Experiment Station, are largely responsible for most of the corrections to my former list.

A short description of collecting grounds in connection with this list is deemed necessary. To the northwest of South Meriden there lies a long, narrow valley enclosed by hills and cliffs which is traditionally known as "Oregon" by the inhabitants of the village. Through the center of this valley flows the Connecticut river, on its northern bank runs the track of the "Cannon Ball Express," while along the southern bank a road, known as the Cheshire or Oregon road, wends its way. Everything from sandy shores to deep woods and dense vegetation is found in this valley, thus affording a variety of collecting which is not easily imagined. My favorite collecting route is along the Oregon road for a couple of miles until I come to a bridge which takes me across the river, allowing me to make my return trip along the railroad track and thence home.

Black Pond is a large and very deep body of water, more

than half surrounded by high cliffs situated to the east of the city of Meriden. The fauna of this locality differs considerably from that surrounding my own home and almost always supplies new names for the list with each visit, an abandoned road through the hills to the north of this pond being one of my favorite collecting places.

Family Cicindelidae.

Cicindela hirticollis Say. Rare. Taken from June 7 to Aug. 6.

Family Carabidae.

Carabus limbatus Say. Rare. Taken in a trap made by sinking a glass jar containing some molasses into the ground so that the top was level with the ground. Dense woods were selected as best for the trap and a specimen of *C. limbatus* was secured in it on May 30.

Calosoma willcoxi Lec. Rare. Taken with *C. frigidum* while killing caterpillars. May 21-27.

Calosoma frigidum Kirby. Not common. Taken from May 27-June 12. All my specimens were captured while running along the fence on the Oregon road where they were busy killing and eating the caterpillars of *Malacosoma americana*. These worms fairly swarmed along the fence and every now and then would be seen an open spot where the Calosomas had broken their ranks and left the dead and wounded on the field.

Calosoma sycophanta Linn. Rare. 1 specimen May 14.

Scarites subterraneus Fab. Rare. 2 specimens on June 30 and July 7.

Schizogenius lineolatus Say. Very rare. Secured one on the 27th of May.

Bembidium contractum Say. Rare. Taken on July 9.

Tachys nanus Gyll. Common. Sept. 19-20.

Pterostichus adoxus Say. Not common. Taken under boards and stones on May 15.

Pterostichus sayi Brullé. Somewhat rare. Under boards from May 1 to July 7.

Pterostichus corvinus Dej. Several taken July 14 and 16.

Pterostichus mutus Say. Quite rare. Taken from April to September.

Amara exarata Dej. Seldom taken. Appears during August, September and October.

Amara apricarius Payk. Not common. Taken September first.

Dicaelus elongatus Bon. Rare. Occurs under damp boards and leaves. May to October.

Platynus sinuatus Dej. Found under stones from April 30 to Aug. 26.

Platynus excavatus Dej. Occurs near and under rocks in July.

Platynus octopunctatus Fab. Quite rare. Have taken but two specimens.

Platynus crenistriatus Lec. Not common. Found in moist localities from April 11 to Sept. 27.

Platynus rubripes Zimm. Very rare. 1 specimen Oct. 3.

Lebia grandis Hentz. 1 specimen taken in Wallingford, Conn., on July 27 by Mr. D. J. Caffrey.

Lebia atriventris Say. Fairly common from June to July.

Lebia fuscata Dej. Rare. May 31.

Dromius piceus Dej. Not common. Taken from March 20 to July 18.

Axinopalpus biplagiatus Dej. Not common. Found under moist bark of ash and oak from March 8-15.

Cymindis americana Dej. Rare. Taken in moist localities on Sept. 7.

Chlaenius aestivus Say. April 11-Sept. 20.

Chlaenius pennsylvanicus Say. April 29-July 7.

Lachnocrepis parallelus Say. Rare. 1 specimen July 13.

Oodes americanus Dej. 1 specimen June 2. Very rare.

Stenolophus conjunctus Say. Not common. March 3-May 14.

Tachycellus badiipennis Hald. Quite common from April 11 to 19.

Anisodactylus rusticus Dej. Common from April to August.

Anisodactylus nigerrimus Dej. Common. Found in wet localities under boards, stones and rubbish from April 20 to Sept. 14.

Anisodactylus sericeus Harr. Rare in my experience. 1 specimen May 24.

Family HALIPLIDAE.

Haliplus fasciatus Aubé. Not common. I have one taken on March 10 and another specimen taken in Hamden, Conn., by Mr. B. H. Walden on Oct. 24.

Haliplus ruficollis DeG. Rare. 1 specimen April 6.

Cnemidotus edentulus Lec. Common during March.

Family DYTISCIDAE.

Hydrocanthus iricolor ? Say. Rare. 1 specimen on April 10.

Laccophilus maculosus Germ. Rare. Taken in a small pond known as Little Hanover on April 5.

Laccophilus undatus ? Aubé. Common in Little Hanover during March and April.

Hydroporus americanus ? Aubé. Not common. July 18.

Copelatus glyphicus ? Say. Rare. Taken in sluggish pools on April 5.

Family Gyrinidae.

Dineutes emarginatus Say. Common. July 12.-Oct. 17.

Family Hydrophilidae.

Sphaeridium scarabaeoides Linn. Rare. 1 specimen from pasture May 2.

Cercyon nigricolle ? Say. Rare. 1 specimen May 13.

Family Staphylinidae.

Staphylinus maculosus Grav. Taken while flying. May 3-June 1.

Staphylinus cinnamopterus Grav. Sept. 27. Seldom taken.

Philonthus lomatus Er. 1 specimen July 6.

Stenus juno ? Fab. Very rare. 1 specimen May 15.

Platystethus americanus Er. Taken from under rubbish on July 10. Rare.

Triga picipennis Lec. Taken from beneath bark of maple on March 15. Rare.

Family Phalacridae.

Phalacrus penicillatus Say. April 20-July 14. Quite rare.

Olibrus apicalis. Common. Taken from flowers in May, June and July.

Family Coccinellidae.

Hippodamia glacialis Fab. Common on alfalfa from March 29-Aug. 31.

Brachyacantha 4-punctata Melsh. Rare. Occurs from June to September.

Family Erotylidae.

Languria gracilis Newm. Rare. Taken by sweeping. June 8-July 9.

Family Cucujidae.

Silvanus surinamensis Linn. Taken under bark on July 12. Not common.

Silvanus planatus ? Germ. Found under bark of elm on March 19.

Laemophlaeus fasciatus Melsh. Taken under moist bark of trees from April 20-May 25.

Laemophlaeus testaceus Fab. Not common. Found under wet bark of elm, March 28.

Laemophlaeus pusillus Sch. Very rare. 1 specimen August 1.

Family Cryptophagidae.

Telmatophilus americanus Lec. Common throughout the month of May.

Family Dermestidae.

Byturus unicolor Say. Not common. May 25.

Attagenus piceus Oliv. Quite common from June 2-July 4.

Anthrenus castaneae Melsh. Rare. 1 specimen by sweeping on June 30.

Anthrenus lepidus. Rare. Taken by sweeping in Oregon on July 2.

Family Histeridae.

Hister merdarius Hoffm. Very common.

Family Nitidulidae.

Stelidota geminata Say. 1 specimen taken July 16. Quite rare.

Family Latridiidae.

Stephostethus liratus ? Lec. Swept one specimen of this rare species from deep grass on July 16.

Melanophthalma cavicollis Mann. Rare. 1 specimen July 23.

Family Trogositidae.

Tenebrioides corticalis Melsh. Taken from under bark of elm, maple and oak from March 28-April 13. Very common.

Tenebrioides americana Kirby. Took one specimen under bark of maple on March 28.

Family Parnidae.

Psephenus lecontei Lec. Took one specimen July 11.

Elmis vittatus Melsh. Rare. 1 specimen by sweeping June 18.

Family Dascyllidae.

Anchytarsus bicolor Melsh. Rare. 1 specimen July 13.

Cyphon ruficollis Say. Not common. Swept from flowers of wild carrot and wild parsnip. May 31-July 6.

Cyphon obscurus Guer. Rare. Obtained by sweeping in boggy meadows.

Cyphon variabilis Thunb. Rare. May 7.

Family Elateridae.

Microrrhagus triangularis Say. Rare. 1 specimen July 13.

Oedostethus femoralis Lec. Rare. Taken by sweeping cat-tail June 19-July 3.

Monocrepidius aversus Lec. Very rare. Taken at light on window July 16.

Monocrepidius auritus Hbst. Taken by sweeping in May.

Elater miniipennis ? Lec. Rare. June 21-25.

Elater laesus ? Lec. Found in his home by Fred Kaiser of So. Meriden, on March 26.

Elater rubricus Say. Rare. Taken in June.

Elater obliquus ? Say. Rare. Swept from elm foliage near little Hanover from April 9-July 7.

Agriotes mancus Say. Not common. Taken by sweeping meadows from June 1-July 7.

Melanotus pertinax Say. Rare. 1 specimen May 14.

Limonius stigma Hbst. Very rare. 1 specimen April 16.

Limonius griseus ? Beauv. Common on meadow grass from May 21-June 9.

Oestodes tenuicollis Rand. Common. Taken from cat-tail June 2-20.

Sericosomus viridanus Say. Very rare. 1 specimen May 8.

Corymbites tessellatus Linn. Taken from bark of elm and other trees. May 3-16.

Corymbites cylindriformis Hbst. Common. Taken by sweeping in May.

Corymbites tarsalis Melsh. Very rare. Swept from foliage on April 29 and May 2.

Corymbites hamatus Say. Rare. Taken from foliage of elm on June 7.

Corymbites inflatus Say. Rare. May 21.

Hemicrepidius decoloratus Say. Rare. July 9-16.

Melanactes piceus DeG. Very rare. Taken from dead and dying trees July 7.

Family Buprestidae.

Dicerca pugionata Germ. Very rare. 1 specimen May 3.

Anthaxia viridifrons Lap. Taken in Wallingford from dead hickory on April 24, by D. J. Caffrey and also in New Haven on dead hickory by H. B. Kirk on May 10. Have never met with it in my locality.

Chrysobothris femorata Fab. Rare. Taken from June 19-July 7.

Chrysobothris 6-signata Say. May 9-July 28. Taken in New Haven by Mr. Walden also.

Eupristocerus cogitans Web. Rare. Beaten from blackberry bushes and oak from May 20-July 13.

Agrilus acutipennis Mann. Beaten from shrubbery. Rare.

Agrilus anxius Gory. Rare. Picked off from low shrubs.

Agrilus cephalicus Lec. Rare. Beaten from oak on July 6.

Agrilus arcuatus var. **coryli** Horn. Very rare. 1 specimen July 16.

Agrilus masculinus Horn. Rare. Obtained by beating from May 31-June 14.

Agrilus obsoletoguttatus. 2 specimens from No. Branford, Conn., collected on June 23 by B. H. Walden.

Family Lampyridae.

Calopteron terminale Say. Rare. Taken along fences and marshy places from August to September.

Pyropyga nigricans Say. Fairly common. Taken from flowers of meadow-sweet and wild carrot during the early part of July.

Photinus marginellus Lec. Common from June to August.

Telephorus nigritulus ? Lec. Very rare. Taken from meadow-sweet blossoms on July 13.

Telephorus rectus Melsh. Rare. 1 specimen June 19.

Trypherus latipennis Germ. 2 specimens taken on sandy shore of Little Hanover July 6-13.

Family MALACHIIDAE.

Collops eximius Er. Rare. Swept from flowers of spicebush.

Collops 4-maculatus Fab. Quite common along fences and on cultivated land from March to July.

Anthocomus erichsoni Lec. Quite common on flower heads in July.

Attalus terminalis Er. Common. Occurs with *A. scincetus.*

Attalus scincetus Say. Taken on flowers of meadow-sweet June 7. Rare.

Family CLERIDAE.

Cymatodera bicolor Say. Rare. July 6.

Clerus rosmarus Say. Common. Taken by sweeping from April to July.

Hydnocera cyanescens Lec. Rare. June 25-July 7.

Hydnocera tabida Lec. Very rare. 1 specimen July 13.

Necrobia violacea Linn. Common. Occurs in numbers around skeletons of horses and cattle from April 8-May 18.

Family PTINIDAE.

Sitodrepa panicea Linn. 1 specimen taken by sweeping July 6.

Hadrobregmus carinatus Say. Rare. 1 specimen June 10.

Anobium notatum Say. Rare. Taken by sweeping on July 2.

Endecatomus rugosus Rand. Frequent in the sapwood of an aged elm.

Lyctus caniculatus. Rare. 1 specimen June 18.

Family CUPESIDAE.

Cupes concolor Westw. Rare. Beaten from oak on July 6.

Family CIOIDAE.

Cis fuscipes Mellie. Common under bark of trees in March.

Family LUCANIDAE.

Platycerus quercus Web. Quite rare. Taken flying April 29 and May 6.

Family SCARABAEIDAE.

Copris anaglypticus Say. Common. Found on roadsides and in pastures in June and July.

Onthophagus pennsylvanicus Harold. Rare. Taken by sweeping August 27.

Ataenius gracilis Melsh. Very rare. 2 specimens by sweeping on May 14.

Aphodius vittatus Say. Very rare. 1 specimen April 24.

Aphodius lividus Oliv. Rare. Taken by sweeping in April and June.

Aphodius inquinatus Hbst. Common. Taken on the wing during March and April.

Hoplia trifasciata Say. Common. Taken on wild cherry, etc.

Hoplia modesta Hald. Rare. Taken from low shrubs during the early part of July.

Serica trociformis Burm. Very rare. 1 specimen July 12.

Diplotaxis atlantis Lec. Not common. Taken from poles at light in May and June.

Lachnosterna tristis Fab. Taken at light in April and May. Very rare.

Lachnosterna gracilis Burm. Taken at light in July and August.

Anomala oblivia Horn. Common. Occurs on the blossoms of wild cherry in the spring.

Ligyrus gibbosus DeG. Taken at light in May. Rare.

Family Cerambycidae.

Elaphidion villosum Fab. Rare. Taken at light.

Elaphidion unicolor Rand. Taken at light July 18. Very rare.

Purpuricenus humeralis Fab. Very rare. 2 specimens taken on wild parsnip July 13.

Clytanthus ruricola Oliv. Occasionally found on wild carrot in May and June.

Cyrtophorus verrucosus Oliv. Rare. Taken on meadow-sweet and wild carrot April 24-July 9.

Anthophilax malachiticus Hald. Taken in Oregon by my sister on June 9th. Found on the ground at the edge of a small brook.

Acmaeops directa Newm. Fairly common on the blossoms of wild carrot. The specimens I have taken here vary considerably from the type in having the thorax a dark brown or nearly black in some cases.

Arhopalus fulminans Fab. Quite rare in my experience. Mrs. Deming, of Middletown, has taken it in considerable numbers from wood-piles and in wood-sheds.

Typocerus acuticauda Casey. Quite common on wild carrot and parsnip from June 26-July 9. Occurs earlier than *T. velutinus*.

Leptura proxima Say. Very rare. 1 specimen July 12.

Leptura mutabilis Newm. Rare. Taken from wild carrot in May and June.

Leptura mutabilis var. **luridipennis**. Very rare. Have taken but one specimen of this.

Leptostylus macula Say. Quite rare. Taken from July 1-24.

Liopus alpha Say. Not common. Beaten from dead oak June 15-July 4.

Oncideres cingulata Say. Rare. Taken on electric light pole on August 20.

Saperda obliqua Say. Very rare. My single specimen flew into my study room on the night of July 4th and lit on a pinned

specimen in one of my cases, where it clung so tightly that the mounted specimen was ruined before I could disengage it.

Oberea tripunctata Swed. Rare. Taken by sweeping deep grass June 14-July 6.

Tetraopes tetraophthalmus Forst. Common on milkweed in June and July.

Family CHRYSOMELIDAE.

Donacia aequalis Say. Common on low foliage at edge of pond from April to July.

Donacia rufa Say. Not common. Found on skunk's cabbage in May and June.

Orsodachna atra Ahr. A common species of great variation. Occurs in the following forms: Yellow thorax, yellow legs and black elytra; black thorax, yellow legs and black elytra; yellow thorax, brown legs and brown elytra; black thorax with dark brown legs and black- and yellow-striped elytra, and a small uniform brownish form. April 14-May 29.

Zeugophora scutellaris Suffr. Very rare in my vicinity. 1 specimen July 13.

Lema brunnicollis Lec. Rare. Taken in the early part of July.

Lema trilineata Oliv. Rare. Occurs from May till August.

Babia 4-guttata Oliv. Rare. Taken from flowers of meadow-sweet July 2-6.

Chlamys cribripennis Lec. Rare. Taken by sweeping from April 15-August 21.

Bassareus formosus Melsh. Rare. Taken on July 14.

Bassareus mammifer Newm. Rare. Taken during July also.

Bassareus lituratus Fab. Taken sparingly in June.

Cryptocephalus 4-maculatus Say. Common. Taken from leaves of blackberry in May and June.

Cryptocephalus ornatus Fab. Fairly common. Taken from meadow-sweet flowers.

Cryptocephalus cinctipennis Rand. Rare. Also taken from meadow-sweet.

Pachybrachys viduatus Fab. Rare. Taken from meadow-sweet on July 6.

Pachybrachys roboris. Very rare. 1 specimen July 9.

Monachus saponatus Fab. Common. Taken by sweeping marshy meadow grass in July.

Xanthonia villosula Melsh. Very rare. 1 specimen July 6.

Adoxus vitis Linn. My single specimen is a product of the sweeping method. Very rare in this vicinity.

Tymnes tricolor Fab. Very rare. 2 specimens on July 4 and 7.

Chrysodina globosa Say. Rare. By sweeping swampy land in July.

Colaspis tristis Oliv. Common. Taken from low shrubs near Black Pond from June 25-July 7.

Prasocuris varipes Lec. Obtained by sweeping in May.

Chrysomela lunata Fab. Rare. May 21-Aug. 13.

Chrysomela spiraeae Say. Rare. Have taken one specimen of this species on sumach.

Phyllodecta vulgatissima Linn. Fairly common from June 7-Sept. 5.

Cerotoma caminea Fab. Taken crawling along the ground in April.

Galeruca decora Say. Common from May to July.

Monoxia puncticollis Say. Taken by sweeping, but very rare. July 7-13.

Hypolampsis pilosa Ill. Very rare. 1 specimen July 13.

Oedionychis vians Ill. Rare. 2 specimens taken in April and June.

Oedionychis thoracica Fab. Common from April to September.

Oedionychis fimbriata ? Forst. Very rare. 2 specimens taken on April 25 and June 1.

Disonycha xanthomelina Dalm. Taken by sweeping. 1 specimen Sept. 22.

Disonycha rufa Ill. 1 specimen April 27. Very rare.

Haltica chalybea Ill. Rare. Taken from April 29-May 2.

Haltica marevagans Horn. Rare. Taken from low shrubs on July 12.

Crepidodera helxines Linn. Taken by sweeping. Common from May to July.

Crepidodera rufipes Linn. 1 specimen May 25.

Orthaltica copalina Fab. Taken from poison ivy on June 19. Common.

Longitarsus melanurus Melsh. Rare. 1 specimen July 9.

Phyllotreta sinuata Steph. Common. Taken on plants allied to the fennel family in June and July.

Phyllotreta bipustulata Fab. 1 specimen taken by sweeping. Very rare.

Chaetocnema minuta Melsh. Rare. Taken from May 3-10.

Chaetocnema subcylindrica ? Lec. Common. April 27-May 3. Swept from poison-ivy.

Dibolia aerea ? Melsh. Quite common in May.

Microrhopala xerene Newm. Rare. 1 specimen July 2.

Odontota horni Smith. Rare. 1 specimen June 14.

Stenispa metallica Fab. 3 specimens taken by sweeping from May 24-July 14.

Family BRUCHIDAE.

Bruchus alboscutellatus Horn. Rare. Taken by sweeping in July.

Family Tenebrionidae.

Xylopinus rufipes Say. Taken on electric light pole on night of July 18. Rare.

Tenebrio obscurus Fab. Fairly common from June 2-July 20.

Uloma impressa ? Melsh. 1 specimen on May 14.

Paratenetus punctatus Sol. 1 specimen July 12.

Platydema excavatum Say. Occurs plentifully in company with *Hoplocephala bicornis* Oliv. under bark of fallen trees in March and April.

Platydema subcostatum Lap. Very rare. 1 specimen July 18.

Family Cistelidae.

Capnochroa fuliginosa Melsh. Rare. Taken at light clinging to pole on July 10.

Androchirus erythropus Kirby. Taken at light on pole in Hemlock Grove on July 18.

Family Melandryidae.

Penthe obliquata Fab. Very rare. 2 specimens dug from under rotten stump.

Synchroa punctata Newm. 1 specimen at light on July 19.

Family Oedemeridae.

Nacerdes melanura Linn. Very rare. 1 specimen taken from the post office building in Meriden on June 17.

Family Mordellidae.

Anaspis rufa Say. Rare. Took one specimen June 19.

Mordella scutellaris Fab. Taken by sweeping. Fairly common from June to July.

Mordellistena pustulata Melsh. Very rare. Taken by sweeping on July 2.

Mordellistena bihamata Melsh. Very rare. Swept from flowers on July 13.

Family Anthicidae.

Corphyra collaris Say. Taken with *Orsodachna atra* on willow catkins in May. Very common.

Macratria confusa Lec. Very rare. Taken in June and July.

Family Meloidae.

Meloe angusticollis ? Say. Not common. Taken crawling over the grass.

Macrobasis unicolor Kirby. Very common.

Epicauta vittata Fab. Rare. 1 specimen June 7.

Family Rhipiphoridae.

Rhipiphorus dimidiatus ? Fab. Taken from heads of white daisy in July. Rare.

Family Otiorhynchidae.

Hormorus undulatus Uhler. Rare. 1 specimen June 7.
Otiorhynchus ovatus Linn. Taken by my sister in late spring.

Family Curculionidae.

Sitones hispidulus Germ. Common in meadows from May 3-24.
Sitones flavescens Marsh. 3 specimens taken from July 7-20.
Apion nigrum Hbst. Common. Obtained by sweeping. May 16-July 13.
Phytonomus punctatus Fab. Rare in my vicinity.
Listronotus caudatus ? Say. 1 specimen on August 9. Very rare.
Hylobius pales Hbst. Rare. 1 specimen May 10.
Onychylis nigrirostris Boh. 1 specimen May 18. Rare.
Bagous transversus Lec. Rare. Taken by sweeping in May and July.
Magdalis armicollis Say. Rare. Immature specimens are of a light reddish color throughout. Found during May and June.
Anthonomus scutellatus Gyll. Rare. Another result of using the sweeping net.
Anthonomus sycophanta Walsh. Quite rare. Taken by sweeping in Oregon in May.
Elleschus bipunctatus Linn. Fairly common. Evidently an introduced species.
Tychius picirostris. Common from May 24-June 8.
Conotrachelus nenuphar Hbst. Rare. Found in deep grass. This beetle imitates bird droppings to perfection and thus escapes the notice of many people.
Gymnetron teter Fab. Common. Taken from mullein in June and July.
Tyloderma aerum Say. Rare. Taken by sweeping in May.
Cryptorhynchus parochus Hbst. Rare. Taken by searching low shrubbery from April 26-June 23. Have one specimen taken by Mr. H. B. Kirk in No. Branford on June 23.
Cryptorhynchus lapathi Linn. Not common. May 21-Sept. 9.
Cylindrocopturus binotatus Lec. 1 specimen collected in New Haven on April 28 by Mr. Walden.
Ceuthorhynchus cyanipennis. Rare. Taken by sweeping April 22-May 24.
Ceuthorhynchus septentrionalis Gyll. Rare. Taken by sweeping flowers in May and June.
Rhinoncus pyrrhopus Lec. Common. Taken by sweeping in May and June.
Baris scolopacea. Rare. Taken by sweeping on July 16.
Madarellus undulatus Say. Very rare. 1 specimen April 22.

Family CALANDRIDAE.

Cossonus bohemanni ? Horn. Rare. Taken from under bark on March 23.

Cossonus impressifrons Boh. Common. Under bark in July.

Family SCOLYTIDAE.

Xyleborus caelatus Eich. 1 specimen taken in Stafford, Conn., by Dr. Britton on Aug. 24.

Family ANTHRIBIDAE.

Hormiscus saltator Lec. Very rare. 1 specimen July 13.

Cratoparis lunatus Fab. Found under bark of oak in the spring.

In connection with the preceding list it is necessary at this time to make several corrections to my first list published in Entomological News for July, 1915. The following names should be erased from the list as incorrectly determined:

Carabidae: *Ardistomis viridis* Say, *Pterostichus pennsylvanicus* Lec., *Amara pallipes* Kirby, *Platynus decens* Say, *Lebia collaris* Dej., *Chlaenius diffinis* Chd.

Gyrinidae: *Dineutes horni.*

Staphylinidae: *Quedius fulgidus* Fab., *Dianous* sp.

Dermestidae: *Dermestes marmoratus* Say, *Anthrenus thoracicus* Melsh.

Elateridae: *Elater hepaticus* Say, *Monocrepidius lividus* DeG.

Scarabaeidae: *Trox unistriatus* Beauv., *Hoplia trivialis* Harold, *Serica intermixta* Blatch., *Lachnosterna gibbosa* Burm., *Cremastochilus harrisii* Kirby.

Cerambycidae: *Neoclytus capraea* Say, *Acanthoderes quadrigibbus* Say.

Chrysomelidae: *Donacia pusilla* Say, *Galeruca notata* Fab.

Tenebrionidae: *Xylopinus aenescens* Lec.

Meloidae: *Epicauta cinerea* Forst.

The following corrections in synonymy are also advisable:

Cicindela vulgaris Say. should be *Cicindela tranquebarica* Herbst.

Coccinella sanguinea Linn. should be *Cycloneda munda* Say. according to Mr. Britton, of the Conn. Agricultural Exp. Station at New Haven.

Copris carolina Linn. should be *Pinotus carolinus.*

Leptura zebra Oliv. should be *Leptura nitens* Forst.

Toxotus vittiger Rand. is now listed as *Toxotus trivittatus.*

Galeruca sagittariae Gyll. is now listed as *G. nymphaeae* Linn.

Hoplocephala bicornis Oliv. is now *Arrhenoplita bicornis* Oliv.

Connecticut Coleoptera.

By Annie Trumbull Slosson, New York City.

I have read with interest the list of Connecticut beetles by Mr. Harry L. Johnson published in the News of July, 1915. I find that I can add a few names to that list and append them herewith. All were taken near Hartford, my old home.

Carabidae.
Notiophilus aeneus *Hbst.*
Pterostichus sayi *Brullé.*
Dicaelus elongatus *Bon.*
Chlaenius aestivus *Say.*
Chlaenius pennsylvanicus *Say.*
Anisodactylus verticalis *Say.*

Gyrinidae.
Dineutes vittatus *Germ.*
Dineutes emarginatus *Say.*

Staphylinidae.
Staphylinus cinnamopterus *Grav.*
Philonthus aeneus *Rossi.*

Nitidulidae.
Epuraea rufa *Say.*
Stelidota geminata *Say.*

Trogositidae.
Thymalus fulgidus *Er.*
Bactridium cavicolle *Horn.*

Elateridae.
Betarmon bigeminatus *Rand.*
Limonius plebejus *Say.*

Cerambycidae.
Cyllene pictus *Drury.*

Chrysomelidae.
Diabrotica lemniscata *Lec.*

Tenebrionidae.
Platydema excavatum *Say.*
Platydema ruficorne *Sturm.*
Platydema laevipes *Hald.*

Meloidae.
Meloe angusticollis *Say.*
Epicauta vittata *Fab.*

Otiorhynchidae.
Otiorhynchus ovatus *Linn.*

Curculionidae.
Pseudobaris nigrinus *Say.*

Dinner to Professor Herbert Osborn.

A dinner in honor of Prof. Herbert Osborn was tendered him by about forty of his former students on Wednesday evening, December 29, 1915, at the Chittenden Hotel, Columbus, Ohio. The occasion was highly enjoyed as a home-coming by both Professor and Mrs. Osborn. Some verses entitled "Herbert Osborn, an Appreciation," composed by J. G. Sanders, and followed by the signatures of other students, illuminated in black, red and gold on vellum, was presented to the guest of honor. The sixth (last) stanza read:

"Fond memories of you, kind sir, we hold
Most dear in summer's heat and winter's cold;
We pledge our love, our faith, in ease or stress:
Good friend—your best reward is our success."

New Thysanoptera from Florida—III.

By J. R. WATSON, Gainesville, Fla.

(Plates V and VI)

Aeolothrips floridensis n. sp. (Plate V, figs. 1-3).

♀.—*Measurements.*—Total body length 1.7 mm.; head, length 0.17 mm., width 0.2 mm.; prothorax, length 0.16 mm., width 0.25 mm.; mesothorax, width 0.25 mm.; metathorax, width 0.37 mm.; abdomen, width, 0.4 mm.

Antennae: Segment 1, 32; 2, 53; 3, 129; 4, 96; 5, 70; 6, 13; 7, 12; 8, 15; 9, 12 microns; total, 0.4 mm.

Color, dark brown with much red pigmentation, which is particularly marked on the lighter pterothorax and base of abdomen.

Head about one-fifth longer than wide, elevated a little between the antennae; cheeks slightly arched, diverging very slightly posteriorly; there are no prominent spines but minute papillae with short hairs occur along the cheeks; dorsal surface with minute cross striations.

Eyes prominent, black, with large facets, sparsely pilose, oval in dorsal aspect but greatly elongated on the ventral surface, where they end in rather a sharp point. *Ocelli* present, approximate, the posterior pair not touching the margins of the eyes.

Mouth cone acute, reaching beyond the middle of the prothorax.

Antennae nine-segmented, segments 1 and 2 concolorous with the head, segment 3 and the basal half of 4 yellow, the very tip of 3 and the remainder brown. Sense areas on segment 3 greatly elongated. Spines rather numerous but short. Those on segments 2 and 3 dark, the others colorless. Two on the dorsal surface of the second segment near the anterior end are a little stouter and longer than the others, while between and a little anterior to their bases is a dark, round papilla.

Prothorax more than half again as wide as long, a little shorter than the head; sides quite markedly bulging and diverging posteriorly, deeply notched in the middle; without prominent spines.

Mesothorax much wider than the prothorax, markedly rounded at the anterior angles, without spines.

Metathorax narrower than the mesothorax, sides moderately convex, converging posteriorly, no spines.

Legs rather long, concolorous with the body (i. e., reddish brown) except the tarsi which are light brown, without the reddish pigmentation; fore femora but slightly enlarged; tibiae with a short spine at the anterior end. Legs sparsely furnished with short but rather thick curved hairs.

Wings moderately long, membrane of the fore pair reaching to about

the end of the abdomen. Near the end of the posterior border the wings are densely margined with long brown hairs, none on the basal portion. On the anterior margin the hairs are rather short and sparse. The posterior half of the wing is shaded a decided but not very dark brown and is clothed with short hairs, as is also the hind wing; the second longitudinal vein has heavy dark brown spines. Hind wings nearly as long as the fore, no brown longitudinal shading as in the fore pair; on the anterior margin the hairs are rather short and dense.

Abdomen spindle-shaped, abruptly narrowing at the seventh segment. One or two short, weak, curved, inconspicuous spines on the lateral margin of each segment. On the eighth and ninth there are eight very long stiff spines; two much shorter ones at the end of the abdomen.

Described from a single female taken on oats with *Acolothrips bicolor* at Gainesville, Florida, April 26, 1914.

Type in the National Museum.

*Key to North American species of Acolothrips.**

1. Fore wings with dark cross bands.
   - *a.* Wings with cross veins.
     - *b.* Last 4 segments of antennae much longer than the 5th; abdominal segments 2 and 3 and the posterior half of 1 white or yellow .....*Ac. bicolor,* Hinds.
     - *bb.* Last four segments of antennae little if any longer than the fifth.
       - *c.* Prothorax and segments 2 and 3 of the abdomen white .....*Ac. albocinctus,* Haliday.
       - *cc.* Without white bands.....*Ac. fasciatus,* Linn.
   - *aa.* Wings without cross veins. Last four segments of antennae about 1.25 times as long as the fifth.....*Ac. nasturtii,* Jones†
2. Fore wing with a dark longitudinal band along posterior margin.
   - *a.* With normal veins in the anterior wings.
     - *b.* Antennal segment 3 about as long as 1 and 2 together; segment 4 brown .....*Ac. kuwanaii,* Moulton
     - *bb.* Antennal segment 3 about 1.5 as long as 1 and 2 together; basal half of segment 4 yellow, *Ac. floridensis,* n. sp.
   - *aa.* Anterior wings without veins .....*Ac. longiceps,* Crawford

* Modified from that of Moulton, 1911, U. S. Bur. Ent., Tech. Ser. No. 21.

† Hood, in Ent. News, xxvi, p. 162, expresses the opinion that this species is the male of *Ac. kuwanaii.*

Anthothrips floridensis n. sp. (Plate VI, figs. 10 to 12).

♀.—*Measurements.*—Length 1.3 mm. (1.1 to 1.5). Head, length 0.19 mm., width 0.18 mm.; prothorax, length 0.16 mm., width 0.26 mm.; mesothorax, width 0.29 mm.; abdomen, width 0.29 mm.; tube, length 0.107 mm., width at the base 0.049 mm., at the end 0.035 mm.; antennae, segment 1, 20.4: 2, 41; 3, 40; 4, 49; 5, 41; 6, 36; 7, 37; 8, 26 microns; total length 0.276 mm.

Color dark brown, fore tarsi and tibiae yellow, mid- and hind-tarsi light brown; segments 1 and 2 of antennae dark brown; 3, yellow; base of 4 and 5 yellowish brown; tips of 4 and 5 light brown; 6, light brown; 7 and 8 dark brown. Eyes reddish brown.

Head a little longer than broad; cheeks slightly arched, without warts, posterior portion of dorsal surface quite noticeably transversely striated. Ocelli large and well separated, posterior pair placed about opposite the middle of the eyes whose margins they nearly touch, dark brown; postocular bristles well developed, sharp-pointed. Mouth cone shorter than its breadth at the base and very rounded at the tip, reaching to about three-fourths the length of the prothorax.

Antennae eight-segmented, not as long as the width of the mesothorax, segments short and stout, the fourth a little thicker and considerably longer than the others, sense cones short.

Prothorax considerably wider than long when measured to outer angles of the coxae, somewhat triangular in outline, sides converging anteriorly, a spine on each posterior angle.

Mesothorax somewhat wider than prothorax, sides nearly parallel but somewhat narrowed in the middle.

Legs short, fore femora but slightly thickened.

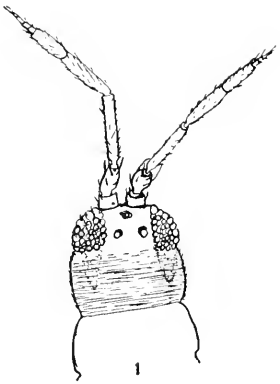
Wings well developed, membrane reaching nearly or quite to the end of the tube in most individuals; decidedly constricted in the middle; hairs of the fringe long and nearly equal, in a single row except on the hind border of the fore wing where there are eight hairs of a second row.

Abdomen about as wide as mesothorax, usually widest at the base from which it slopes to the tip, gradually at first and then more abruptly. Tube rather small and short, tapering but little, six terminal spines longer than the tube, and a number of shorter ones. Spines on the remainder of the abdomen weak and inconspicuous.

Described from nine specimens, Gainesville, Florida, April 22, 1914. Food plant maize. Male not seen.

The *type* is in the American Museum of Natural History, cotypes in the author's collection.

This species differs from *A. niger* (Osborn) in its smaller size, the presence of the post-ocular bristles, the relative



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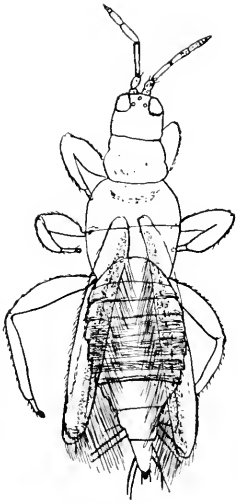

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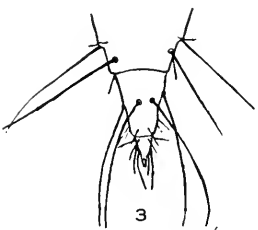

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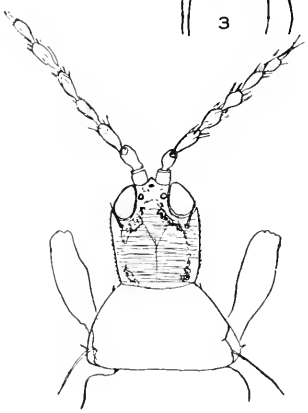

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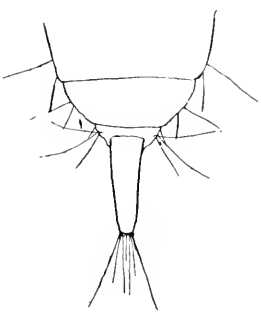

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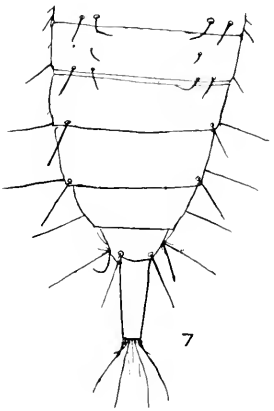
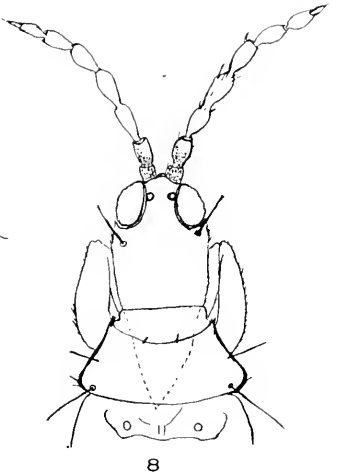
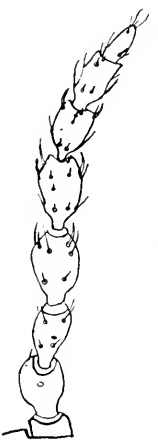
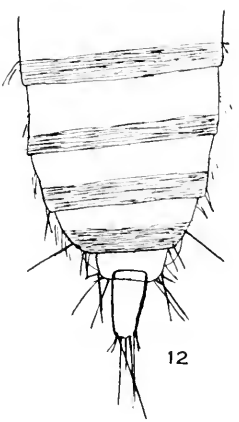
6

1-3, AEOLOTHRIPS FLORIDENSIS;
4-6, LIOTHRIPS CARYAE FLORIDENSIS—WATSON.









7-9 LIOTHRIPS FLAVOANTENNIS;
10-12 ANTHOTHRIPS FLORIDENSIS—WATSON.

lengths of the antennal segments, especially the greater length of the fourth, in the relative dimensions of prothorax, head and abdomen, in the shape of the abdomen, and in the long hairs on the tube. From *A. variabilis* Crawford it differs in its smaller size, in the sharp tips of the post-ocular bristles, the longer mouth cone, the shorter antennae, relative size of head and prothorax, shape of pterothorax, the weak spines of the abdomen, and the relative lengths of the antennal segments, especially the fifth.

The following key (modified from that of P. R. Jones, U. S. Bur. Ent., Tech. Series, Bull. No. 23, pt. I, 1912) will enable one to separate the North American species of *Anthothrips*.

1. Postocular spines wanting; antennae almost uniformly brown except segment 3 and base of 4, which are light brown....*A. niger*, Osborn
2. Postocular spines well developed.
   a. Postocular spines and most of those on the postero-lateral margin of abdominal segments knobbed.....*A. flavipes*, Jones
   aa. Postocular and abdominal spines not knobbed.
      b. Apex of femora with a small, anteriorly directed, triangular tooth within; antennae uniformly brownish black .....*A. nigricornis*, Jones
      bb. Apex of femora without such tooth.
         c. Segments 3 to 6 of antennae bright yellow, abdominal spines (except those of the tube) slender and rather faint..*A. verbasci*, Osborn
         cc. Segments 3 to 6 of antennae light brown, abdominal spines stout and conspicuous, *A. variabilis*, Crawford
         ccc. Only segment 3 of antennae wholly bright yellow; abdominal spines short and inconspicuous .....*A. floridensis*, n. sp.

Liothrips flavoantennis n. sp. (Plate VI, figs. 7-9).

♀.—*Measurements.*—Total body length, 1.8 mm. Head, length 0.24 mm., width 0.185 mm.; prothorax, length 0.14 mm., width 0.31 mm.; mesothorax, width 0.365 mm.; abdomen, width 0.41 mm.; tube, length 0.19 mm., width at base 0.072 mm., at the end 0.038 mm. Antennae: Segment 1, 27; 2, 56; 3, 81; 4, 74.5; 5, 63; 6, 54; 7, 52; 8, 33 microns; total length 0.4 mm.

Color uniformly dark brown except the antennae. *Head* nearly one and one-third times as long as wide, sides slightly arched, widest a short distance behind the eyes, converging slightly behind; warts on the cheeks small and with small short spines, surface of the head showing rather faint cross striations, postocular spines long, stout, knobbed

at the end, dark, but the knob white as are most of the spines on the body. Eyes dark in color, rather large. Ocelli rather large. Posterior pair placed near the margin of the eyes and anterior to the middle; anterior pair directed forward.

Mouth cone very long and sharp-pointed, reaching fully to (and sometimes beyond) the posterior border of the prothorax.

Antennae one and two-thirds times as long as the head. Segment 1 dark brown, only a little lighter than the head; segment 2 brownish yellow, darker at the base; segments 2 to 7 bright yellow; 8 brownish yellow; segment 3 averaging only slightly shorter than 1 and 2 together, in some individuals longer, in others shorter; sense cones and spines about one-third the length of segment 3, very pale in color, almost white.

Prothorax subtriangular in outline, seven-twelfths as long as head and over twice as broad as long, measuring from outer angles of coxae. A very long, stout, knobbed spine on each posterior angle; a short, thick one on each anterior angle, and between them one intermediate in length; a pair along the anterior border.

Mesothorax one-fifth broader than prothorax. *Legs* rather long and slender, concolorous with the body except the tarsi which are a lighter brown. The fore tarsi often darker than the meso- and metatarsi; fore femora considerably less than half as wide as the head, sparsely provided with short, very stiff, almost spine-like hairs; these are longer and less stiff on the other femora and on the tibiae and tarsi.

Wings well developed, not at all constricted in the middle; hairs long and copious, from eight to thirteen (usually ten) near the end forming a second row; membrane brownish towards the base where it is provided with a short vein which bears three very heavy, long, knobbed spines.

Abdomen with rather convex sides, at the widest portion (which is about the fourth segment) one-ninth wider than prothorax. Posterior angles from segments 4 to 9 with spines; those on segments 6 to 9 long and heavy. Tube rather narrow, tapering to nearly half its diameter at base; length nearly three times the width at the base; terminal hairs shorter than the tube.

Described from nine females taken from wild grape vine, April 23, 1914, at Gainesville, Florida. Males unknown.

Type in the collection of the National Museum.

Liothrips caryae floridensis n. subsp. (Plate V, figs. 4-6).

♀.—*Measurements.*—Total body length 2.6 mm. Head, length 0.275 mm., width 0.24 mm.; prothorax, length 0.25 mm., width 0.39 mm.; mesothorax, width 0.51 mm.; metathorax, width 0.49 mm.; abdomen, greatest width 0.53 mm; tube, length 0.228 mm., width at base 0.09 mm., at the end 0.046 mm.; antennae, total length 0.5 mm.; segment 1, 34; 2, 61; 3, 94; 4, 84; 5, 75; 6, 68; 7, 61; 8, 34 microns.

Color brown to brownish yellow with heavy red pigmentation on thorax and abdomen.

Head rather large; cheeks somewhat convex and slightly converging posteriorly, covered with numerous minute serrations, each of which carries a small hair; vertex with strong cross-striations; postocular spines prominent, about as long as the eye, with sharp-pointed tips. Eyes bright orange color by reflected light, facets rather small and numerous, not pilose. Ocelli rather prominent, orange yellow; posterior pair situated well forward, anterior to the middle of the eyes, the margins of which they approximate but do not touch; anterior ocellus directed forward.

Mouth cone rather long but rounded at the tip, reaching seven-tenths of the distance across the prothorax.

Antennae somewhat less than twice as long as the head; segments 1 and 2 light grayish brown, 3 yellow, 4 to 8 yellowish brown, becoming darker toward the tip, 4 frequently brown only at the base, and the base of 5 often yellow. Spines and sense cones light-colored and inconspicuous.

Prothorax triangular in outline; nearly as long as the head but considerably narrower than the mesothorax. One strong spine on the dorsal part of each lateral margin projects backward, and a smaller one on the ventral part projects forward. There is a short spine near the anterior angle. Pterothorax without prominent spines. Legs rather long, concolorous with the body; fore tibiae somewhat enlarged.

Wings scarcely reaching .75 the length of the abdomen; membrane clear, bordered with long hairs, 17 to 22 hairs of a double line interlocated on the posterior border of the fore pair.

Abdomen long, widest at the base, whence it tapers gradually to the sixth segment and then more abruptly to the tube; hairs short, pale and inconspicuous, especially on segments 1 to 4. Tube long and narrow.

♂.—Very similar but usually smaller, averaging less than 2 mm. in length.

Larva.—Ground color pale yellow. This extends over all parts of the legs and antennae. The thorax and abdomen are so liberally provided with a blood red pigment as to cause the insect to appear deep red to the unaided eye. There are no white or black bands on the thorax as described for *L. caryae* by Fitch.

Described from numerous individuals taken from deserted galls of *Phylloxera* on hickory leaves, Gainesville, Florida. Both young and adults feed on the succulent walls of the galls which ultimately become hard and black. The larvae are very common in these galls from late April to June, but the adults are more difficult to find and have not been collected before

the middle of May. The entire life history of this generation of these insects is spent in these galls instead of their being used only as a place of protection during metamorphosis as was surmised to be the case with *L. caryae* by J. D. Hood (Proc. Biol. Soc. Wash., XXVII, p. 160).

The *type* will be placed in the U. S. National Museum.

Differs from *Liothrips caryae* (Fitch) in color (including that of the antennal joints), size, length of wings and the longer prothorax; the larva is quite different in color. It should perhaps be given specific rank, but its characters and its ecological relationships are in many ways so similar to those of *L. caryae* that it seems best to give it only subspecific rank.

The following key modified from that of Moulton (1911) will enable one to separate the North American species of *Liothrips*.

1. Head about 1.3 (or less) times as long as wide.
   a. Fore wings brownish at the extreme base; tube .8 or .9 as long as head.
      b. Head 1.15 times as long as wide; marginal abdominal spines yellowish; usually only segment 3 of antennae all clear yellow.
         c. Black; postocular bristles blunt, .6 times as long as eye; fore wing with about 14 hairs of a second row; antennal segments 5 and 6 mostly blackish brown to black,
            L. occllatus, Hood
         cc. Postocular bristles sharp-pointed and almost as long as eye; fore wing with 17-22 interlocated hairs; antennal segment 5 yellowish.
            d. Color brown or black; length about 2 mm.; wings long; prothorax .6 times as long as head; antennal segments 6-8 blackish brown,
               L. caryae (Fitch)
            dd. Color brown to yellow with much deep red pigmentation; length about 2.6 mm.; wings reaching only about .75 the length of the abdomen; prothorax .9 times as long as head; antennal segments 6-8 yellowish brown,
               L. caryae floridensis, n. sub. sp.

bb. Head 1.3 times as long as wide; color dark brown, spines light brown; antennal segments 3-7 and apex of 2 clear yellow.....*L. flavoantennis,* n. sp.

aa. Fore wings nearly black in basal half; head about 1.3 times as long as wide; marginal abdominal spines nearly black; tube .6 times as long as head.....*L. umbripennis,* Hood

aaa. Fore wings brownish in basal half,

L. umbripennis mexicanus, Cr.

2. Head about 1.5 times as long as wide.

a. Antennae lemon yellow; spines on prothorax large and prominent; mid-laterals present, fully as long as anterior marginals; tube two-thirds as long as head.....*L. citricornis,* Hood

aa. Antennal segments 1 and 2 concolorous with the head; spines on prothorax not prominent; mid-laterals wanting.

b. Antennal segments 1 and 2 almost black, 3 light yellow to light brown, others brown; tube one-half as long as head.

c. Head converging anteriorly,

L. fasciculatus, Crawford

cc. Head distinctly converging posteriorly,

L. fasciculatus stenoceps, Crawford

bb. Antennae 1.25 times as long as head; segment 1 and base of 2 concolorous with the body, apical half of 2 and of 5 and 6 to 8 light brown, 3, 4 and base of 5 yellow; tube one-half as long as head,

L. maconnelli, Crawford

EXPLANATION OF PLATES V AND VI.

Plate V, figs. 1-3, *Acolothrips floridensis* n. sp.

Figs. 4-6, *Liothrips caryae floridensis* n. subsp.

Plate VI, figs. 7-9, *Liothrips flavoantennis* n. sp.; 7, posterior portion of abdomen; 8, dorsal view of head and prothorax; 9, dorsal view of left antenna.

Figs. 10-12, *Anthothrips floridensis* n. sp.; 10, dorsal view of head and prothorax; 11, dorsal view of right antenna; 12, tip of abdomen.

Florida Entomological Society.

In *Science* for Feb. 4, 1916, we are advised that the Florida Entomological Society has recently been organized at Gainesville, Florida, with Prof. J. R. Watson, President; Mr. Wilmon Newell, Vice-President, and Mr. R. N. Wilson, Secretary-Treasurer. This is the first Entomological Society organized in the Southern States. We wish it a long and useful life.

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., MARCH, 1916.

Discontinue the Fahrenheit Thermometric Scale.

In the House of Representatives, on December 6, 1915, Mr. Albert Johnson, of Washington, introduced the following bill, which was referred to the Committee on Coinage, Weights and Measures, and ordered to be printed.

A Bill (H. R. 528) *to discontinue the use of the Fahrenheit thermometer scale in Government publications.*

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the centigrade scale of temperature measurement shall be the standard in United States Government publications, the use of the Fahrenheit scale being discontinued, at the option of Heads of Departments or other independent branches of the Government, either immediately upon the signing of this bill or at any time before January 1, 1920, except as provided in Section 3.

Sec. 2. During the period of transition, the Fahrenheit equivalent of centigrade degrees may be added in parentheses or as a footnote or in any other way, if in the opinion of Heads of Departments or independent officers it seems necessary.

Sec. 3. The use of the Fahrenheit scale shall be permitted after January 1, 1920, in cases where it is required by State and municipal law, or in certificates of tests of instruments graduated in the Fahrenheit scale.

On December 14, 1915, this bill being under consideration, Mr. Johnson spoke in its favor. His speech, followed by extracts from letters of 200 scientific men whom he addressed on the subject, has been printed and furnishes a strong body of evidence in favor of this change.

The subject is one which largely affects entomologists and their work. All of us have surely experienced the inconvenience of translating values from one thermometric scale to another. As long as the Fahrenheit scale is used by the United States Weather Bureau we shall have to take it into account, and yet the Centigrade scale is that in which temperatures are stated in the majority of scientific publications of the rest of the world. There can be no question as to the desirability of one international scale. Dr. S. W. Stratton, Director of the United

States Bureau of Standards, writes in Mr. Johnson's pamphlet: "In my opinion the strongest reason for the adoption of the Centigrade scale is the one given above, viz., the international uniformity."

The American Entomological Society in Philadelphia fully endorsed Mr. Johnson's bill on December 13, 1915. We hope that other entomological societies will take similar action and acquaint Mr. Johnson of their act. Letters to members of Congress from individuals and from associations will help the cause. Mr. Johnson will be glad to send the reprint of his speech and of the letters to any societies whose secretaries will express a wish to that effect.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

Punkies feeding on a fish fly. (Dip.: Chironomidae; Neur.: Sialidae).

On July 4, 1915, while eating lunch beside a delicious spring which feeds one of the characteristic bogs near Beltsville, Maryland, my attention was attracted by motion in a nearby bush. Upon looking for the cause I found a fish fly (*Chauliodes fasciatus* Walker) crawling along a small twig. This large insect partially lifted its wings at frequent intervals and hitched along as if in discomfort. When I picked up the *Chauliodes*, a flock of about six minute flies appeared in the air about it, and as I held the fish fly between thumb and finger seemed reluctant to leave it. This disposition on the part of the little flies enabled me to capture one of them. The specimen has been identified by Mr. J. R. Malloch as *Ceratopogon fusicornis* Coquillet, a species which with two new species Mr. Malloch has recently segregated* in a new genus *Euforcipomyia*.—W. L. McAtee, Washington, D. C.

Curious behavior of Cicindela unipunctata (Col.: Cicindelidae; Hym.; Formicidae).

On July 14, 1915, the writer chanced upon a specimen of *Cicindela unipunctata* Fab. in a woodland road just east of Dead Run, Virginia, a locality opposite and a little down stream from Plummer's Island, Maryland. An ant, *Formica fusca* var. *subsericea* (Say), was running all over the body surface of the beetle, which stood high from the

*Bul. Ill. State Lab. Nat. Hist. XI, Art. IV, December 1915, pp. 312-315.

ground. It even ran over the face and onto the lower side of the head. As I had frequently seen tiger beetles capture and devour ants, I fully expected that venturing about that part of the tiger beetle would be the end of the ant. But it was not; the beetle maintained its pose and the ant continued reconnoitering.

My next thought was that the beetle must be dead, so in a leisurely careless way I stooped to pick it up. At the approach of my fingers it ran like a flash and I almost lost it.

Having revolved in my mind several theories that might account for this behavior, I offer my favorite. That is, that being perfectly quiet and waiting for something to come within pouncing range is this tiger beetle's way of hunting, and that having established itself on guard it was not to be swayed from its poise, even by what would seem most annoying attentions of the ant.—W. L. McAtee, Washington, D. C.

Vanessa californica and Frost (Lepid.).

On November 1st, while pruning fruit trees in the upper Wenatchee Valley, I observed a *Vanessa californica* flying just above the tops of the young trees. The morning was quite frosty; in fact, the crust on the ground was thick enough to bear my weight; the sun was obscured by high-flying snow clouds, while a light but raw breeze off the snow fields of the Cascades made the feel of my heavy mackinaw coat very comfortable indeed. I was so surprised to meet with a butterfly under such conditions that I called to my brother-in-law, Mr. J. C. Hopfinger, who was working nearby, and together we watched it for some time. It was headed into the wind, but was not making any progress, and presently began to drift, but rising higher as it did so, finally disappeared from our sight.

Its movements seemed rather sluggish,—not at all like the flight of *californica* in summer—and I kept expecting it to drop to the ground, but it did not do so, and at the last seemed to be flying more strongly than when I first observed it.

This occurred near Leavenworth, Washington, in the higher foothills of the Cascades.—J. D. Yancey, Port Columbia, Washington.

Color Phases in Argynnis diana (Lep.).

I note with interest in the January issue of the News, page 35, the query of Mr. W. C. Wood as to the color of his female specimen of *A. diana*, caught near here (Blacksburg, Virginia), in which specimen the basal two-thirds of the underside of the hind wings is dark, bluish-black instead of "dark, red-brown," as described by Edwards.

I first collected *Argynnis diana* near Asheville, North Carolina, in the summer of 1880, since which time I have collected it throughout its Alleghany range, particularly near Brevard, North Carolina, and Caesar's Head, South Carolina, and for the past twenty-five years, here in Montgomery, Washington and Giles Counties, Virginia.

During this period of years, I have taken the female from the 1st of July until late in September, and have handled hundreds of specimens in various stages of perfection and wreckage, and have in my collection a carefully selected series illustrating different color phases. From my experience with the fly, I am inclined to believe that perfect, freshly-emerged females always have the underside of the hind wings and apex of fore wings of the dark blue-black color described by Mr. Wood, and that this speedily assumes the rusty brown as the insect ages, even before the upper surface shows any wear or dimness. The case is similar with *Protoparce rustica,* which, when freshly-emerged, has no trace of the familiar rust color, but is of a clean black and white. All the fresh specimens of *diana* in my collection, as well as my recollection and notes of other captures, indicate the correctness of the above idea. Some slightly worn females show in direct light the brown color, but held at a slight angle, and particularly in artificial light, the blue-black can still be seen. I have one female, nearly fresh, in which the outer third of hind wing, underside, which usually retains the blue-black, is also rusty brown, with blue-black angular dashes running to the outer margin. I have specimens showing the green coloring on the upper surface, instead of the blue; also specimens showing various shades of blue, and the blue area on the upper surface of hind wings varying from an almost complete band to isolated, blue, angular dashes. —Ellison A. Smyth, Jr., Va. Polytechnic Institute, Blacksburg, Virginia.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded. The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of systematic papers are all grouped at the end of each Order of which they treat, and are separated from the rest by a dash.

Unless mentioned in the title, the number of new species or forms are given at end of title, within brackets.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London.

For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

2—Transactions, American Entomological Society, Philadelphia. **3**—The American Naturalist. **4**—The Canadian Entomologist. **5**—Psyche. **6**—Journal, New York Entomological Society. **8**—The Entomologist's Monthly Magazine, London. **10**—Nature, London. **11**—Annals and Magazine of Natural History, London. **13**—Comptes

Rendus, Societe de Biologie, Paris. **40**—Societas Entomologica, Zurich. **50**—Proceedings, U. S. National Museum. **67**—Entomologiske Tidskrift, Stockholm. **68**—Science, New York. **69**—Bolletino, Societa Italiana Entomologica. **84**—Entomologische Rundschau. **87**—Bulletin, Societe Entomologique de France, Paris. **102**—Proceedings, The Entomological Society of Washington. **180**—Annals, Entomological Society of America. **185**—Journal, Quekett Microscopical Club, London. **189**—Journal of Entomology and Zoology, Claremont, Calif. **193**—Entomologische Blatter, Cassel. **198**—Biological Bulletin, Marine Biological Laboratory, Woods Hole, Mass. **216**—Entomologische Zeitschrift, Frankfurt a. Main. **275**—Philippine Journal of Science, Manila. **278**—Annales, Societe Zoologique Suisse et du Museum d'Histoire de Geneve, Revue Suisse de Zoologie. **324**—Journal of Animal Behavior, Cambridge. **335**—Smithsonian Miscellaneous Collections. **344**—U. S. Department of Agriculture, Washington, D. C. **369**—Entomologische Mitteilungen, Berlin-Dahlem. **383**—Proceedings and Transactions of the Nova Scotian Institute of Science, Halifax. **407**—Journal of Genetics, Cambridge, England. **420**—Insecutor Inscitiae Menstruus: A monthly journal of entomology, Washington. **438**—Bulletin, Illinois State Laboratory of Natural History, Urbana. **447**—Journal of Agricultural Research, Washington. **477**—The American Journal of Tropical Diseases and Preventive Medicine, New Orleans. **490**—The Journal of Parasitology, Urbana, Illinois. **521**—Bulletin Mensuel l'Academie des Sciences et Lettres de Montpellier.

GENERAL SUBJECT. Adams, C. C.—An ecological study of prairie and forest invertebrates, **438**, xi, 33-279. **Ainslie, C. N.**—An improved collecting bottle, **5**, xxii, 211-12. **Bradley, J. C.**—Rules for entries in bibliographies, supplementary to the American and British Library Associations' Catalog rules. Published for use of students in a course on the technics of entomological literature (Ithaca, N. Y.), 8 pp. **Cockayne, E. A.**—"Gynandromorphism" and kindred problems, **407**, v, 75-132. **Croft, H. H.**—Obituary, **4**, 1916, 1-5. **Davis, W. T.**—Shooting insects with a bean-shooter, **6**, xxiii, 253-4. **Fabre, J. H.**—Obituary notice by W. M. Wheeler, **324**, vi, 74-80. **Heyden, L. von**—Biographical notice, **193**, xi, 193-203; **369**, iv, 255-67. **Krausse, A.**—Ein neuer automatischer gesiebe-auslese-apparat, **369**, iv, 278-9. **Lampa, S.**—Bibliography, **67**, xxxvi, 273-281. **Meixner, A.**—Die beiden auflagen von Dr. G. W. F. Panzer's Faunae Insectorum Germanicae Initia, **369**, iv, 268-78. **Nelson, E. M.**—Various insect structures, **185**, xii, 593-6. **Webster, F. M.**—Obituary by W. R. Walton, **68**, xliii, 162-4. **Woodworth, C. W.**—Quantitative entomology, **180**, viii, 373-83.

PHYSIOLOGY AND EMBRYOLOGY. **Patterson, J. T.**—Observations on the development of Copidosoma gelechiae, **198,** xxix, 333-72.

MEDICAL. **Roberg, D. N.**—The role played by the insects of the dipterous family Phoridae in relation to the spread of bacterial infections. II Experiments on Apiochaeta ferruginea with the cholera vibrio, **275,** x, 309-339. **Townsend, C. H. T.**—The insect vector of Uta, a Peruvian disease, **490,** ii, 67-73.

ARACHNIDA, ETC. **Barber, H. S.**—Migrating armies of Myriopods. (A correction), **102,** xvii, 189. **Moles, M. L.**—Three common spiders of Laguna, **189,** vii, 209-10. **Parvlowski, E.**—Sur la structure des organes phagocytaires chez Scorpio maurus; Sur la phagocytose chez Scorpio maurus, **13,** lxxviii, 746-47; 748-50.

NEUROPTERA, ETC. **Krecker, F. H.**—Phenomena of orientation exhibited by Ephemeridae, **198,** xxix, 381-88. **Lloyd, J. T.**—Notes on the immature stages of some New York Trichoptera, **6,** xxiii, 201-12. **Warren, A.**—A study of the food habits of the Hawaiian dragon flies or Pinau. (Coll. of Hawaii Pub. No. 3) 45 pp.

Cummings, B. F.—New species of lice, **11,** xvii, 90-107.

ORTHOPTERA. **Caudell, A. M.**—The genera of the Tettiginiid insects of the subfamily Rhaphidophorinae found in America No. of Mexico. [2 n. gen.; 6 n. sps.], **50,** xlix, 655-90. Three interesting O. from the vicinty of Washington, D. C., **102,** xvii, 189. **Giglio-Tos, E.**—Mantidi esotici, **69,** xlvi, 31-108, 134-200.

HEMIPTERA. **Amans**—Sur le vol des Cigales, **521,** 1915, 182-92. **Ball, E. D.**—Adaptations to arid conditions in Cercopidae and Membracidae, **180,** viii, 365-8. **Dewitz, J.**—On the poisons of plant lice, **180,** viii, 343-46. **Funkhouser, W. D.**—Life history of Vanduzea arquata, **5,** xxii, 183-98.

Davis, W. T.—A new Cicada from Arizona, **6,** xxiii, 239-41. **Quaintance & Baker**—A n. gen. and sps. of Aleyrodidae from British Guiana, **180,** viii, 369-72. **Wilson, H. F.**—A synopsis of the aphid tribe Pterocommini, **180,** viii, 347-58.

LEPIDOPTERA. **De Gryse, J. J.**—Some modification of the hypopharynx in lepidopterous larvae, **102,** xvii, 173-79. **Essig, E. O.**—The brown Ctenucha (brunnea), **189,** vii, 241-4. **Fracker, S. B.**—The classification of lepidopterous larvae (Illinois Biol. Mon. ii, No. 1), 164 pp. **Klotz, W.**—Abnormitat von Philosamia cynthia, **216,** xxix, 84. **McDunnough, J.**—Notes on types of L. in Snow collection, **4,** 1916, 25-8. **Scott, H.**—Tineid moths of Central America [Review of Biologia Centrali-Americana, Vol. IV, Lepid.], **10,**

xcvi, 533-4. **Winn, A. F.**—Heliotropism in butterflies; or, turning towards the sun, **4,** 1916, 6-9.

Barnes & McDunnough—Notes on some recently described species of N. A. Lep., **4,** 1915, 282-4. **Closs, A.**—Xylophanes algrensis, sp. nov., **369,** iv, 290-1. **Fruhstorfer, H.**—Neue neotropische Rhopaloceren, **40,** xxxi, 3-4. Zwei neue Pieridenrassen aus dem neotropischen faunengebiet, **84,** xxxii, 76. **Heinrich, C.**—Two n. sps. of Coleophora, **420,** iii, 143-4. **Perrin, J.**—Additions to the catalog of butterflies and moths, collected in the neighborhood of Halifax, N. S., **383,** xiv, 49-56.

DIPTERA. Back & Pemberton—Effect of cold-storage temperature upon the Mediterranean fruit fly, **447,** v, 657-66. **Barrett, H. P.**—Notes on the breeding places of Anopheles, **477,** iii, 406-10. **Bishopp, F. C.**—The distribution and abundance of the ox warbles, Hypoderma lineata and H. bovis in the U. S., **180,** viii, 359-64. **Hutchison, R. H.**—Notes on the preoviposition period of the house fly, Musca domestica, **344,** Bul. 345. **Moreira, C.**—L'habitat du Masicera brasiliensis, parasite des Anosia, **87,** 1915, 269. **Shannon, R. C.**—Eastern Symphoromyia attacking man, **102,** xvii, 188-9. **Thompson, W. R.**—Sur la biologie de deux Tachinaires a stade intramusculaire (Plagia trepida et Strumia scutellata), **13,** lxxviii, 717-21.

Aldrich, J. M.—Two new Canadian D., **4,** 1916, 20-2. **Alexander, C. P.**—New or little-known crane flies from Colombia, Ecuador and Peru, **2,** xlii, 1-32. Two new crane-flies from Porto Rico; New nearctic crane-flies in the U. S. National Mus. [12 sps.], **420,** iii, 104-7; 127-42. **Banks, N.**—Notes on some Virginian species of Platypeza [5 new], **6,** xxiii, 213-16. **Dyar & Knab**—Notes on the species of Culex of the Bahamas, **420,** iii, 112-15. **Edwards, F. W.**—On the systematic position of the genus Mycetobia, **11,** xvii, 108-16. **Felt, E. P.**—New gall midges [5 new], **4,** 1916, 29-34. **Hunter, W. D.** A new species of Cephenomyia from the U. S., **102,** xvii, 169-73. **Jennings, A. H.**—Two n. sps. of Simulium from tropical America, **102,** xvii, 199-200. **Johnson, C. W.**—Note on the species of the genus Acrocera, **5,** xxii, 198-203. **Knab, F.**—New Ceratopogoninae from Peru; A new American fruit-fly, **420,** iii, 109-11; 146. **Malloch, J. R.**—A revision of the N. Am. Pachygasterinae with unspined scutellum [2 n. gen.; 2 n. sps.], **180,** viii, 305-20. Some additional records of Chironomidae for Illinois and notes on other Illinois D. [13 new], **438,** xi, 307-63. **Shannon, R. C.**—A new Eastern Brachyopa, **420,** iii, 144-5. **Townsend, C. H. T.**—New western and southwestern Muscoidea [19 n. gen.; 18 n. sps.], **6,** xxiii, 216-34. Diagnoses of n. gen. of Muscoid flies founded on old species, **50,** xlix, 617-33. Nine new tropical American genera of Muscoidea; New

gen. of muscoid flies from the Middle Atlantic states [5 n. gen.; 5 n. sps.]; Synonymical notes on Muscoidea, **420,** iii, 91-97; 97-104; 115-22. **Van Duzee, M. C.**—Notes on Chrysotimus, with the description of a n. sp., **4,** 1916, 23-4. **Walton, W. R.**—The Tachinid fly Mauromyia pulla, and its sexual dimorphism, **102,** xvii, 190-93.

COLEOPTERA. Barber, H. S.—Macrosiagon flavipennis in cocoons of Bembex spinolae, **102,** xvii, 187-8. **Brocher, F.**—Recherches sur la respiration des insectes aquatiques, **278,** xxiii, 401-38. **Coad, B. R.**—Studies on the biology of the Arizona wild cotton weevil, **344,** Bul. 344 **Frost, C. A.**—Remarks on collecting at light, with a list of the C. taken, **5,** xxii, 207-11. **Harris, J. A.**—On differential incidence of the beetle Bruchus, **6,** xxiii, 242-53. **Hyslop, J. A.**—Notes on the habits and anatomy of Horistonotus uhlerii, **102,** xvii, 179-85. **Knab, F.**—Dung-bearing weevil larvae, **102,** xvii, 193-4. **Leng, C. W.**—Coccinella transversoguttata, Trichodes nuttalli, and Malachius aeneus, **6,** xxiii, 254. **Morse, E. S.**—Fireflies flashing in unison, **68,** xliii, 169-70.

Blatchley, W. S.—Notes on Smicronyx with descriptions of a n. sp. and a n. var., **4,** 1916, 10-12. **Carnochan, F. G.**—Notes on the genus Phelister [2 new], **5,** xxii, 213-14. **Champion, G. C.**—Notes on Melandryidae, **8,** 1916, 1-10. **Morse, A. P.**—Leptura emarginata in England [Notice], **5,** xxii, 212. **Schaeffer, C.**—New C. and miscellaneous notes, III [5 new], **6,** xxiii, 235-8. **Schenkling, S.**—Neue beitrage zur kenntnis der Cleriden, **369,** iv, 310-22 (cont.).

HYMENOPTERA. McIndoo, N. E.—The sense organs of the mouth-parts of the honey bee, **335,** lxv, No. 14, 55 pp. **Morgan, T. H.**—The Eugster gynandromorph, **3,** I, 39-45. **Rohwer, S. A.**—The mating habits of some saw-flies, **102,** xvii, 195-98. **Wheeler, W. M.**—On the presence and absence of cocoons among ants, the nest-spinning habits of the larvae and the significance of the black cocoons among certain Australian species, **180,** viii, 323-42. The marriage-flight of a bull-dog ant (Myrmecia sanguinea), **324,** vi, 701-3.

Cockerell T. D. A.—New Californian bees [4 new], **189,** vii, 230-33. **Crawford, J. C.**—New No. American H. [3 sps.]; The bee genus Holocopasites [3 new], **420,** iii, 107-9; 123-6. **Grimshaw, P. H.**—The Greville collection of Chalcididae and Proctotrypidae in the Royal Scottish Museum, with some reference to Walker's types, **206,** 1915, 344-51 **Morley, C.**—A revision of the Ichneumonidae. Part IV, Tribes Joppides and Banchides [British Museum Publications]. **Rohwer, S. A.**—Ametastegia glabrata, a holarctic sawfly, **102,** xvii, 198-9. **Wheeler, W. M.**—A new bog-inhabiting variety of Formica fusca, **5,** xxii, 203-6.

Doings of Societies.

Entomological Section, Academy of Natural Sciences, Philadelphia.

Meeting of November 18th, 1915. Twelve persons present, Mr. Philip Laurent, Director, presiding.

Lepidoptera.—Mr. Daecke exhibited *Thecla liparops,* taken at Carlisle Junction, Pennsylvania, July 9th, 1909, and *Thecla edwardsi,* Hunter's Run, Pennsylvania, July 11th, 1914, the latter species being abundant. Dr. Skinner exhibited the Academy collection of the Pierid genus *Delias* and called attention to the predominance of orange in butterflies that extend their range into the tropics.

Diptera.—Mr. Hornig said he had found *Culex pipiens* breeding on November 1st and *Anopheles punctipennis* on November 5th this fall.

Orthoptera.—Mr. Rehn referred to the area from Florida to Texas, over which he had collected in conjunction with Mr. Hebard this summer. Former studies of the Orthoptera in the adjoining territory were mentioned. The distribution of certain species was pointed out and the various delimiting barriers mentioned and illustrated. Mr. Laurent exhibited a mounted specimen of *Paratenodera sinensis* in the act of catching and holding a humming-bird. He related the occurrence of a Mantid of this species, catching a humming-bird, in Germantown, Philadelphia, and represented the act by the mounted specimens shown.—Henry Skinner, *Recorder.*

The Convocation Week Meetings: Horticultural Inspectors.

The fourteenth annual meeting of the American Association of Official Horticultural Inspectors, an affiliated division of the Association of Economic Entomologists, was held in Columbus, Ohio, December 28 and 29, 1915. The following papers of an entomological character were presented:

Harry B. Weiss, New Brunswick, N. J., Foreign Pests Recently Established in New Jersey—E. R. Sasscer, Washington, D. C., Imported Insect Pests Collected on Imported Nursery Stock in 1915, Remarks on Inspection Facilities in the District of Columbia, and Vacuum Fumigation and Its Application to the Control of Insects Affecting Plants and Plant Products—J. G. Sanders, Madison, Wis., The Uniform Horticultural Inspection Law—J. H. Dayton, Painesville, Ohio, Report of the Legislative Committee of the National Nurserymen's Association (Reported the acceptance of the Uniform Inspection Bill by the nurserymen at their national convention in Detroit, Michigan, June, 1915; said that it was a gratifying advance in horticultural legislation to note the closer feeling of co-operation among the nurserymen and the entomologists; conveyed the sentiments of the nurserymen to this Association and expressed a wish for the continued good feeling and co-operation existing at present.)—F. M. O'Byrne, Gainesville, Fla., Nursery Inspection in Florida.—J. Edward

Taylor, Salt Lake City, Utah, Co-operation in the Establishment of State Quarantines.—N. E. Shaw, Columbus, Ohio, The Ohio Inspection System.

During the discussion of Mr. Weiss' paper it was moved by Dr. Headlee that it is the sense of this body that the federal quarantine be strengthened and that an absolute quarantine be placed on all plants imported with soil about the roots, except such as are introduced by the U. S. Department of Agriculture for experiment and those to be held in quarantine for a reasonable period. This motion was passed unanimously and the Secretary instructed to notify the Federal Board of this action. Mr. Burgess reported that Christmas trees and greens to the extent of over forty-one carloads, containing 1200 to 1800 trees each, had been shipped from the quarantine area in New England, all of which had been inspected previous to shipment, and a considerable number of egg clusters of the "Gipsy Moth" had been found on these trees. All carload lots went from New Hampshire and Maine and had been shipped to many of the States of the Union, including Michigan, Wisconsin, Minnesota, Washington and Oregon, where already grows a plentiful supply of Christmas trees. It was the sense of the inspectors present that the Federal Quarantine should be replaced on Christmas greens, otherwise several of the States would absolutely quarantine the shipments of Christmas trees originating in the moth quarantine area.

(From notes furnished by J. G. Sanders, *Sec'y.*)

[To the total of 84 entomological papers and papers of general bearing on entomology, listed on pages 91-96, *anteá*, as presented at the Convocation Week meetings of 1915, the above notes add 9.—Ed.]

Feldman Collecting Social.

Meeting of October 20th, 1915, at the home of H. W. Wenzel, 5614 Stewart Street, Philadelphia. Twelve members were present, Pres. Wenzel in the chair.

Diptera.—Mr. Hornig said he had found many mosquito larvae in Cobbs Creek, Pennsylvania, all of which at the time he had considered *Culex pipiens* Linn., but had bred from them some *Aedes jamaicensis* Theob.

Lepidoptera.—The same speaker said he had found larvae of *Hemileuca maia* Dru. at Westville, New Jersey, in 1913, which pupated the same year. Some of these emerged in 1913 and two came out within the present week. Mr. Haimbach recorded *Racheospila atripes* Druce from Homestead, Florida, v-14-15, collected by Dr. Castle. The type was described from Panama and is in the Staudinger Collection.

Coleoptera.—Mr. Daecke said he had found many *Toxotus trivittatus* Say, which never varied until he caught one at Cove Mt., Pennsylvania, June 27, 1915, which he exhibited, and which has the proximal portion of the marginal stripes on the elytra missing; also exhib-

ited a specimen of *Dicerca obscura* Fabr., Rockville, Pennsylvania, October 3, 1913; the New Jersey list records this species in July and August. A specimen of *Dicerca lepida* Lec. was shown from Hummelstown, Pennsylvania, July 13, 1915, collected on ironwood by Mr. Knull; this is extremely rare. Mr. H. W. Wenzel exhibited a female Scarabaeid from Huachuca Mts., Arizona, (July) collected by H. A. Wenzel. This is undoubtedly a *Xyloryctes* and most likely a new species. Geo. M. Greene exhibited *Eurytrachelus bucephalus* Pt. from Java and *Eutrachelus temmincki* Latr. from Borneo in comparison with our local *Dorcus parallelus* Say, and *Eupsalis minuta* Oliv.

Adjourned to the annex.

Meeting of November 17, 1915, at the home of H. W. Wenzel, 5614 Stewart St., Philadelphia; eleven members were present. Pres. Wenzel in the chair.

Hymenoptera. Mr. Kaeber exhibited a pair of wasps in copulation, beaten from hickory at Upper Darby, Pennsylvania, vi-28-15, which were identified by Mr. Harbeck as *Methoca stygia* Say.

Lepidoptera. Mr. Laurent stated that though he knew the season was late he was surprised to see on November 13th specimens of *Colias philodice* Gdt. flying at Mt. Airy, Philadelphia, Pennsylvania.

Coleoptera.- Dr. Castle stated that the *Balanini* mentioned in the September minutes as common at Pine Beach, New Jersey, are *B. uniformis* LeC. and they are much darker than California specimens in his collection; he exhibited a weevil, *Chiotanthobius schwarzi* Pierce, from Enterprise, Florida, vii-10-15. Mr. H. W. Wenzel exhibited *Coccinella affinis* Rand, and *Lina scripta* Fabr. found by H. A. Wenzel at Westville, New Jersey, xi-14-15, and *Plagiodera armoraciae* Linn. from Staten Island, New York, ix-9-15, collected by Wm. T. Davis. All three species were hibernating on willow.

Adjourned to the annex. GEO. M. GREENE, *Sec'y.*

Chicago Entomological Club.

Meeting of November 21, 1915, at the home of Thomas Smart, eleven members present.

Lepidopterists exhibited specimens of *Melalopha* and *Datana* and discussed their characteristics and larval habits, etc. Local captures reported were *Melalopha apicalis, inclusa, strigosa, albosigma* and *brucei; Datana ministra, angusii, perspicua, integerrima* and *contracta.*

Coleopterists had the Meloidae as a subject and extensive series were exhibited. Notable among them was a specimen of *Pomphopoea sayi* (not quite typical) taken by Mr. Wolcott at Beverly Hills, Illinois, on blossoms of *Spiraea salicifolia* on June 7, 1915. This is new to the region. Mr. Liljeblad showed a specimen of *Nemognatha cribraria* taken at Hessville, Indiana, August 13th, also new to the region.—A. KWIAT, *Secretary.*

P. C. Stockhausen, Printer, 53-55 N. 7th Street, Philadelphia.

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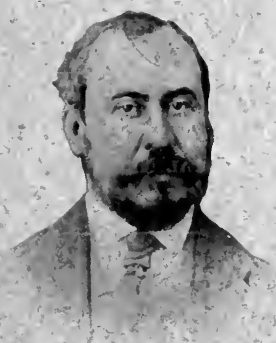

John Lawrence Le Conte,
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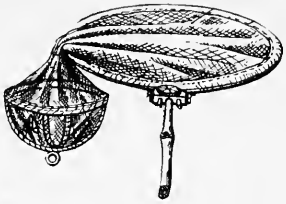
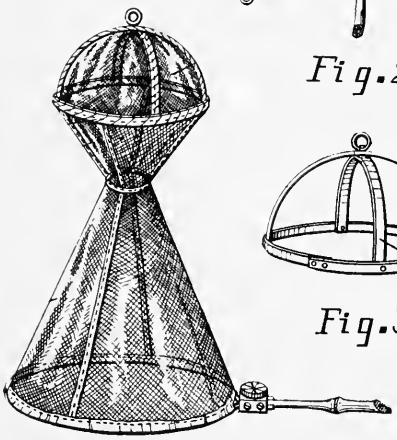


Fig.2



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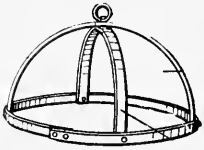

Fig.3

Fig.4

Fig.5

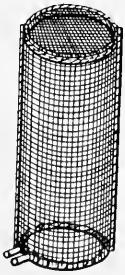

Fig.6

Fig.7

M.H.Mead

A RECENTLY PATENTED COLLECTING NET—WEISS.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

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A Recently-Patented Collecting Net.*

By HARRY B. WEISS, New Brunswick, New Jersey.

(Plate VII)

To collectors in general, but especially those of Lepidoptera, who are desirous of obtaining specimens in as perfect a condition as possible, the net recently patented by Mr. Marvin H. Mead, of Passaic, New Jersey, should not be without interest. The accompanying Plate VII shows so clearly the construction of the net that only a few words of description are necessary. The most important part is the specimen chamber or dome at

*U. S. Patent Office, Patent No. 1143721, to Marvin H. Mead, Passaic, N. J., June 22, 1915.

the end of the net proper. The frame-work of this (see figure 3) is constructed of light weight, flexible metal and covered with gauze, preferably of a transparent quality. The remainder of the net may be made of any suitable material such as is ordinarly used for butterfly nets.

The net is used in the usual manner, but the addition of the specimen chamber secures the following advantages. It permits the collector to catch a number of insects simultaneously or in succession without danger of mutilation or rubbing. In other words, the insects are free to fly to a certain extent while still in the net. By reason of this the rubbing and crushing actions of the folds in an ordinary net are avoided. With a net of this kind, the operator can also readily introduce a cyanide jar without danger of the insects escaping. On account of the spaciousness of the specimen chamber, the jar can be easily moved about inside and the insects gently tapped into it.

For arc light collecting, it is impossible to overstate the advantages of a net of this kind. It is not at all clumsy to handle, the additional weight of the specimen chamber, (diam. 1 ft., height, 6 in.) being negligible. Mr. Mead has used such a net for the past several years and has collected many specimens so perfect that he has been accused of breeding them.

Figure 1 is a view of the net in perspective; figure 2, a view in perspective on a smaller scale showing the net in position to retain a captured specimen; figure 3, a view showing the form of the structure for insuring the dilation of the specimen chamber, and figure 4 illustrates the operator with a cyanide jar introduced in the net.

A smaller cylindrical net for capturing microlepidoptera is shown in figure 6, this being five or six inches in diameter and eight to ten inches high. Figure 5 shows the light weight, flexible metal frame which is covered with fine gauze as shown in figure 6. Figure 7 shows the net grasped with the hand so as to form a special chamber into which the cyanide bottle can be thrust and the specimen removed in as good a condition as when it entered the net.

Descriptions of new Genera and Species of the Dipterous Family Ephydridae—III.

By E. T. Cresson, Jr., Academy of Natural Sciences of Philadelphia.

TYPOPSILOPA n. gen.

Allied to *Psilopa* from which it may be distinguished by the two well developed dorso-central bristles, arranged 1 + 1. The face is distinctly foveolate, with foveae well removed from the orbits; two distinct facial bristles each side, although the upper is much stronger. *Psilopa*, typically, based on its genotype, *Notiphila nitidula* Fall., has no dorso-central bristles and the facial foveae if noticeable are very near the orbits, and the face has only one side bristle, very low. The present genus is apparently allied to *Clasiopella* Hendel, differing in the presence of two dorso-centrals. Whether the presence or absence of these bristles is of generic importance may be questioned.

Genotype—Typopsilopa flavitarsis Cress.

Psilopa atra Lw. also belongs here.

Typopsilopa flavitarsis n. sp.

Black; knob of halteres white, all tarsi yellow or tawny, apices brownish.

Similar to *Psilopa atra* Lw. Frons with the proclinate orbitals slightly below the reclinate frontals. Face about twice as long as broad and nearly as broad as vertex, with the upper bristles about at middle, in profile. Antennal spine as long as third joint. Length 3.0 mm.

Type—♂, Bill Williams Fork, Arizona, August, (F. H. Snow), [University of Kansas Collection].

Paratypes—3 ♂, topotypical.

In comparison with *atra* this species differs principally in the longer face, higher placed facial bristles and the contrasting yellow tarsi. The frons seems less shining, so that the opake frontalia are less differentiated; the face also is less shining and more or less irregularly wrinkled.

Ilythea flaviceps n. sp.

Similar to *spilota* but larger.

Yellow; frons and thorax brown or darker; abdomen and all bristles

black. Wings with series of fuscous bars between veins; veins brown. Opake, yellow pruinose; thorax more or less shining; mesonotum and scutellum somewhat metallic-tinged; abdomen shining but obscured by gray dust. Face with patch of silver inside at base of upper bristles. Arista with 8 hairs. Wings with 4-6 bars in marginal cell, 4-6 in submarginal, 4 in first posterior beyond post. c.v. Length 2.5 mm.

Type—♀, Bill Williams Fork, Arizona, August, (F. H. Snow), [University of Kansas Collection].

This species in form simulates *spilota* Curt. It however is quite distinct in having the legs as well as the face yellow. All the pruinose coating is yellow or golden through which the metallic tints of the mesonotum and scutellum are apparent.

Discocerina parva var. **nigriventris** n. var.

A variety separated on account of the palpi being mostly black and the abdomen more shining. The tibiae, especially the hind ones, entirely shining black.

This variety is probably confined to the Pacific coast region.

Type.—♂, Berkeley Hills, Alameda County, California, April 11, 1909. (Cresson) [A. N. S. P. No. 6100].

Paratypes.—4♂, 4♀, topotypical.

Discocerina setigera n. sp.

Black; base of third antennal joint, palpi, knees, apices of tibiae and all tarsi except apices, tawny; halteres whitish; wings hyaline, veins yellow, costa dark.

Opake, cinereous; frons black or brown pruinose; orbits narrowly white; face and cheeks densely white; mesonotum brownish-tinged medianly; abdomen similar, becoming cinereous laterally; femora and tibiae cinereous.

Frons broad as long; orbits parallel. Face narrower, concaved above, moderately prominent at middle, strongly retreating below; three pairs of converging bristles and another series of smaller laterally curved bristles nearer orbits; parafacials bare. Cheeks hardly as broad as third antennal joint. Arista with 4-5 hairs.

Mesonotal setulae numerous, irregular; prescutellars present. Scutellum rounded apically. Abdomen ovate; segment 5 of ♂ triangular convex. Length 2.5 mm.

Type.—♂, Mesa Grande, Sonoma County, California, May, 1908 (P. C. Baumberger), [A. N. S. P. No. 6101].

Paratypes.—3♂, 5♀, topotypic.

A species belonging to a group possessing a second series of

facial bristles directed laterally, *i. e.*, in opposition to the regular converging series. The cheeks are rather narrow and the parafacials are not noticeably setulose above; the dorsum of thorax and abdomen cinereous or but faintly brownish.

Discocerina argyrostoma n. sp.

Black; apex of proboscis, bases of tarsi, tawny; halteres yellowish-white. Wings clear hyaline.

Shining; front opake brownish, orbits whitish below; face opake silvery or grayish white; antennae white or gray pruinose.

Frons longer than broad, with orbits parallel; one orbital bristle. Face as broad as frons, flat, slightly retreating below, with two bristles below middle; foveae weak or absent. Mesonotal setulae erect; prescutellar bristles near margin. Scutellum convex, triangular. Abdomen ovate, apex acute; segments subequal; hypopygium inconspicuous. Length 4.5 mm.

Type.—♂, Berkeley Hills, Alameda County, California, April 11, 1908, (E. T. Cresson, Jr.), [A. N. S. P. No. 6102].

Paratypes.—1 ♂, 3 ♀, topotypical.

This is not a typical *Discocerina*. The face is flat and broad, with no, or very weak, foveae. The shining black thorax and the flat, silvery white face will separate this species from all the others of the genus.

Mosillus tibialis n. sp.

Black; third antennal joint sometimes, tibiae except middle of hind ones, and tarsi except apices, tawny; halteres whitish; wings hyaline, lacteous, veins yellow.

Polished, with faint metallic reflections; parafacials (but not the cheeks), foveae, middle of face except prominence and lateral papillae, all outer surfaces of tibiae, silvery; third antennal joint and mesonotum somewhat faintly gray. Frontal triangle, mesonotum and scutellum subopake, minutely punctured.

In other respects similar to *M. subsultans* Fab.

Type.—♂, Wildwood, New Jersey, July 18, 1908, (E. T. Cresson, Jr.), [A. N. S. P. No. 6103].

Paratypes.—19 ♂, 5 ♀, topotypical.

This name is proposed for the American species. It is possible that Walker may have described it. Our species differs from the European *subsultans* in having the tibiae tawny, not black, and in general it is more distinctly sculptured espe-

cially on the frons, mesonotum and abdomen. The silver of the face is not noticeable on my specimens of *subsultans*.

This species has been known in the American collections as *Gymnopa nana* Walk. and *G. aenea* Fall. It is not the latter but may be the former. Walker's type cannot be located in the British Museum by Mr. E. E. Austen to whom I submitted specimens for comparison.

Lytogaster willistoni n. sp.

Black; third antennal joint except apex, knees, and tarsi except apices, tawny; halteres yellow with black knobs; wings clear hyaline with black veins.

Subopake; abdomen shining; face gray with silvery orbits; pleurae sparsely gray. Disc of frons, two median thoracic stripes, disc of scutellum granulose; abdomen minutely pitted becoming very dense on the depressed dorsum of second segment.

Abdomen very broad, convex and subglobose; lateral margins revolute; second and more or less of third segment depressed on dorsum with lateral lines of delimitation sharp; fourth segment very large, convex, two to three times as long as second and third together; fifth triangular, nearly as long as fourth, with two shallow depressions near apex. Length 2.3 mm.

Type.— ♂, Berkeley Hills, Alameda County, California, April 20, 1908, (E. T. Cresson, Jr.), [A. N. S. P. No. 6104].

Paratypes.—4 ♂, 6 ♀, topotypical.

This species is found in most collections under the name *Ephydra* or *Pelina brevis* Walker. As I do not know Walker's species I cannot recognize the name. The species is distinguished by the large, shining, convex, subglobose abdomen, with the fourth segment much developed. The surface of the abdomen is minutely pitted as described.

Parydra tibialis n. sp.

Structurally similar to *P. bituberculata* Lw.

Black; halteres, knees, tibiae and tarsi tawny; wings clear hyaline, veins tawny, cross veins not clouded.

Shining, more or less sparingly obscured by gray or brown pollen, which on the face is dense and white, and on the abdomen and femora is variegated with minute bare dots at the bass of setulae. Mesonotum reddish coppery-tinged; abdomen greenish-tinged. Scutellum with two small bristle-bearing tubercles, well separated as in *bituberculata;* lateral bristles with or without minute tubercles. Length 4.5 mm.

Type.— ♂, Oak Creek Canyon, Arizona, 6000 ft. alt., August, (F. H. Snow), [University of Kansas Collection].

Paratypes.—5 ♂, 15 ♀, topotypical.

Belonging to the *bituberculata*-group, and distinguished from its congeners by the clear wings and tawny tibiae and tarsi. The entire surface in general obscured by the sparse but distinct coating of gray pollen.

Ephydra niveiceps n. sp.

Similar to *E. subopaca* Lw.

♂. Black; metallic green; halteres, knees, bases of tibiae, tarsi except apices, tawny.

Opake, gray or whitish; frons polished, with gray orbits; mesonotum subopake with metallic tinge, with broad more whitish median stripe; abdomen more obscured but metallic color evident. Face and cheeks glistening silvery or snowy white when seen from above.

Frons nearly horizontal; prefrontal bristles well developed, nearly equalling frontal orbitals. Face in profile, projecting greatly, nearly equalling horizontal diameter of eye; parafacialia broad, at least one-half length of third antennal joint in width; bristles normal; cilia of posterior orbits normal. Mesonotal acrostichals in well defined series anteriorly; posterior margin of mesopleuron with only 4-6 bristles. Abdominal segment 5 not longer than 4; genitalia not noticeably developed. Length 5.0 mm.

♀. Similar, but the gray face not so glistening.

Type.— ♂, Wawawai, Washington, [A. N. S. P. No. 6105].

Paratypes.—1 ♀, topotypical.

I have also seen a series of 3 males, 1 female, from 40 miles north of Lusk, Wyoming, July, 1895, [Kansas Univ. Coll.], and a female from Manitou Park, Colorado, [Kans. Univ. Coll.].

This may possibly be only a variety of *E. subopaca* Lw. or of *E. milbrae* Jones. The general gray color, not brown; the snowy white projecting face; the broad facial orbital areas and seriated acrostichal setulae are noticeable in the material before me, as differing from the above mentioned species.

Ephydra pectinulata n. sp.

Similar to *niveiceps*.

Opacity more brownish, especially on the frons and thorax; the grays not whitish except on the face; abdomen more olivaceous, not opake.

Frons less horizontal, face not so projecting being white but not glistening snow-white. Cilia of posterior orbits developing into two or three stout bristles at buccal extremity. Mesopleural fringe, of more numerous bristles, especially of ♀, is very dense and close.

Scutellum of ♀ longer and more acutely pointed with noticeably long pile. Bristles of fore femora very long. Length 4.7 mm.

Type.—♂, 40 miles North of Lusk, Wyoming, July, 1895, (U. of K. Lot 425), [Univ. of Kansas Coll.]

Paratypes.—2 ♂, 6 ♀, topotypical.

DIMECOENIA n. gen.

This genus is proposed for the reception of *Caenia spinosa* Loew, its type species. It differs from *Coenia,* as based on its genotype, *Ephydra palustris* Fallen, in the absence of pulvilli and having the claws long and nearly straight. In these respects it resembles *Ephydra,* but in the present genus there are only two frontal orbital bristles and no post-humeral or prescutellar bristles. The pre-frontal bristles are strongly developed. The genus seems intermediate between *Coenia* and *Ephydra* but is constant in the characters mentioned.

Here also belongs *Ephydra austrina* Coquillett, of which *Caenia virida* Hine is a synonym. I have examined the cotypic series of Coquillett's and Hine's species. It is strange that both authors overlooked the characteristic tufts of hair on the hind tarsi of the male of this species. This is described by Aldrich in his paper on "Two Western Species of Ephydra."*

A new Genus of Eulophidae from the United States (Hym.).

By A. A. Girault, Washington, D. C.

PSEUDOLYNX new genus.

Belongs to the Omphalini and is characterized by its robustness, the elongate stigmal vein and middle tibial spur.

1. **Pseudolynx io** new species. Genotype.

♀.—Length 3.00 mm. Robust. Head a little wider than long, large. Dark metallic green except the reddish brown femora, tibiae, tarsi and scape (except above along more than the distal half). The fol-

*Jour. N. Y. Ent. Soc. xx, 101, 1912.

lowing parts reddish yellow: Mouth, margin of the eyes very narrowly, a narrow line across the vertex from the eyes and behind the lateral ocelli, the large prepectus except a spot dorso-cephalad, the dorsal margin broadly of the cephalic of the two mesothoracic sclerites, a narrow line across the face about halfway between antennae and cephalic ocellus, lateral margin of scutum at about cephalic third (a triangle), mesal margin of each parapside from near cephalic end, broadening caudad (thus a longer triangle), lateral margin narrowly and caudolateral corner broadly of each axilla, lateral and apical margins of scutellum narrowly, postscutellum excepting a large area filling the entire meson.

Fore wings with a smoky area under the marginal vein, ending against the stigmal and not extending quite halfway across the wing; it extends more suffusedly proximad.

Marginal vein somewhat shorter than the submarginal, the stigmal long, over half the length of the marginal, the postmarginal somewhat shorter than it.

Hind tibial spurs double, stout, very unequal.

Head densely scaly, below the antennae with many thimble punctures of moderate size, the genal suture distinct. Antennae inserted a little above the ventral end of the eyes, 9-jointed with two ring-joints and three club-joints, the flagellum thick, the club large-oval, obtuse at apex, wider than but not quite as long as the funicle whose joint 1 is elongate, somewhat over twice longer than wide, 2 somewhat longer than wide, the pedicel a little shorter than it; club 3 a hemisphere. Ring-joints large. Mandibles rude, tridentate.

Thorax coarsely scaly, the axillae advanced, large, the propodeum rather short at the meson, with a delicate median carina and no others, longer laterad. Scutellum simple, large.

Abdomen conic-ovate, produced beneath, as long as the rest of the body, densely, finely scaly like most of the propodeum.

Described from one female in the United States National Museum from North Saugus, Massachusetts, May 24, 1907 (J. C. Crawford).

Type: Catalogue No. 19630, U. S. N. M., the female on a tag, the head, a pair of wings and the hind legs on a slide.

2. **Pseudolynx flavimaculatus** new species.

♀.—Length 4.50 mm. Differs from the preceding in being larger, the mouth more broadly yellow and a broad oblique line runs from each corner of it to the end of the eye, between the antenna and the genal suture; the propleuron is yellow except ventrad, the axillae are margined with yellow all around and the lateral margin of the parapside is rather broadly yellow (very obscurely and narrowly in the other spe-

cies); the scape is all yellow and the lower half of the pedicel. The infuscation of the fore wing is narrower, more along the venation (marginal and stigmal veins, mostly, against and beneath them). There are also on the abdomen above, near base, two obscure marginal spots of ochreous and along the sides a rather conspicuous broken stripe of the same color (ventro-lateral aspect), the spots of which it is composed being much longer than wide on segments 2 and 5; this stripe does not extend to the apex by some little distance. Otherwise about as in *io*. Both species have a glabrous plate, wider than long, just cephalad of the spiracle and there are thimble punctures on the scutellum in longitudinal lines laterad (two lines in *io*, one of three or four punctures in this species). Submarginal vein distinctly, abruptly broken in regularity in both species. In this species, the middle tibial spur is very long and slender (also in *io*).

Described from one female in the U. S. N. M., labeled "*Olynx flavimaculata* Ashm., Ramsey County, Minnesota."

Type: Catalogue No. 19631, U. S. N. M., the specimen on a tag; middle and hind tibiae and the antennae on a slide.

Insect Notes for the Season of 1915 (Lep., Col., Dip.).

By Harry L. Johnson, South Meriden, Conn.

Abundance of Feralia jocosa, etc. (Lep.).

I have taken *jocosa* sparingly for a number of years on the common hemlock (*Tsuga canadensis?*). A little grove of these trees is situated on the Oregon* Road on a cliff of rocky formation overlooking the Connecticut River and I have made it a point to visit this place each year for this species, usually securing two to three a day for several days. This year, however, I decided to visit what is known as Hemlock Grove, situated about halfway between Meriden and South Meriden in a park known as Terrace Garden. This grove is also on high rocky ground overlooking a stream, so that locality and surroundings being similar, I expected good results.

Three warm, sunny days in April were selected as best for collecting. On the first day, April 7th, some twenty-six speci-

* Oregon is a small cliff-enclosed valley bounding South Meriden on the northwest. This place has always gone by the name of Oregon or the Oregon road. Possibly the place took its name from this road, which goes through it. The place is very thinly settled and is designated on the map of Meriden as Cheshire Road, although it is always spoken of as Oregon.

mens of *jocosa* together with several *Phigalia titea* and three *Nyctobia limitata* were taken from the grove from three to four o'clock in the afternoon. Most of the *jocosa* were found low down on the bases of the trees but *P. titea* was usually higher up. The Joker moths were easily bottled as they are sluggish, but *Phigalia titea* and *Nyctobia limitata* required the use of a net, as they were inclined to fly up when one got to within several feet of them. The second day, April 8th, was still warmer and clear but the result was not as anticipated as only about ten specimens of The Joker were secured. On the third day, April 9th, which was decidedly cooler but still clear, I took over eighty specimens of *jocosa* from the grove, practically all of them freshly emerged specimens.

When pinning and spreading these specimens care has to be taken to remove with cotton all the oily substance which exudes from the wings, around the pin, etc., as otherwise the wings stick to the spreading board when dry, spoiling the specimen by tearing the wings.

This species is well named The Joker, as it forms one of the most natural mimics of the insect world, being almost a perfect copy of the lichen found on hemlock.

Euchloe genutia Fab. **(Lep.).**

A pair of *Euchloe genutia* fell to my lot for the first time this year. On April 24th while walking along the track of the "Cannon Ball" express in Oregon I spied a butterfly which did not seem familiar and as it was a slow flier I captured it and found it to be the male of *E. genutia*. On the next day I happened along the same route and took the female in practically the same place, but although I visited the region steadily after that, I could not add more to the number.

Vanessa milberti Godart. **(Lep.).**

Vanessa milberti was also present in my vicinity this year although I have never seen it here before. One specimen was taken on the blossoms of wild plum near Hanover Park on April 29th, and later in the season I took several fresh specimens near the same locality on the flowers of alfalfa. These last were undoubtedly of a second brood.

Pieris napi, aberrant form **virginiensis?** Edwards. **(Lep.).**

Another butterfly new to me, *P. napi virginiensis,* fell to my lot this year, making three new butterflies in one season. Six specimens of this species were secured on the Oregon road. They are somewhat smaller and weaker fliers than *P. rapae* and are readily told from them and as easily taken with the net.

Abundance of Melitaea phaeton Drury. **(Lep.).**

This butterfly has always been rare with me until this year. One or two specimens each season was all that I could possibly obtain even by the most strenuous hunting. These single specimens I always found on swampy land in Oregon. This year I was fortunate in discovering a new place for this species on the road to Meriden. While walking along this road I saw a single specimen around a wet place in the road and after taking it noticed two more further along, then three, then several more. Knowing their habits I began to investigate and found their gathering place in a marshy field of grass about three feet high on the side of the road. *Phaeton* was here in abundance flying lazily around and alighting on the blades of grass. I took thirty on July 11th inside of fifteen minutes; on the 12th I took twenty and thirty-five more on the 13th. All this helps to prove the theory that nothing is rare if you know where to find it.

Tenacity of Life in the Spice Bush Silk Moth. (Lep.).

On returning home from work one July noon, I noticed an unfamiliar object through motions made by an insect which was partly concealed in the leaves near the house. On a closer inspection I found it to be a *Callosamia promethea* which I had taken the previous day and had thrown away after supposedly killing it. The family cat seeing the specimen had deprived it of its head, all the legs and three of its wings, leaving only the body and one wing and the insect apparently dead at the time. That it was not dead was proven by its lively actions when I rediscovered it. It kept up continual motion, the lone wing flopping from side to side, causing the body to jump around somewhat resembling a sailboat in a choppy sea.

Deciding to see how long this action would keep up I left the specimen and on returning at six o'clock that night the mangled specimen was as active as before, whereupon I crushed it with my foot as I was satisfied that it was fated for several more hours of torture whether painless or otherwise.

Calosoma sycophanta Linn. **(Col.).**

While collecting at light in Hemlock Grove on May 14, I took a specimen of this beautiful European beetle which has been imported to fight the gypsy and brown-tail moths. This insect is reputed to be a good climber which seems to be upheld by the fact that the specimen was more than halfway up an electric light pole when captured. Mr. Britton, of the Connecticut Agricultural Experiment Station at New Haven, states in a letter concerning the specimen, "Apparently you are correct in regard to the specimen of *Calosoma sycophanta* Linn. I did not suppose that it had yet reached a point so far west as Meriden. A colony was liberated in Stonington in 1914. None were planted in the town of Thompson but the beetles were found there in moderate numbers in 1914 as the result of spreading from Massachusetts towns."

Curious Food Habits of Musca domestica (Dip.).

Having occasion to use a quantity of gummed labels in the course of some work on my collection I was surprised to find that any uncovered labels which I left on my table over night would be minus the mucilage in the morning. Sometimes the mucilage was removed in spots and blotches but almost always the paper was entirely cleaned as though with a vacuum cleaner. This condition and its cause baffled me for quite awhile and I was on the point of laying it to a cockroach which I knew to be in the room when, happening to go to the study after dark one evening, I was astonished to discover a group of house flies on the labels. After watching them a few minutes I was convinced that they were feeding on the sticky substance. The weather being quite warm the mucilage on the labels was somewhat soft, allowing the flies to remove it. Not having heard of this habit of the housefly before I record it here.

A new Phalangid from the Coronados Islands (Arach.).

By T. D. A. Cockerell, Boulder, Colorado.

Last August my wife and I visited the South Island of the Coronados group, off the coast of Lower California, Mexico. Among the interesting arthropods collected was a Phalangid of the family Trogulidæ, which proves to be an undescribed member of the genus *Ortholasma* Banks (Psyche, 1894, p. 11.) It may prove to be peculiar to the islands.

The table given by Banks (Pomona Coll. Jn. Entom., 1911, p. 417) may be enlarged and modified to admit the new species as follows:

Process of eye-tubercle relatively long and narrow, with six or more transverse ribs on each side; femora and tibiæ not banded, *rugosa* Banks.

Process of eye-tubercle relatively broad, spoon-shaped..... 1

1. Femora and tibiæ banded; apical projections of process of eye-tubercle beyond rim longer than broad.....*pictipes* Banks.

Femora and tibiæ not banded; apical projections of process of eye-tubercle beyond rim much broader than long, *coronadensis* n. sp.

Ortholasma coronadensis n. sp.

Length of body 3.5 mm., 4 mm. if process of eye-tubercle is included. Process dull white, constructed as in *pictipes*, with the same number of ribs, but even broader, the outline not far from circular (excluding the narrower base), and the projections beyond the rim very broad and short, with sloping sides; anterior spine-like processes of cephalothorax as in *pictipes*.

Legs sepia-brown, without bands. Body sepia-brown, the dorsal surface with numerous white tubercles, the principal ones in two longitudinal rows of six each; these tubercles are connected with transverse somewhat darkened ridges in the cephalothoracic region, and on abdomen are situated on a lattice-work pattern of dark ridges, forming a net-like structure with square meshes, the corners directed laterad, caudad and cephalad; the margin of the body posteriorly is furnished with a row of pallid blunt processes, connected by dusky transverse bars, like a fence; the body beneath, including the coxæ, is densely beset with pallid round tubercles; palpi bristly, last joint short; legs minutely hairy, trochanters strongly tuberculate.

Type in the author's collection.

Found in a cave-like hollow under a large rock, a considerable distance above sea-level.

A new Species of the Genus Neoblattella from Costa Rica (Orthoptera, Blattidae).

By Morgan Hebard, Philadelphia, Pa.

In studying material of the family Blattidae, accidentally introduced in the United States, an undescribed species of *Neoblattella* has been encountered. As we desired to describe the species, if possible, from material taken at a locality at which it is native, we have gone through the undetermined material which we have and have found the additional series recorded below.

Neoblattella fratercula new species.

This species is apparently rather closely allied to *N. brunneriana*. When compared with specimens before us which we believe to represent that species[1], the present insect is readily distinguished by its smaller size, tegmina and wings with cross-veinlets less strongly indicated[2], slightly iridescent wings and very distinctive male genitalia.[3]

TYPE: ♂ ; Isla de Cocos, Costa Rica, January, 1902. (P. Biolley.) [Acad. Nat. Sci. Phila., Type No. 5298.]

Size medium small for the group, smallest of the more nearly related species; form rather slender. Interocular space wide; ocellar spots weakly defined. Maxillary palpi very elongate; third and fourth joints subequal in length; fifth (distal) joint about two-thirds as long as fourth, obliquely truncate to near its base.

[1] From San Rafael in Vera Cruz, Mexico; Port Limon, Reventazon, Juan Viñas and Azahar near Cartago, Costa Rica.

[2] In *brunneriana* very numerous and conspicuously defined in darker brown distad, both on tegmina and wings.

[3] The only male of *brunneriana* before us is from Port Limon, Costa Rica. It has the sides of the subgenital plate nearly vertical and suddenly abruptly truncate, leaving mesad a quadrate aperture; the bottom margin of which (representing the mesal portion of the distal margin of this plate) is irregularly truncate, with a small mesal knoblike projection, slightly longer than wide, and styles briefly distant on each side, of almost the same size and form as this projection. From within the plate, near this margin, spring aciculate, chitinous, somewhat decurved projections, which reach a short distance beyond the margin of the plate, projecting from the narrow channels between the styles and the small median projection of the distal margin.

Pronotum with disk very weakly raised, the whole surface in nearly the same plane; cephalic margin moderately truncate, weakly convex; angles broadly rounded, the cephalic more so than the caudal; caudal margin truncate, very weakly convex.

Tegmina very delicate; with seven longitudinal discoidal sectors (this including the median vein, all its branches and the production of the ulnar vein); cross veinlets very weak; wings very delicate; six of the costal veins rather heavily clubbed distad, ulnar vein with four branches, intercalated triangle small, axillary vein with three branches which are directed away from the costal margin.

Abdomen with dorsal surface little modified; sixth segment more produced than the others, with distal margin broadly and weakly convex lateral and broadly and more decidedly concave mesad; seventh segment somewhat narrower, with distal margin sinuous; eighth segment still

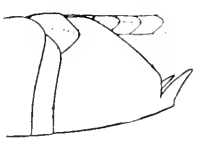


Fig. 1.—Lateral outline of subgenital plate of type. ♂. (Greatly enlarged).

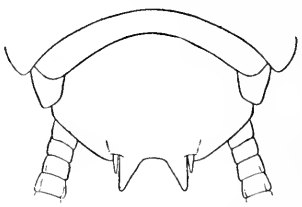


Fig 2.—Ventral outline of subgenital plate of type. ♂. (Greatly enlarged).

narrower and normally almost completely concealed, broadly cleft mesad; ninth segment very much narrower, very little produced; tenth segment (supra-anal plate) distinctly transverse, triangularly weakly produced with blunt apex. Subgenital plate with lateral margins weakly elevated and declivent distad forming small and narrow emarginations at their juncture with the mesal portion, within which emarginations are situated the styles which are minute almost microscopic pegs with apices acute; the remaining mesal portion of the plate is produced latero-distad in acute-angulate weakly divergent thin plates, the remaining very brief mesal portion of the margin between these transverse.

Limbs very delicate with delicate spines; ventro-cephalic margin of cephalic femora with long, slender, widely spaced spines in a little more than proximal half, which slightly decrease in size distad, remaining distal portion with very much smaller and more closely set spines.

Allotype: Same data as type. [Acad. Nat. Sci. Phila.]

Agrees with male except in following features. Dorsal abdominal segments not differing greatly in outline, supra-anal plate very small, strongly transverse, weakly triangularly produced, with lateral margins weakly convex and apex briefly and very shallowly notched. Subgeni-

tal plate very large and strongly produced, in general form scoop-shaped; distal margin strongly convex latero-proximad, then nearly straight for a decidedly greater distance to broadly convex apex.

Measurements (in millimeters).

♂♂	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen
TYPE	8.3	2.4	3.3	10.7	3.1
Paratypes (5)	8.-9.3	2.3-2.4	3.2-3.3	10.-10.3	2.8-3.
Lincoln, Nebr.	9.4	2.7	3.7	11.4	3.4
♀♀					
Allotype	8.5	2.6	3.4	10.2	3.
Paratypes (5)	9.5-10.8	2.7-2.8	3.4-3.6	9.8-10.3	3.
S. S. Tenadores (2)	10.10.2	2.9	3.7-3.8	11.1-11.3	3.4

The specimens taken away from their native habitat were almost certainly from the east coast of Central America, those from the S. S. Tenadores were taken on at either Bocas del Toro, Panama, or Limon, Costa Rica. The measurements would indicate that the species on the Isla de Cocos averages somewhat smaller than material from the mainland.

Coloration: General color warm buff[4], lateral margins of pronotum and all of the tegmina clear translucent warm buff; disk of pronotum antimony yellow, with a few slightly darker (buckthorn brown) markings and very few much darker (mummy brown) minute dots. Wings hyaline with a very slight iridescence, veins and distal cross-veinlets translucent very pale brown. Head warm buff with a very slightly darker diffused broad brown band ventrad between the eyes, a similar but much narrower band between the ocellar spots and on the face traces of two interrupted very narrow bands of the same shade. Abdomen buckthorn brown, ventrad with a large diffused dark brown marking proximad and with a dark brown dot laterad on each segment. Antennae and limbs warm buff.

Specimens Examined: 15; 7 males, 8 females.

Isla de Cocos, Costa Rica, January, 1902 (P. Biolley), 6 ♂, 6 ♀, TYPE, *allotype, paratypes,* [A. N. S. P. and Hebard Cln.]

Material adventive in United States.[5]

Lincoln, Nebraska, July 15 (introduced in bananas, probably from Central America), 1 ♂ [Hebard Cln.].

S. S. Tenadores, en route New York, N. Y., to Jamaica, October 19, 1913 (Hebard; dead in hold), 2 ♀ [Hebard Cln.]

[4] These colors are all taken from Ridgway's Color Nomenclature.

[5] In these specimens the eyes are slightly wider and the abdominal colors slightly paler than in the typical series.

Additions to Insects of New Jersey, No. 4.*

By HARRY B. WEISS, New Brunswick, N. J.

Mr. Raymond C. Osburn informs me that the genus *Tubifera* Meigen, 1800 (Dip.), has priority over *Helophilus* Meigen 1804, owing to the acceptance of the 1800 paper, so that all records under *Helophilus* in Smith's 1909 list should be placed under *Tubifera*.

Gracilaria azaleae Busck recorded in *Additions to Insects of New Jersey, No. 2* (Ent. News, vol. 26, p. 262), has been reduced to a synonym of *Gracilaria zachrysa* Meyrick.

To Mr. E. R. Sasscer and Mr. Rust I am indebted for the determination of certain scale insects and mealy bugs; to Mr. C. A. Frost for identifications made in the Coleoptera; to Mr. L. C. Bragg for the identification of *Rhopalosiphum ligustri* Kalt., and to Mr. J. A. G. Rehn for the determination of the two species recorded in the Orthoptera.

Inasmuch as it is convenient to have the references to the New Jersey fauna as complete as possible, attention is called to *Additions to the New Jersey Tipulidae (Diptera)*, by M. D. Leonard (Ent. News, vol. 24, p. 247), in which eleven species are recorded.

Order MECOPTERA.

Panorpa latipennis Hine. Hewitt, June 18 (Davis). (Bull. Brook. Soc. vol. 10, p. 109).

Panorpa subfurcata West. Ramsey, June 23, Hewitt, June 18 (Davis). (Bull. Brook. Soc. vol. 10, p. 110).

Merope tuber Newman. Chester (Dickerson). (Bull. Brook. Soc. vol. 10, p. 111).

Order THYSANURA.

Achoreutes armatum Nicolet. The Mushroom Spring Tail. Occurs in mushroom cellars in New Jersey.

Order NEUROPTERA.

Conwentzia hageni Bks. Rutherford, May 30, bred from evergreens. E. L. Dickerson.

Order HOMOPTERA.

Cicada auletes Germar. This should replace *C. marginata* Say of the 1909 list. (Jour. N. Y. Ent. Soc. vol. 23, p. 2) Davis.

* Nos. 1-3 were published in the NEWS as follows: xxvi, 101-107, March, 1915; 260-262, June, 1915; xxvii, 9-13, Jan., 1916.

Cicada pruinosa var. **latifasciata** Davis. Cape May County, Davis. This record should replace *C. pruinosa* Say in the 1909 list. (Jour. N. Y. Ent. Soc. vol. 23, p. 8) Davis.

Livia vernalis Fitch. Trenton, July 2. E. L. Dickerson.

Pachypsylla celtidis-mamma Riley. Makes leaf galls on *Celtis*. Riverton, June 25. E. L. Dickerson.

Pemphigus ulmifusus Walsh. Elizabeth. Gall on leaf of *Ulmus pubescens*. H. B. Weiss.

Aphis hederae Kalt. In greenhouses on English ivy. Not common. H. B. Weiss.

Aphis houghtonensis Troop. Riverton, on gooseberry. T. J. Headlee.

Aphis nerii Fonsc. In greenhouses on oleander. Not common. H. B. Weiss.

Aphis rufomaculata Wils. Green aphis of chrysanthemum, in greenhouses. H. B. Weiss.

Rhopalosiphum ligustri Kalt. Jersey City, July 15, on privet. H. B. Weiss and E. L. Dickerson.

Macrosiphum sanborni Gill. Black aphis of chrysanthemum, in greenhouses. H. B. Weiss.

Myzus rosarum Kalt. On roses in greenhouses. H. B. Weiss.

Aleyrodes mori Quaint. var. **maculata** Morr. Palmyra, August 6, on sweet gum. E. L. Dickerson.

Pseudococcus kraunhiae Kuwana. Rutherford, July, 1915, on *Taxus cuspidata*. Evidently introduced from Japan. H. B. Weiss.

Antonina crawi Ckll. On *Bambusa henonis* and *B. aurea*. Riverton, Aug. 6. Evidently introduced from Japan. H. B. Weiss.

Eucalymnatus tessellatus Sign. On palms in greenhouses. H. B. Weiss.

Coccus pseudohesperidum Ckll. Rutherford, South Orange, Summit, in greenhouses on *Cattleya* orchids and other greenhouse plants. H. B. Weiss.

Toumeyella pini King. Asbury Park, July 26, on pine. E. L. Dickerson and H. B. Weiss.

Aulacaspis zamiae Morg. On *Cycas revoluta* in greenhouses. H. B. Weiss.

Chrysomphalus rossi Mask. On orchids, rubber plants in greenhouses. H. B. Weiss.

Order HEMIPTERA (HETEROPTERA).

Stephanitis pyrioides Scott (*azaleae* Horv.). Rutherford, Arlington, Palmyra, Riverton, Nutley and other parts of the state. August to November. Feeds on foliage of azaleas. Originally imported from Japan. H. B. Weiss & E. L. Dickerson.

Sphaerobius quadristriata Barber. Lakehurst, July 4, Sept. 7 (Davis & Barber). (Jour. N. Y. Ent. Soc. vol. 19, p. 24).

Jalysus multispinosus Ashm. Lakehurst (Barber). (Jour. N. Y. Ent. Soc. vol. 19, p. 23).

Pseudocnemodus canadensis Prov. Lakehurst, July 11 (Davis). (Jour. N. Y. Ent. Soc. vol. 19, p. 26).

Order ORTHOPTERA.

Pycnoscelus surinamensis Linn. Rutherford, in greenhouses. H. B. Weiss.

Gryllotalpa gryllotalpa Linn. Rutherford, May, June, July, August. Lives in burrows underground and cuts off the roots of various plants. The European mole cricket, introduced from Europe. H. B. Weiss.

Order COLEOPTERA.

Molamba fasciata Say. Tenafly, June 5, in bark of maple tree. H. O. Pond.

Phaedon (Plagiodera Redt.) **versicolor** Laich. Arlington, Elizabeth, Aug. 13, Irvington, July 28. Dickerson & Weiss. Adults and larvae destructive to the foliage of poplars and willows. This is the common *P. armoricae* of Europe.

Eugnamptus collaris Fab. var. **fuscipes** Pierce. Egg Harbor, June 15. H. B. Weiss.

Eugnamptus collaris Fab. var. **nigripes** Melsh. Egg Harbor, June 15. H. B. Weiss.

Magdalis barbicornis Latr. Burlington, May. H. B. Weiss.

Ceutorhynchus affluentus Dietz. This should replace *C. rapae* Gyll. in the 1909 list as Mr. Dietz states that *C. rapae* so called is not the same as the Eureopean species of that name. C. A. Frost.

Xyleborus saxeseni. Tuckahoe, Oct. 5, in dead sugar maple. T. J. Headlee.

Order LEPIDOPTERA.

Apatela (Acronycta) afflicta Grt. Passaic, Rutherford, July 2, at light. M. H. Mead.

Hadena misera Grt. Rutherford, Aug. 3, at light. M. H. Mead.

Baileya doubledayi Guen. Passaic, May, June, at light. M. H. Mead.

Semiophora tenebrifera Wlk. Passaic, April 26. M. H. Mead.

Noctua fennica Tausher. Passaic, July 2, at light. M. H. Mead.

Euxoa redimicula Morr. Passaic, July 28, at light. M. H. Mead.

Mamestra assimilis Morr. Rutherford, July, at light. M. H. Mead.

Mamestra capsularis Guen. Passaic, May 27, at light. M. H. Mead.

Xylina baileyi Grt. Passaic, Oct. 12, at light. M. H. Mead.

Epiglaea pastillicans Morr. Lakehurst, Oct. 17. (Buchholz and Lemmer).

Orthosia lutosa Andrews. Passaic, June 30, at light. M. H. Mead.
Parastichtis discivaria Wlk. Passaic, July 31, at light. M. H. Mead.
Calymnia orina Guen. Passaic, July 13, at light. M. H. Mead.
Bomolocha deceptalis Wlk. Passaic, July 26. M. H. Mead.
Cissura spadix Cramer. Passaic, May 6, at light. M. H. Mead. Probably a visitor.
Melalopha strigosa Grt. Passaic, May 29, at light. M. H. Mead.
Schizura apicalis G. & R. Passaic, May 26, at light. M. H. Mead.
Coenocalpe magnoliata Gn. Lake Hopatcong, July 15. Lemmer.
Pinipestis zimmermanni Grt. Eatontown, Aug. 5. Larvae in terminal shoots of Austrian and other pines. H. B. Weiss.
Eois demissaria Hbn. Elizabeth, Aug. 15. Lemmer.
Orthofidonia exornata Wlk. Lyons Farms, April 29, May 2. Lemmer.
Pero marmoratus Grossb. Irvington, Aug. 10. Lemmer.
Plagodis fervidaria H. S. Passaic, April 28, May 3, at light. Mead.
Plagodis alcoolaria Gn. Passaic, May 19, at light. Mead.

Order HYMENOPTERA.

Tenthredella nortoni Smulyan. New Jersey. (Canad. Ent. vol. 47, p. 321).
Strongylogaster alboannulatus Rohwer. Brown's Mills Jc. Daecke. (Proc. U. S. Nat. Mus. vol. 43, p. 238).
Pteronus hudsonii Dyar. Rutherford, Aug. 19, Trenton, Aug. 20. Larvae on poplar. H. B. Weiss.
Acordulecera caryae Rohwer. Ft. Lee, larvae on new shoots of pignut hickory. Dyar. (Proc. U. S. Nat. Mus. vol. 43, p. 248).
Acordulecera nigritarsis Rohwer. Brown's Mills Jc., May 30, Rohwer. (Proc. U. S. Nat. Mus. vol. 43, p. 250).
Acordulecera parva Rohwer. Ft. Lee, Sept. 3, larvae on young leaves of black oak. Dyar. (Proc. U. S. Nat. Mus. vol. 43, p. 248).
Acordulecera quercus Rohwer. Ft. Lee. Larvae on young leaves of black oak. Dyar. (Proc. U. S. Nat. Mus. vol. 43, p. 251).
Diastrophus fragariae Bt. Athenia, August, E. L. Dickerson. The strawberry leaf petiole gall maker.
Spalangia muscidarum Richardson. Bred from pupae of *Musca domestica* at New Brunswick. C. H. Richardson.

Order DIPTERA.

Lasioptera corni Felt. Mountainville, Sept. 24. Dogwood leaf gall. On leaf of *Cornus paniculata*. H. B. Weiss.
Neolasioptera perfoliata Felt. Mountainville, Sept. Boneset stem gall. H. B. Weiss.

Dasyneura parthenocissi Steb. Different parts of state. Midrib gall of Virginia creeper. H. B. Weiss.

Hormomyia crataegifolia Felt. Kingston, Aug. 20. Cockscomb gall on *Crataegus* leaf. H. B. Weiss.

Hormomyia verruca Walsh. Mountainville, Sept. 24. Gall on willow leaf. H. B. Weiss.

Neocerata rhodophaga Coq. The rose midge. Found in greenhouses. Maggots in leaf and flower buds of rose. H. B. Weiss.

Phytophaga violicola Coq. The violet gall midge. Maggots curl leaves. Found in greenhouses. Not common. H. B. Weiss.

Prosimulium hirtipes Fries. College Farm, May 10. C. H. Richardson.

Hydrophorus intentus Ald. Atlantic City, May 6. Johnson. (Psyche, April, 1911, p. 51).

Eristalis arbustorum Linn. Palisade, Lakehurst, Ramsey (R. C. Osburn), Fairlawn, Sewell (E. L. Dickerson). (Jour. N. Y. Ent. Soc. vol. 23, p. 142).

Eristalis latifrons Loew. Snake Hill, July 16 (Grossbeck). (Jour. N. Y. Ent. Soc. vol. 23, p. 145).

Hypostena tortricis Coq. Cliffwood. Endoparasitic upon larvae of *Bellura obliqua.* H. H. Brehme.

Sarcophaga bullata Mans. College Farm, May 19, July 18. C. H. Richardson.

Sarcophaga dalmatina Schiner. College Farm, Aug. 21. C. H. Richardson.

Sarcophaga falculata Pand. College Farm, July 27. C. H. Richardson.

Sarcophaga scoparia Pand. College Farm, July 18. C. H. Richardson.

Sarcophaga utilis Ald. College Farm, May 25, Oct. 5. C. H. Richardson.

Ravinia communis Parker. College Farm, May 19 to Sept. 26. Also reared from cow and pig dung. C. H. Richardson.

Ravinia latisetosa Parker. College Farm, May 19 to Aug. 7. Also reared from cow and pig dung. C. H. Richardson.

Bottcheria latisterna Parker. College Farm, Sept. 28. C. H. Richardson.

Coquillettina plankii Walton. Pasadena, Aug. 8. Reared from grasshoppers. H. K. Plank. (Proc. Wash. Ent. Soc. vol. 17, p. 104).

Leptocera (Limosina) ferruginata Steub. New Brunswick, July to Sept. C. H. Richardson.

Lonchaea deutschi Zett. College Farm, July 22, Aug. 25. C. H. Richardson.

A new Cyanogomphus (Odonata).

By E. B. Williamson, Bluffton, Indiana.

(Plates VIII, IX)

Three specimens of *Cyanogomphus* have been recorded. Each is the type of a new species. The genus was established by de Selys in 1873 (Trois. Add. Syn. Gomph.) for the new species *waltheri*, known from a single male from Rio Janeiro, Brazil. Its relationships with *Epigomphus* and *Agriogomphus* were discussed and analyzed for several characters. Perhaps the most striking single character of *C. waltheri* is the remarkable shape of the tenth abdominal segment where the lower posterior border is cut out with the resulting peculiar relative positions of the bases of the superior and inferior appendages.

The second specimen was described by de Selys (Ann. Soc. Ent. Belg. xxxviii, 1894) as *C. ? demerarae*. This specimen was from Demerara, British Guiana, and unfortunately lacked the last four abdominal segments. (The text is confusing on the extent of the injury; at one place it is stated 7 segments 13 mm.; at another the 5th-10th segments lacking; in the text 6 segments are described.) The anal triangle is 2-celled, and brief mention is made of the accessory genitalia. It is much smaller than *C. waltheri* and de Selys remarks, "C'est une des plus petites Gomphines connues," adding that it will be necessary to know the abdominal appendages before deciding certainly that it belongs to the genus *Cyanogomphus*.

The third specimen is a female from Atoyac in Vera Cruz, Mexico, described by Calvert (B. C. A.) as *C? tumens*. The specific name refers to a peculiar swelling on the rear of the head above, behind the eyes "the swollen portions continuous with the occiput and extending outward and downward along each posterior eye margin to about the level of the upper surface of the frons; when the head is viewed from the side the point where the swelling ceases inferiorly is seen to coincide with a posteriorly directed obtuse angulation of the posterior eye margin." This character is not mentioned for de Selys' two species, though I believe it probably exists in both. In

tumens the most remarkable venational character, in the light of its probable relationship, is the relative position of the arculus and the proximal angle of the subtriangle—in the front wings the arculus is widely basal to the proximal angle, and in the hind wings they are about on the same level (compare with wing venation in the two species figured in this paper.) This is the only reason I see for holding the generic position of the species in doubt. It has the distal side of the triangle of the front wing straight as described for *C? demerarae*.

Cyanogomphus conchinus* n. sp. (Plates viii, ix, figs. 1, 6-11).

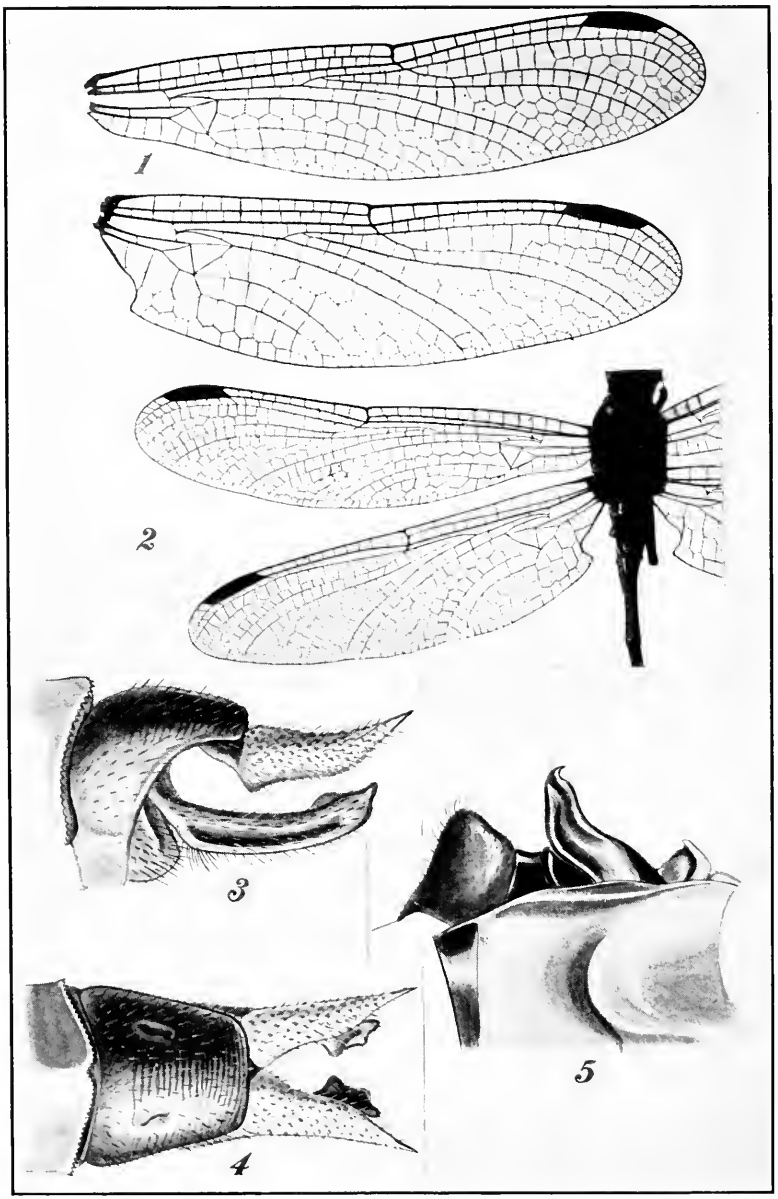
♂. Abdomen 32 mm.; hind wing 23.5 mm.

Face greenish brown, labrum slightly paler and clearer green, browner at base, extreme lower edge black or dark brown; rhinarium browner, the nasus again lighter and the frons in front darker; genae brown. Frons above, vertex and occiput obscure reddish brown; frons in front shaded greenish; antennae black; transverse keel posterior to lateral ocelli distinctly tri-lobed; occiput posteriorly straight, without a posterior keel or edge, but rounded off, with short scarcely discernible hair; occiput laterally on either side behind the eyes swollen as described by Calvert (B. C. A.) for *tumens* (see note above under that species). Rear of head reddish brown; labium dull yellow.

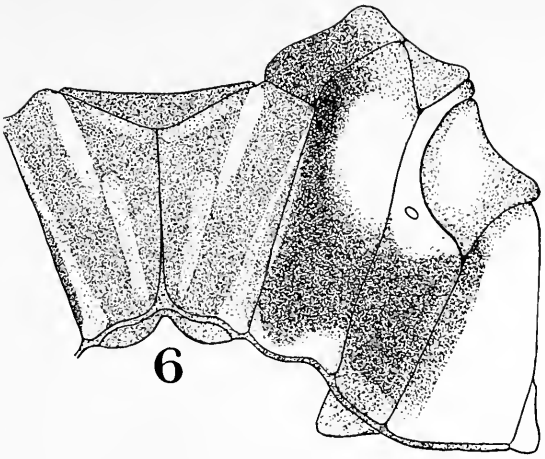
Prothorax brown, markings if any obscure.

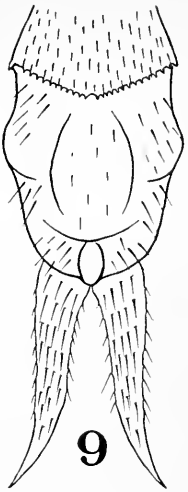
Thorax robust; above brown, on either side, starting at the antealar sinus, an obscure bluish stripe reaching about two-thirds the distance to the mesothoracic crest; its lower end just inside the upper end of a short yellow stripe which extends down on to the mesothoracic crest; a bluish or greenish obscure mesothoracic half-collar, divided at the middle and not joined, or if so very obscurely, with the yellow dorsal stripe at either extremity. An indistinct narrow pale bluish antehumeral stripe which passes below on to the humeral suture; a very narrow and more obscured posthumeral stripe of the same color. Mesepimeron black or nearly so, obscurely pale yellow over a very restricted area above, and more extensively and clearer posteriorly below. Mesinfraepisternum nearly black, paler below. Metepisternum similar to mesepimeron, but yellow below more extensive and clearer; metinfraepisternum largely yellow, brown bordered. Metepimeron broadly brown along the second lateral suture, except above where the brown shades out into yellow which occupies the balance of the sclerite. Beneath pale yellow.

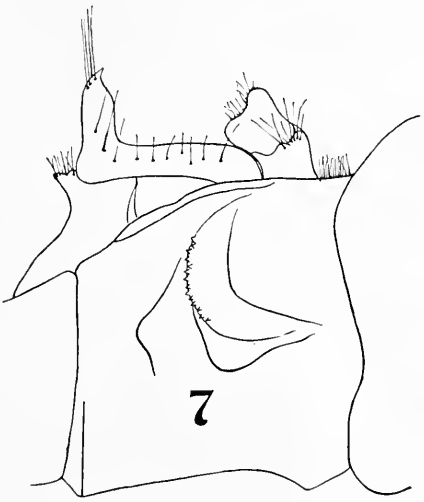
* Referring to the shell-like first hamules.

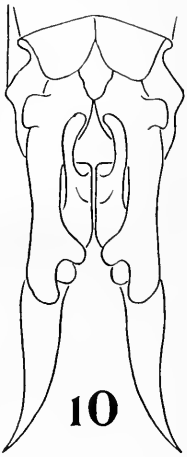


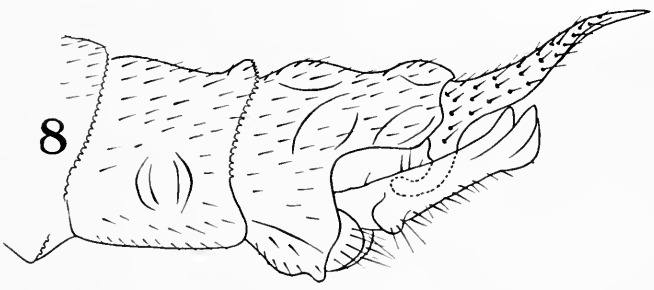
CYANOGOMPHUS CONCHINUS, 1; C. WALTHERI, 2-5.—WILLIAMSON.

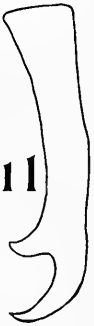












CYANOGOMPHUS CONCHINUS—WILLIAMSON.

Abdomen slender; 1 yellow, light brown above to level of the auricles, except at the extreme base which is pale; 2 similar, dorsal pale brown narrower on anterior half of segment, extreme posterior border brown on the sides as well as above; 3 brown, fading out anteriorly into clear light yellow, especially on the sides which are nearly one-half the lighter color, while on the dorsum the brown, grown very pale, reaches the anterior border of the segment; 4-7 black, bright yellow at base of each segment, where it is very narrowly divided by black in the mid-dorsal line, this black line a narrowed continuation of the apical black which occupies two-thirds to three-fourths of each segment; the yellow and black encircle each segment; 8-10 dull obscure brown without definite markings, sides slightly paler, yellowish; 7 similarly paler basally; 8-10 dark at extreme apex. Superior appendages pale dull green, black beneath and basally; inferior black or dark brown.

Stigma brown; venation black. Femora brown, first pair greenish beneath, all alike armed with numerous short equal spines; tibiae and tarsi black (right hind tibia and tarsus pale brown). First hamule and horizontal shaft of second hamule very pale brown or flesh colored, second hamule at the subapical elbow shading darker, becoming black at the apex. The hamules are both remarkable, but the first probably more so. It consists of a short cylindrical, truncated base, the inner side of which is produced in a large, thin, shell- or leaf-like expanded plate with its concave face directed outward, and its apex bilobed.

Described from a single male in my collection, taken near Wismar, British Guiana, January 31, 1912. Between Wismar and Christianburg is a small stream flowing into the Demerara River and crossed by the footpath between the two towns. In the afternoon the backward flow of the river due to tides makes this stream almost unwadable near its mouth. We were attracted to this muddy, log-choked creek by the beautiful *Diastatops dimidiata* which we found nowhere else. The banks of the creek are generally covered with impenetrable brush and the exposed margins are slippery and treacherous, due to the rise and fall of water over them. At places logs are piled so indiscriminately in the creek that progress is slow and difficult; and at places the overhanging bushes completely shade the stream. While working through one of the log piles I flushed the only *Cyanogomphus* seen, which flew weakly to a bush on the bank, alighting on a leaf at an elevation of 10 or 12 feet. The specimen is apparently young, though I believe

fully colored, and has suffered an injury at emergence, by which the fifth segment is spread out flat and bent at a right angle. Apparently the body cavity is completely separated at this point. The injury will explain its weak flight.

C. conchinus, as a comparison of the figures will show, has the peculiar characters of the genitalia and appendages of *waltheri* still more exaggerated. It is separated at once by these characters from *waltheri.* From *demerarae* it is separated at once, so far as I can judge from the description, by the sectors of the arculus less widely separated, by the convex distal side of the triangle of the front wings, and by the 3-celled, not 2-celled, anal triangle. There are some differences in the color of the abdomen, and the striking hamules of *conchinus* could hardly have escaped de Selys' notice. From *tumens* it is separated at once by the venational character mentioned above under *tumens*—the position of the arculus relative to the proximal angle of the subtriangle. *C. demerarae,* hind wing 23, is a smaller species than *waltheri,* hind wing 27, and is separated from the latter by the anal triangle, 2-celled in *demerarae,* 3-celled in *waltheri.* Apparently both are separated from *tumens* by the closely approximated sectors of the arculus of *tumens.*

In the figure of the wings of *waltheri* the cross-vein shown in the supertriangle is undoubtedly not normally present. The brace vein at the stigma is less marked in *conchinus* than in *waltheri;* in *waltheri* the sectors of the arculus are widely separated at their origin, in *conchinus* they are still separated but are very close together; *conchinus* has the proximal angle of the subtriangle more basal, relative to the arculus, than *waltheri,* which in turn has it more basal than *tumens;* in the number of distal rows of cells posterior to Cu2 in the front wings, *tumens* and *conchinus* are alike with 2 rows, *waltheri* has 3 rows; but in the hind wings *waltheri* and *tumens* have 3 rows, while *conchinus* has but 2; in *waltheri* there are 2 rows of postrigonal cells in the hind wings, and 1 row in *tumens* and *conchinus.*

The grand genre Gomphus of de Selys has long been a prob-

lem to taxonomists. De Selys in 1873, largely on the size and form of the male abdominal appendages, divided the associated genera into 2 major groups, the latter of which was divided into 5 subgroups, one of these being in turn divided into 2 groups and one of these subdivided on geographical grounds. I believe that these groupings have little basis in fact, but that two groups of real taxonomic value can probably be distinguished on the basis of the number of cross-veins between M1-3 and M4. In the larger number of genera the number is reduced in the front wings and in the hind wings there is normally only one, which is strengthened and definitely placed. In the remaining genera the number of these cross-veins is relatively larger (the complexity of venation must be taken into account), and in the hind wing there are always *two or more,* instead of one definitely placed cross-vein. These genera known to me are *Macrogomphus, Microgomphus, Leptogomphus, Epigomphus, Cyanogomphus* and *Agriogomphus* —a group of striking and remarkable forms. *Microgomphus* and *Agriogomphus* have much in common, including the unsymmetrical forking of M1-2 and M3, and the single row of cells in the anal area of the front wings; in *Microgomphus* there are two rows of postrigonal cells, one row in *Agriogomphus.* The remaining genera have a basal antenodal of the second series present in all wings. In only one, *Cyanogomphus,* has the stigma a brace vein, and in this genus alone the distal thickened antenodal is the fifth, being more distal in the others. In *Epigomphus* and *Macrogomphus* there are two cubito-anal cross-veins in addition to the inner side of the subtriangle.

To summarize, the genus *Cyanogomphus, as a member of the legion Gomphus,* may be venationally defined briefly as follows: Cross-veins between M1-3 and M4 numerous; stigma with a brace vein; M4 and Cu1 divergent; basal subcostal cross-vein of second series present; one cubito-anal cross-vein in addition to the inner side of the subtriangle; anal area of front wing proximally one cell wide, distally two or three cells wide; three postanal cells in hind wing, distal to postanal

cells two or three rows wide, two rows of postrigonal cells in front wing, one or two in hind wing; distal thickened antenodal the fifth; anal angle well developed in the male, the triangle 2- or 3-celled (the venation of *C? demerarae* known to me only from de Selys' brief description).

The figures of *C. waltheri* have been prepared for me by M. Menger at Bruxelles through the good offices of Dr. F. Ris.

Explanation of Plates VIII and IX.

All the figures are of males.

1. Wings of *Cyanogomphus conchinus*, n. sp.
2. Wings of *Cyanogomphus waltheri*.
3 and 4. Abdominal segment 10 and appendages, in profile and dorsal views, of *C. waltheri*.
5. Abdominal segment 2, in profile, of *C. waltheri*.
6. Diagram of thoracic color pattern of *C. conchinus*, n. sp.
7. Abdominal segment 2, in profile, of *C. conchinus*, n. sp.
8. Abdominal segments 9 and 10 and appendages, in profile, of *C. conchinus*, n. sp.
9 and 10. Dorsal and ventral views of abdominal appendages of *C. conchinus*, n. sp. Notice in fig. 10 the curved basal projections of the superior appendages which overlap the broadened base of the inferior; apparently the only way in which the superiors can be released is by a wide spreading in the dorso-ventral direction of the superiors above and the inferior below.
11. Tarsal claw of *C. conchinus*, n. sp.

Prof. Herbert Osborn Research Professor, Ohio State University.

The Ohio State University has recently inaugurated a plan providing for Research Professorships which enables the holders to devote their time especially to research work, and Professor Herbert Osborn has been elected Research Professor in the Department of Zoology and Entomology. He will be relieved from routine, class and department duties, devoting his time to researches, especially in the line of Entomology, but will continue to have direction of research work of graduate students in his particular field.

Notice of Disposal of Manuscripts, etc.

Manuscripts and originals of figures which have been published in the News during recent years and galley proofs of the same to and including the number for December, 1915, will soon be disposed of. Any one desiring any of these manuscripts, drawings or proofs may have such on application to the Editor, 4515 Regent St., Philadelphia, before June 1, 1916, if postage for transmission be enclosed.

Some new Species of Athysanus and Related Genera (Homoptera).

By E. D. Ball, Logan, Utah.

In working with the leaf hoppers the writer has found that the species are as a rule either confined to a single plant or else to a group of closely related plants. The few exceptions to this rule include many of our most injurious species. These forms being able to change from one plant to another are not restricted in location or season. Fortunately for us the number of these polyphagous forms is very small compared with the total number of leaf hoppers. Some of our most injurious species are on the other hand very restricted in their food habits. The grape leaf hoppers and beet leaf hoppers are examples of the latter class. The beet leaf hopper is a striking example of a rare and almost unknown insect becoming a serious pest under the influence of civilization. This insect is a native of the alkali deserts of the Southwest and was unknown until 1895. Soon after this, sugar beet raising was introduced into the region and this insect quickly transferred its affections from the desert plants of the beet family to the beets themselves, causing losses running into the millions of dollars in favorable seasons.

The writer is attempting to work out the food plants of all the leaf hoppers of the Western region, and in doing so has discovered a number of new forms that must be named before they can be included in the list.

The types of these new species are in the writer's collection.

Athysanus calvatus n. sp.

♀. Resembling *symphoricarpae*, but with a broader and much more inflated vertex and front. Straw color. Length 5 mm.

Vertex distinctly broader than in *symphoricarpae*, the apex obtusely roundly inflated, about two-thirds the length of the pronotum; front very broad, much inflated, the margins only slightly narrowing until just before the apex, where they are abruptly constricted to the clypeus. As seen in profile the apex of the front is distinctly above the clypeus and bulges so that it meets the rounding vertex margin at almost a right angle. Elytra rather long, venation simple, as in *vaccinii*, often an extra nervure or two on clavus to the suture and occasionally an extra cell in the outer anteapical, apical cells long. Female segment

moderately long, the outer angles prominent, the posterior margin with a slight median production, margins usually dark-marked.

Color: vertex bright straw, or lemon yellow, a pair of angular black spots well back of the ocelli and a pair of smaller ones behind these near the base, occasionally a trace of transverse brown band on disc. Face bright straw, sutures dark and occasionally a trace of brownish arcs on front and a pair of spots near apex. Pronotum all clear straw or dirty straw with the anterior light margin set off by dark spots. Elytra pale subhyaline straw, the nervures inclined to be lighter.

Described from four females from Logan and Richfield, Utah, collected by the writer. The inflated shining front and vertex gives this insect a distinctly "bald-headed" appearance, which is its most distinctive character.

Athysanus shastus n. sp.

Size and form of *varus,* nearly resembling *striatulus* in pattern, but with fewer markings. Stout, rusty straw with darker margins. Length 4.5-5 mm.

Vertex broad slightly roundly right-angled, with the apex narrowly acutely produced, three-fourths the length of the pronotum. Front broad not inflated, narrowing regularly into the broad clypeus. Face in profile almost flat, acutely angled with the vertex. Pronotum long, the anterior margin curving deeply into head. Elytra very broad and extending well beyond the pygofers, broadly rounding behind with short apical cells. Venation strong, resembling *arctostaphyli,* but with a large number of irregular cross nervures on clavus and occasional supernumerary cells in the outer anteapicals, second cross-nervure often present. Female segment broad, moderately long, truncate, the apical angles slightly produced, pygofers very short strongly angularly inflated. Male plates together spoon-shaped, narrowed apically.

Color: vertex dirty straw, a transverse black band just back of ocelli, another just before this broken forward in the middle, both bands inclined to be emphasized at the end and against a narrow median line which bisects them; occasionally nothing is left but these enlargements. Front black with a triangle at apex and short arcs straw color. The rest of face straw color with sutures and an oval spot on clypeus dark. Pronotum rusty straw, darkening posteriorly to a dusky cloud on disc, anterior submargin with a few irregular black marks. Elytra smoky subhyaline, the nervures light, very narrowly lined with fuscous, emphasized in the smaller cells.

Described from two females and two males from Dunsmuir, California, collected by the writer. The broad form with short inflated pygofers renders this distinct species somewhat of a connecting link between the *obsoletus* and *striatulus* groups.

Athysanus escalantus n. sp.

♀. Resembling *simplarius,* but much shorter and stouter, straw colored. The vertex margin with a black line above and below. Length 4 mm.

Vertex twice wider than long, margins almost parallel, disc flat, anterior margin between the dark lines broadly rounding to the flat, retreating front. Front rather narrow, wedge-shaped, margin continuous with the clypeus margin. Pronotum scarcely longer than vertex, distinctly narrower than the head with eyes. Elytra broad and short, just equalling the pygofers, narrowing apically. Venation deltocephaloid, the central apical cell elongate, slightly constricted, apical cells short. Female segment short, apparently truncate.

Color: vertex straw yellow, a spot on each side against the eye and just back of the margin, a pair of elongate, partly coalescing spots inside these on each side, forming a slightly interrupted sub-marginal black band. Pronotum and scutellum soiled straw color. Elytra pale greenish subhyaline showing the rusty straw of the dorsum set off by two round black spots on the pygofers. Face straw yellow, slightly tawny, a narrow dark line under the vertex margin with a black spot just below and against each eye.

Described from a single female taken at Richfield, Utah, by the writer. In its broad head this species resembles *parallelus* and its allies, but in other characters it is distinctly allied to *osborni.*

Athysanus lassus n. sp.

Resembling *sexvittatus* in size and form. Brown and white with a pair of large, round, black spots on each of vertex, pronotum and scutellum. Length 4 mm.

Vertex obtusely angled, the apex rounding, shorter than *sexvittatus,* only a little longer on middle than against eyes, two-thirds the length of the pronotum, slightly acutely angulate with the front, the margin blunt. Front broader than in *sexvittatus,* margins slightly rounding but continuous with those of clypeus. Elytra equalling or slightly exceeding pygofers, nearly parallel-margined, flaring. Venation deltocephaloid, the central anteapical slightly constricted, sometimes divided, but not extending much beyond the adjacent cells. Female segment short, lateral angles rounding, posterior margin excavated with a broad, short, median tooth. Male plates broad at base obtusely triangular, the apices acutely produced.

Color: vertex creamy, a pair of round black dots just back of the apex, a pair of large round black spots on the margin between the dots and the ocelli, sometimes another pair of black dots behind the first and often traces of brown stripes towards the base. Pronotum

milky, a pair of large, round, black spots on the anterior margin behind the two on vertex, usually two pairs of brown stripes, the inner pair arising some distance behind the eyes and curving slightly to join the inner pair just over a pair of black spots on the scutellum partly hidden by the pronotum. Elytra milky, an indistinct brown stripe on each clavus and usually two on the corium omitting the veins.

Described from two females and two males from Quincey, California, collected by the writer. The three pairs of black spots will at once distinguish this species.

Platymetopius compactus n. sp.

♀. Resembling *abruptus* and *nasutus* but broader, with the short vertex of a *brevis*. Broad, short, dark above and below. Length 4.5 mm.

Vertex scarcely longer but somewhat narrower than in *brevis*, forming a slightly sharper angle, length slightly more than the basal width, about equalling the pronotum, angle with the face about as in *brevis*, the face in profile almost straight. Elytra broad and rather short, venation normal except that the fourth apical cell is extremely wide, due partly to the first reflexed veinlet being placed far forward and partly to the extremely narrow base of the third apical which appears to be cut off by a dark marking to form a small circular cell. Female segment very short and almost truncate, disc slightly convex with the posterior margin raised, giving a concave effect.

Color-pattern of *nasutus* nearly, vertex heavily irrorate with fuscous, omitting a transverse light band before the eyes narrower and more uniform than in *nasutus*, and an ivory spot at apex. Pronotum paler, irregularly irrorate with fuscous, omitting the anterior margin. Scutellum irrorate with fuscous, omitting a pair of spots on disc and the apical margin. Elytra milky, nervures and coarse vermiculations dark, the reflexed ones margined with black. A dark irrorate cloud on clavus and in the apical cells, omitting two pairs of round spots along the sutural margin, the first apical cell, a round spot at the base of the other apicals and one in each end of the anteapicals as well as the costal margin before the middle of the fourth apical. Whole face heavily irrorate with brownish fuscous, omitting a narrow margin against the vertex and a triangle below the apex. Below dark except the disc of female segment.

Described from a single female taken at Dunsmuir, California, by the writer. The short vertex and wide apical cells will separate this from any other species.

(to be continued)

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., APRIL, 1916.

How many languages must an Entomologist know?

It would seem to one who lays no claims to successful prediction or seership that the present European conflict will retard progress toward internationalism, cosmopolitanism, the adoption of a universal language, the Parliament of Man. It will continue the effects alleged to have been caused when the Tower of Babel was checked in its upward growth and will intensify the use of its peculiar tongue by each of the many tribes inhabiting this terrestrial ball. We were never especially attracted by Esperanto and similar artificial dialects and evidently entomologists must make up their minds that they must, individually or by proxy, enlarge their acquaintance with European and Asiatic languages. We are moved to these reflections by the recent receipt of an installment of a large and ambitious monograph on the Odonata of Russia and neighboring countries, whose scope, in spite of the title, appears to be wide enough to include the description of a new species from Ohio in six lines of Latin and forty-four lines of Russian, followed by twenty-one lines of comparative notes, also in Russian. To be sure there are two figures of details, but——

We blame neither the Russians nor the Japanese for using their own vernaculars; we do the same. But the languages of science are a heavy burden to us whose memories balk at the acquisition of words utterly unlike those of western Europe in form and spelling.

A Dipterous Larva Parasitic in Earthworms.

At the meeting of the Biological Society of Washington, Dec. 4, 1915, Dr. L. O. Howard called attention to the cluster-fly (*Pollenia rudis*), an insect resembling the house-fly but collecting in houses in autumn and leaving a yellow stain when crushed. Its life history was unknown until recently a foreign entomologist has shown that the larvae are parasitic in earthworms in France. Dr. Howard is having large numbers of earthworms examined for such larvae, but so far without success. He hoped that anyone finding any grub parasitic in earthworms would communicate with him. (*Science*, March 3, 1916, p. 330).

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

New Muscoid Genera (Dip.).

The characters of the following new genera are given in a paper which has been submitted for publication, but which will be considerably delayed:

Myocerops gen. nov.—Genotype, *Musca carinifrons* Fall.—Europe.

Sumichrastia gen, nov.—Genotype, *Hystrichodexia aurca* Gig.-Tos—Mexico.

Pilatea gen. nov.—Genotype, *Masicera celer* Coq.—Louisiana.

Masiceropsis gen. nov.—Genotype, *Masicera pauciseta* Coq.—So. California.

Cnephalogonia gen. nov.—Genotype, *Gonia distincta* H. E. Smith—Connecticut.

Dichoceropsis gen. nov.—Genotype, *Dichocera orientalis* Coq.—Massachusetts.

Megistogastropsis gen. nov.—Genotype, *Megistogaster wallacei* BB.—East Indies.

Pseudoservillia gen nov.—Genotype, *Echinomyia flavopilosa* Big.—Java.

Sericotachina gen. nov.—Genotype, *Paratachina vulpecula* Wulp—W. Java.

Eutheropsis gen. nov.—Genotype, *Euthera mannii* Mik—So. Europe.

Gerocyptera gen. nov.—Genotype, *Trichoprosopa marginalis* Walk.—Amboyna.

CHARLES H. T. TOWNSEND, Washington, D. C.

What the House Fly Did.

Last year our class in Zoology began a campaign against the fly. We started out with the idea that advertising would be our main means of getting the campaign started, and we were right, for very soon the campaign seemed to fairly take care of itself. Students from the class made speeches before all the Patrons' Clubs in the city during the month of February. One of our prominent daily papers promised to print everything we handed in on the subject. The class working together wrote weekly articles that were spicy and interesting. These attracted such attention that other papers demanded articles on the house fly. An insurance company requested that they be allowed to print pictorial posters on the subject, and that these be distributed about the city. The Electric Company asked to be allowed to give away fly swatters. One of the local theatres presented moving pictures of the fly, especially for the school children. Later the various clubs of the city asked to be represented in the movement. Finally a federation of clubs was formed to make this campaign an annual event. But right here is where disaster came to the enterprise, for the work of last year at least. Two factions arose, each demanding that certain officers be elected and certain policies be carried out. The feeling waxed so strong that when officers were finally elected, and policies were finally presented, everyone was far too angry to carry out anything. This smacks somewhat of other campaigns in our national affairs where very little is accomplished for the general good. This all goes to show that even though the teacher interests the parents most keenly, the parents are harder to work with than the children.—NETTIE COOK in *School Science and Mathematics*, XV, 146. February, 1915.

The Unusual Prevalence of Ground Beetles (Harpalus) During the Summer of 1913, at Ashland, Ohio. (Col.).

While in Ashland, Ohio, during the summer of 1913, the writer observed that there was a rather unusual number of the common ground beetles, mainly *Harpalus pennsylvanicus* and its near relatives, and a few specimens of what appeared to be *Diplochila major,* to be found under stones, bark, etc., in the surrounding country. Small stones would frequently hide a dozen or more, often representing one insect to every two square inches of ground covered by the stone. Unusual frequency in the city of Ashland was not noted until about a week after this observation; then one evening about the first of August, swarms of the insects appeared around the arc-lamps in the business part of the city, and during the following two evenings spread to the other sections. The house at which the writer was staying was about a quarter of a mile from a wooded patch of a few acres, and about seventy-five feet from an arc-lamp, the latter being the last one out in the direction of the woods. On the second evening of prevalence the insects struck this section of the city, and the arc-lamp near the house was the center of a swarm. The side of the house illuminated most strongly by the arc had hundreds of the beetles running over it, and for perhaps an hour the sound of them alighting on the walls, floor and tin roof of the front porch was suggestive of rain or scattered hail. Parties out for automobile rides were forced to return on account of the inconvenience produced by the number of beetles flying about. The writer attempted to walk up the road toward the wooded path (going away from the arc-lamp), but the insects were encountered in such numbers coming toward the arc, that after going only a few hundred feet and extracting several beetles from his hair and collar, he decided that discretion was the better part of valor, and returned to the house.

After the third evening of unusual prevalence, the number of these beetles seemed to diminish rather suddenly, and while quite common, they did not appear in excessive numbers during the rest of the writer's stay, to August 17th. It is reported that the insects were very plentiful also in the Pittsburgh district about the same time. The only unusual condition which seems to have prevailed in the places where these swarms were noted, was the heavy rains and following floods in March previous; the Ohio district had also had a very heavy rain and flood on the 13th of July, previous. That the flood conditions should admit of an abnormal number of these insects coming to maturity does not seem probable, or at least the connection is not very clear at this time. The writer was again in this town during about the same period of 1915, but there was nothing resembling what had occurred during 1913, nor was there any report of similar conditions during 1914. The summer season of 1915 was very rainy in this locality.

F. Alex. McDermott, Washington, D. C.

The Biota of Nantucket.

For a number of years past Mr. Eugene P. Bicknell has been publishing in the Bulletin of the Torrey Botanical Club a series of papers on the vascular plants of Nantucket, in which he has brought out a number of very interesting facts. Intensive study has not only yielded much of interest in connection with distribution, but has brought to light a number of new species, belonging to such genera as *Amelanchier, Ilex,* etc., conspicuous members of any Flora. It can hardly be doubted that a similar study of the animals, and particularly the insects, would yield like results. Sorting over some material which I collected on Nantucket several years ago, I found some species which it may be worth while to record.

Hymenoptera (bees): *Halictus capitosus* Smith, ♀, smaller than usual; *H. pilosus* Smith, ♀.

Neuroptera: *Chrysopa harrisi* Fitch, det. Banks.

Araneina (Spiders, all very kindly determined by Mr. N. Banks): *Epeira pratensis* Hentz, *E. trivittata* Keys., *Zilla atrica* Koch, *Plectana stellata* Hentz, *Theridium frondeum* Hentz, *Ceratinella emertoni* Cambridge, *Agelena naevia* Walck., *Clubiona* sp., juv., *Xysticus triguttatus* Keys., *Phidippus podagrosus* Hentz.—T. D. A. Cockerell, Boulder, Colorado.

The Cactus-feeding Volucellines (Dip.).

South Coronado Island (Lower California) is extensively overgrown with cactus, apparently *Opuntia littoralis.* When my wife and I visited the island on Aug. 21, we found what appeared to be a single variable species of Volucelline fly very abundant. Several were collected, and on examination prove to represent two genera and species, namely *Volucella avida* O. S. and *Copestylum marginatum* Say. At Boulder, Colorado, July 19, I collected a superficially similar insect (more like the *Copestylum* than *V. avida*) at flowers of *Helianthus annuus*; this is *Volucella fasciata* Mcq., a variety with dark reddish antennæ. On looking up the literature, I find that all these three insects feed in the larval state on cacti. They form a peculiar group, and in all respects appear to be closely related, except for the extraordinary antennæ of *Copestylum.* The latter genus surely evolved from *Volucella,* but who can say how the change came about, or what purpose it serves? There was, so far as we know, no change in habits. One is reminded of certain strange modifications of the antennæ of chrysomelid beetles, produced by Professor Tower under experimental conditions at Chicago, and wholly without functional significance, so far as we can learn. One of the females of *V. avida* from S. Coronado is quite small, no larger than *V. fasciata.*

The *Atriplex* bushes on S. Coronado carried many galls, doubtless belonging to *Asphondylia atriplicis* Twns., as no difference was apparent.—T. D. A. Cockerell, Boulder, Colorado.

Proportion of the Sexes in Uloborus geniculatus Walck., with a Few Notes (Arach., Aran.).

The collections tabulated below were made in a single dwelling house in Nelson (Cairns), Queensland, Australia. The sex in the young is recognizable after one or two molts, but the very young were ignored. The individuals were killed after being recorded.

Dates	MALE			FEMALE		
	Adult	Young	Total	Adult	Young	Total
April 26, 1913	17	22	39	49	19	68
May 1, "	16	19	35	58	28	86
May 20, "	4	3	7	10	9	19
May 23, "	8	25	33	15	58	73
June 2, "		3	3		8	8
Sept. 27, "	10	5	15	6	31	37
Oct. 14, "	13	3	16	55	42	97
Dec. 8, "	1		1	10	11	21
" 22, "	1		1	4	5	9
" 27, "	1	3	4	3	2	5
May 5, 1914	1	1	2	5	1	6
" 23, "	3	12	15	13	22	35
Totals	75	96	171	228	236	464

Out of 635 individuals 171 were males, or about 27 per cent., less than a third. In 303 adults, 75 or about 24 per cent. were males; 96 males occurred in 332 young, or 28 per cent. Males appear to be more numerous when young.

I haven't any notion how mating occurs with this species, but the sexes from an early age inhabit separate nests and the males being less numerous, cannot be wasted. The males differ in coloration, but on account of their scarcity, wastage in sexual selection would seem poor economy. Yet, one selected male might fertilize many females and more than offset any wastage.

The egg-sacs of this species are of a lilac color and star-shaped, one side flat, the other conically raised centrally into a blunt cone or nipple. There may be from five to eight points to these star-shaped sacs and some of the points are occasionally bifid at apex. When just hatched the young spiders are white, with lilac abdomens. The young escape from the sac through a single hole. The eggs are white, gradually turning to lilac when the embryo is perfect. All females do not make their egg-sacs alike, for in one nest three sacs were found bearing 6, 7 and 8 points, respectively.

The young can live considerable periods without food. Six of them isolated from birth lived 20, 23, 30 and 34 days. Six others lived in this manner, 27, 29 and 32 days. Two adult females taken when feeding and kept without food, lived slightly over a month. The egg stage is about eleven days (one case).—A. A. Girault, Washington, D. C.

Note on use of antennae in Collops vittatus. (Col.: Malachiidae).

Dr. George H. Horn described* the structure of the curiously modified second (or as he says really the third) segment of the antennae in males of the genus *Collops* in 1870, and assumed their function to be grasping the female antenna during copulation. Another use to which they certainly are put appears from an incident observed by the writer on Plummer's Island, Maryland, on July 7, 1912. A male and female of *Collops vittatus* (Say) were found on a leaf over the surface of which they advanced and retreated, constantly maintaining a head-to-head contact. Upon close inspection, it was seen that the female had her mandibles widely spread and that the tips of them rested in depressions in the anterior surfaces of the modified antennal joints of the male, the antennae of the latter being held straight out in front and approximately parallel. If one of the pair retreated, the other followed, preserving the relation of the parts as described. They were also observed to separate and to resume the same posture. This behavior probably is a mating ceremony, and may perhaps be properly regarded as a Collopid soul-kiss.—W. L. McAtee, Washington, D. C.

Additional Iowa Pentatomoidea (Hem., Heter.).

During the past two years the writer has indicated from time to time some Pentatomids that have not before been recorded within the borders of the State. As a partial result of collecting done during the past summer the following additions to the State fauna may be given at this time.

Cydnus obliquus Uhler. This fine Cydnid, which commonly occurs in the western States and which has recently (1910) been recorded from Nebraska by Zimmer, was found in some numbers in a sand area near the Iowa River, two miles north of Iowa City. All the specimens collected were found among the roots of a Rush Grass, *Sporobolus cryptandrus* (Torr.) Gray, which grows in considerable abundance in this small uncultivated area. In two instances, four individuals were found about the roots of a single plant, but usually not more than one or two were found under one plant. None of the bugs were observed on the open sand. On May 31 a pair of these bugs was found in copula. Thirty-six specimens are at hand, collected in May and November.

Euschistus tristigmus var. *pyrrhocerus* H. S. This variety seems much less common than the typical *tristigmus* Say. Five Iowa specimens, collected in August and November at Iowa City and Solon, are at hand. The specimens collected in August were taken on wild raspberry; those in November from under dried leaves. All five specimens have the antennae entirely pale, the humeri spinose and average somewhat smaller than *tristigmus*.

*Trans. Am. Ent. Soc. III, p. 80, June, 1870.

Prionosoma podopioides Uhler. Two specimens of this western species have been taken in Iowa. One was collected in June at Ft. Madison, near the extreme southeastern corner of the State. The immediate region bordered a wooded area and was somewhat sandy and overgrown with rank weeds. Later in the season, October, a second specimen was found under the leaves of a mullein plant in a cultivated sand area near Iowa City.—Dayton Stoner, State University of Iowa, Iowa City, Ia.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded. The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of systematic papers are all grouped at the end of each Order of which they treat, and are separated from the rest by a dash.

Unless mentioned in the title, the number of new species or forms are given at end of title, within brackets.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London.

For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

1—Proceedings, The Academy of Natural Sciences of Philadelphia. **2**—Transactions, American Entomological Society, Philadelphia. **3**—The American Naturalist. **4**—The Canadian Entomologist. **5**—Psyche. **8**—The Entomologists's Monthly Magazine, London. **9**—The Entomologist, London. **11**—Annals and Magazine of Natural History, London. **12**—Comptes Rendus, L'Academie des Sciences, Paris. **13**—Comptes Rendus, Societe de Biologie, Paris. **16**—Bulletin, Societe Nationale d'Acclimation de France, Paris. **18**—Ottawa Naturalist. **37**—Le Naturaliste Canadien, Quebec. **68**—Science, New York. **153**—Bulletin, The American Museum of Natural History, New York. **166**—Internationale Entomologische Zeitschrift, Guben. **179**—Journal of Economic Entomology. **195**—Bulletin, Museum of Comparative Zoology, Cambridge. **200**—Bulletin Scientifique de la France et de la Belgique, Paris. **216**—Entomologische Zeitschrift, Frankfurt a. Main. **267**—Memorias, Real Sociedad Espanola de Historia Natural, Madrid. **285**—Nature Study Review, Ithaca, N. Y. **313**—Bulletin of Entomological Research, London. **336**—Board of Agriculture, Trinidad. **344**—U. S. Department of Agriculture, Washington, D. C. **394**—Parasitology, Cambridge, England. **401**—Catalogue of the Lepidoptera Phalaenae

in the British Museum, London. **411**—Bulletin, The Brooklyn Entomological Society. **447**—Journal of Agricultural Research, Washington. **479**—Washington University Studies, St. Louis. **522**—Association Francaise pour l'Avancement des Sciences.

GENERAL SUBJECT. Bagnall, R. S.—A note on Mr. Walsh's observations on the survival, etc., of insects, **8,** 1915, 267. **Blaisdell, F. E.**—Minutes of meetings of Pacific Coast Entomological Society, 12 pp. **Herrick, C. W.**—The need of a broad, liberal training for an economic entomologist, **179,** ix, 15-23. **Loyer, M.**—L'Exposition internationale d'insectes vivants, de poissons...., **16,** 1915, 355-65. **Russell, F. W.**—Obituary notice, **5,** 1916, 25. **Webster, F. M.**—Obituary by S. A. Forbes, **179,** ix, 239-41. **Zukowsky, B.**—Insekten und blüten, **166,** ix, 119-20.

PHYSIOLOGY AND EMBRYOLOGY. Dehorne, A.—Sur les chromosomes de "Corethra plumicornis" (Dipteres Nemocere), **522,** 1914, 527-9. **Fernandez-Nonidez, J.**—Los cromosomas goniales y las mitosis de maduracion en Blaps lusitanica y B. Waltli, **267,** x, 149-87. **Lecaillon, A.**—Sur la ponte des oeufs non fecondes et sur la parthenogenese du Bombyxae du murier (Bombyx mori), **12,** clxii, 234-6. **Wenrich, D. H.**—The spermatogenesis of Phrynotettix magnus, with special reference to synapsis and the individuality of the chromosomes, **195,** lx, 57-133.

MEDICAL. Shircore, T. O.—A note on some helminthic diseases with special reference to the house fly as a natural carrier of the ova, **394,** viii, 239-43. **Townsend, C. H. T.**—Recent questioning of the transmission of Verruga by Phlebotomus, **313,** vi, 409-11.

ARACHNIDA, ETC. Cummings, B. F.—Note on the thorax in Anoplura and in the genus Nesiotinus of the Mallophaga, **11,** xvii, 171-4. **Dow, R. P.**—The weaver of the web, **411,** 1911, 6-10.

Nuttall, G. H. F.—Relating to the genus Ixodes and including a description of three n. sps. and two var., **394,** viii, 294-337.

NEUROPTERA, ETC. Howe, R. H., Jr.—A preliminary list of the Odonata of Concord, Mass., **5,** 1916, 12-15. **Patch, E. M.**—A Psyllid gall of Juncus (Livia maculipennis), **5,** 1916, 21-2. **Snyder, T. E.**—Termites, or "white ants," in the U. S.; their damage, and methods of prevention, **344,** Bul. 333.

ORTHOPTERA. Urich, F. W.—Locusts or grasshoppers, **336,** Bul. XIV, 120-28.

Rehn & Hebard—Studies in American Tettigoniidae, VII. A revision of the species of the genus Atlanticus (Decticinae) [1 new], **2,** xlii, 33-100.

HEMIPTERA. Baker & Turner—Morphology and biology of the green apple aphis, **447,** v, 955-93. **Leonard, M. D.**—The immature stages of Tropidosteptes cardinalis (Capsidae), **5,** xxiii, 1-3. **Paddock, F. B.**—Observations on the turnip louse (Aphis pseudobrassicae), **179,** ix, 67-71. **Parker, J. R.**—The western wheat aphis (Brachycolus tritici), **179,** ix, 182-7. **Patch, E. M.**—Concerning problems in aphid ecology, **179,** ix, 44-51. **Rosen, H. R.**—The development of the Phylloxera vastatrix leaf gall, **68,** xliii, 216-7. **Weiss, H. B.**—The Coccidae of New Jersey green-houses, **5,** 1916, 22-4. **Whitmarsh, R. D.**—Life-history notes on Apaleticus cynicus and maculiventris, **179,** ix, 51-3.

Abbott, J. F.—A biological reconnaissance of the Okefeenokee swamp in Georgia. The Corixidae [4 n. sps.], **479,** ii, 81-6.

LEPIDOPTERA. Ainslie, G. G.—Notes on Crambids, **179,** ix, 115-119. **Briggs, F. J.**—Means of expansion of wings of L., **9,** 1916, 38-39. **Brittain & Gooderham**—An insect enemy of the parsnip (Depressaria heracliana), **4,** 1916, 37-41. **Felt, E. P.**—Climate and variations in the habits of the codling moth, **179,** ix, 107-110. **Gerould, J. H.**—Mimicry in butterflies, **3,** l, 184-192. **Hoffmann, F.**—Das ei von Vanessa antiopa, **216,** xxix, 86. **Keith, E. D.**—The dance of the ghost moth (Hepialus argenteomaculatus), **411,** 1916, 21-2. **Meder, O.**—Gibt es geschlechtsunterschiede bei schmetterlingseiern, **166,** ix, 118-119.

French, G. H.—A n. sp. of Catocala, **4,** 1916, 72. **Hampson, G. H.**—Catalogue of the Amatidae and Arctiadae (Nolinae and Lithosianae) in coll. of Br. Mus., **401,** Suppl. Vol. I, 858 pp. **Wolley Dod, F. H.**—Noctuid notes from western Canada, with descriptions of two n. sps. and a variety, **4,** 1916, 58-70.

DIPTERA. Fitzsimons, F. W.—The house fly: a slayer of men, 89 pp. (Longmans, Green & Co.). **Guppy, P. L.**—Breeding and colonizing the Syrphid, **336,** Bul. xiii, 217-26. **Hodge, C. F.**—Control of flies as a nature study problem, **285,** 1916, 79-95. **Hyslop, J. A.**—The host of Zelia vertebrata (Dexiidae), **5,** 1916, 24-5. **Keilin, D.**—Recherches sur les larves de dipteres cyclorhaphes, **200,** xlix, 25-198. **Lagendre, J.**—Sur un nouveau mode de transport des larves de moustiques, **13,** lxxix, 26-7. **Schoene, W. J.**—The economic status of the seed-corn maggot (Pegomya fusciceps); Notes on the biology of P. brassicae, **179,** ix, 131-3; 136-9.

Alexander, C. P.—New or little-known crane-flies from the U. S. and Canada: Part 2 [many species], **1,** 1915, 458-514. New nearctic crane-flies (Tipulidae) [11 new], **4,** 1916, 42-53. A biological reconnaissance of the Okefeenokee swamp in Georgia. The Tipulidae

[1 n. sp.], **479,** ii, 97-8. **Cresson, E. T., Jr.**—Studies in American Ephydridae. 1. Revision of the species of the genus Paralimna, **2,** xlii, 101-124. **Lutz, A.**—Commissao de Linpas Telegraphicas Estrategicao de Matto Grosso ao Amazonas. Annexo No. 5. Hist. Nat. Zool. Tabanideos, 9 pp. **Malloch, J. R.**—A new gen. & sp. of Helomyzidae, **411,** 1916, 14-16. **Townsend, C. H. T.**—New and noteworthy Brazilian Muscoidea collected by H. H. Smith, **153,** xxxv, 15-22. **Van Duzee, M. C.**—A biological reconnaissance of the Okefeenokee swamp region in Georgia. The Dolichopodidae [5 n. sps.], **479,** ii, 87-96.

COLEOPTERA. Davis, A.—The genus Pleocoma, **411,** 1916, 11-12. **Dow, R. P.**—Note on Psenocerus supernotatus, **411,** 1916, 20. **Germain, F.**—Buprestidae known to occur in the Ottawa district, **18,** xxix, 129-30. Histerides capturés a Ottawa et dans les environs, **37,** xlii, 103-5. **Hayes, W. P.**—A study of the life-history of the maize bill-bug (Sphenophorus maidis), **179,** ix, 120-130. **Herrick, G. W.**—Observations on the life history of the cherry leaf beetle, **447,** v, 943-9. **Hyslop, J. A.**—Prothetely in the Elaterid genus Melanotus, **5,** 1916, 3-6. **Johnson & Ballinger**—Life history studies of the Colorado potato beetle, **447,** v, 917-25. **Lameere, A.**—Les caracteres sexuels secondaires des Prionides, **200,** xlix, 1-14. **Walsh, G. B.**—Observations on some of the causes determining the survival and extinction of insects with special reference to the C. (cont.), **8,** 1915, 257-61. **Sell, R. A.**—A migration of beetles, **285,** 1916, 55-6.

Casey, T. L.—A new sp. of Baryodma, **4,** 1916, 70-1. **Fall, H. C.**—Three new C. from Washington state, **411,** 1916, 13-14. **Hyslop, J. A.**—Elateridae and Throscidae of the Stanford University expedition of 1911 to Brazil, **5,** 1916, 16-21. **Leng, C. W.**—A list of the families of C. in America north of Mexico, **411,** 1916, 1-5.

HYMENOPTERA. de la Baume-Pluvinel, G.—Sur les formes larvaires de certains Hymenopteres parasites internes des larves de Dipteres, **522,** 1914, 510-14. **Howard, L. O.**—Further notes on Prospaltella berlesei, **179,** ix, 179-81. **McColloch & Hays**—A preliminary report on the life economy of Solenopsis molesta, **179,** ix, 23-38. **Wheeler, W. M.**—[Review of] British ants, their life-history and classification by Donisthorpe, **68,** xliii, 316-18.

Cockerell, T. D. A.—The bees of the Coronado Islands [3 new], **4,** 1916, 54-58. Two new bees from New Jersey, **411,** 1916, 11. **Gaige, F. M.**—The Formicidae of Charity Island, Lake Huron, **507,** No. 5, 29 pp. **Wheeler, W. M.**—Ants collected in British Guiana by the expedition of the American Museum of Natural History during 1911, **153,** xxxv, 1-14.

Doings of Societies.

American Entomological Society.

Meeting of December 13th, 1915, at the Academy of Natural Sciences, Philadelphia. Seven persons present. Dr. Philip P. Calvert, President, in the chair.

The annual reports of the Treasurer, Librarian, Curator and Corresponding Secretary were read and ordered filed.

The death of Charles Kerremans, a corresponding member, was announced.

A new Agreement with the Academy of Natural Sciences of Philadelphia was adopted and the President and Recording Secretary authorized to sign the same. It was voted that House of Representatives bill no. 528, to discontinue the use of the Fahrenheit scale thermometer in Government publications, be endorsed. Dr. Witmer Stone was proposed for membership in the Society. Mr. R. C. Williams, Jr., and Prof. Clarence E. McClung were elected members.

The following were elected officers for the ensuing year: *President,* Henry Skinner; *Vice President,* J. A. G. Rehn; *Treasurer,* E. T. Cresson; *Curator,* Henry Skinner; *Corresponding Sec'y,* Morgan Hebard; *Recording Sec'y,* R. C. Williams, Jr.; *Librarian,* E. T. Cresson, Jr. *Executive Committee,* Philip Laurent, D. M. Castle and H. W. Wenzel; *Finance Committee,* J. A. G. Rehn, D. M. Castle and Morgan Hebard; *Publication Committee,* J. A. G. Rehn, E. T. Cresson and P. P. Calvert.—Henry Skinner, *Recording Sec'y.*

Feldman Collecting Social.

Meeting of December 15, 1915, at the home of H. W. Wenzel, 5614 Stewart St., Philadelphia. Ten members present; Pres. H. A. Wenzel in the chair.

Coleoptera—Mr. H. W. Wenzel said it was surprising that a very large insect could remain in collections for years wrongly identified but such is the case with what we have known as *Cotinis mutabilis* Gory. Col. Casey, in his Memoirs, vi, has pointed out that this species never reaches as far north as the United States and our form is really two species which he describes as new: *arizonica* with narrow yellow margin and *texana* with half yellow elytra.

Adjourned to the annex.

Meeting of January 19, 1916, at the same place. Eleven members present; Pres. Wenzel in the chair.

The present officers were re-elected to serve for 1916.

Coleoptera—Mr. Daecke exhibited a specimen of *Soronia ulkei* LeC. from Rockville, Pennsylvania, v-14-'11. Mr. Wenzel has a specimen from the District of Columbia and H. A. Wenzel has collected it

at Tybee Island, Georgia. There are several records from New Jersey —Ins. N. J., p. 273, 1910. Mr. H. W. Wenzel said the only specimen he had seen of *Buprestis connexa* Horn was the type in the Horn Collection, but recently he had received a specimen labeled Corvallis, Oregon, collected by G. F. Moznetti; this was exhibited.

Hymenoptera and Coleoptera—Mr. Kaeber exhibited *Liopus fascicularis* Harr. bred from sumac collected at Clifton, Delaware County, Pennsylvania, v-23-'15. The *Liopus* began emerging May 27 and continued to about June 2. The first parasite noticed was on June 2 and continued emerging for about one week. Of all the specimens reared about 15 per cent. were parasites; these were identified by Mr. Rohwer as *Capitonius ashmeadii* D. T.

Adjourned to the annex.

GEO. M. GREENE, *Sec'y*

Chicago Entomological Club.

Meeting of December 19, 1915, at home of Charles Krueger. Fifteen members present.

Coleopterists had as a subject the families Endomychidae and Erotylidae. Notable among local captures reported were *Rhymbus minor* Crotch, *Rhanis unicolor* Ziegl., *Phymaphora pulchella* Newm., *Mycetina perpulchra* Newm., *Stenotarsus testaceus* Ziegl., *Langura uhlerii* Horn, *Mycotretus sanguinipennis* Say and *Tritoma mimetica* Crotch. Mr. A. B. Wolcott also exhibited the type of *Symbiotes duryi* Blatchley, described in 1910 in *The Coleoptera of Indiana.* The same species was later re-described as new by Mr. L. B. Walton in *The Ohio Naturalist,* Vol. XII, p. 463 (Feb. 1912) under the same name, giving locality as Gambier, Ohio, and making no mention of the real type locality, Lafayette, Indiana.

Lepidopterists had the Notodontidae as a subject, local captures reported (other than *Datana* and *Melalopha*) being as follows:

Apatelodes torrefacta
" *angelica*
Hyperaeschra stragula
" *georgica* (rare)
Odontosia elegans
Notodonta simplaria (1 A. Kwiat)
Pheosia dimidiata
Lophodonta angulosa
Nadata gibbosa
Nerice bidentata
Symmerista albifrons
Heterocampa obliqua
" *biundata*
" *guttivitta*
" *bilineata*
Ianassa lignicolor
Schizura ipomoeae
" *telifer*
" *cinereofrons*
" *semirufescens*
" *unicornis*
" *badia*
" *leptinoides* (rare)
Hyparpax aurora
Cerura multiscripta (1 E. Beer)
" *occidentalis*
Harpyia borealis (rare)
" *cinerea*
" *scolopendrina* (rare)
Fentonia marthesia (1 A. Kwiat)
Gluphysia septentrionalis
Ellidia caniplaga

Meeting of January 16, 1916, at home of Mr. Frank Psota. Sixteen members present.

Coleopterists reported 44 species of Histeridae as having been taken locally. Mr. Wolcott showed the type of *Saprinus illinoisensis* and also a gigantic species of the same genus, the description of which, he stated, will soon appear.

Lepidopterists exhibited their specimens of Liparidae and allied species, local captures reported being as follows:

Habrosyne rectangula
Pseudothyatira cymatophoroides
" *expultrix*
Orgyia leucostigma
Parorgyia plagiata (Fox Lake, Illinois. A. Kwiat)
Tolype velleda
" *laricis* (Millers, Indiana. E. Liljeblad)
Malacosoma americana
" *disstria*
Heteropacha rileyana (C. Krueger)
Gastropacha americana
Eudeilinea herminiata
Oreta rosea
" *marginata*
" *irrorata* (2 A. Kwiat)
Drepana arcuata
" *genicula*

A. KWIAT, *Secretary.*

Newark Entomological Society.

Meetings held in Newark, New Jersey, Public Library, December 12, 1915, and January 9, 1916. Pres. Buchholz in chair; average attendance, 11 members. At the December meeting, the following officers for 1916 were elected: *Pres.*, Otto Buchholz; *Vice-Pres.*, Henry H. Brehme; *Sec.*, H. B. Weiss; *Fin. Sec.*, T. D. Mayfield; *Treas.*, G. J. Keller; *Librarian*, Louis Doerfel; *Curator*, Chas. Rummel; *Trustee*, Geo. Stortz. At the January meeting, Mr. Herman H. Brehme read a paper on Collecting at Morgan, New Jersey, during 1915.

Lepidoptera—At the December meeting, Mr. Rummel exhibited *Lycaena pseudargiolus* (*ladon* Cram.) taken May 14 and the forms *lucia* Kirby, *marginata* Edw., *violacea* Edw., taken from April 16 to July, and also *Nonagria oblonga* Grt., all from Montclair, New Jersey. At the January meeting, Mr. Lemmer recorded the following captures in New Jersey; *Glaea inulta* Irvington, Oct. 21; *Epiglaea pastillicans* Morr., Lakehurst, Oct. 17, (Buchholz and Lemmer); *E. tremula* Harv., Lakehurst, Oct. 17, (Buchholz and Lemmer); *E. apiata* Grt., Lakehurst, Oct. 18; *Coenocalpe magnoliata* Gn., Lake Hopatcong, July 15; *Eois demissaria* Hbn., Elizabeth, Aug. 15; *Orthofidonia exornata* Wlk., Lyons Farms, April 29, May 2; *Pero marmoratus* Grossb., Irvington, Aug. 10; *Homochlodes fritillaria* Gn., Irvington, July 27, Aug. 12. Mr. Weiss exhibited Japanese postal cards decorated with *Colias hyale* L., *Radena vulgaris* Butl., and *Junonia lemonias* L., the color and markings having been transferred perfectly to the cards.

Hemiptera—Mr. Weiss exhibited specimens of *Stephanitis*

pyrioides Scott (*azaleae* Horv.) which is firmly established in different parts of New Jersey and which feeds on the foliage of hardy azaleas, this species having been introduced from Japan; also *Leptoypha mutica* Say which was taken in large numbers while feeding on the fringe plant during the past summer at Hammonton, New Jersey. This species is recorded as rare in Smith's list.

HARRY B. WEISS, *Rec. Secretary.*

A New Entomological Club.

Editor of Entomological News:—I wish to call to your attention the formation of the "Boston Entomological Club." Meetings are held on the second and fourth Tuesdays of each month at 8 o'clock P. M. at the home of Prof. William Reiff, 366 Arborway, Jamaica Plain, Massachusetts. Although an entomological club we are especially interested in the collection of Lepidoptera. Entomologists visiting Boston will be welcomed at the Club meetings. At the annual meeting the following were elected officers for the coming year: Rudolph C. B. Bartsch, president; W. F. Eastman, vice president; E. F. Knight, secretary; H. J. Law, treasurer; Prof. William Reiff, superintendent of sales; Ernst Grebner and Nathaniel Stowers, members at large.—E. F. KNIGHT, *Secretary*, 9 Fairfield St., North Cambridge, Mass.

The New Ecological Society of America.

A meeting of ecologists was held at Hotel Hartman, Columbus, Ohio, December 28, 1915, under the chairmanship of Prof. J. W. Harshberger, for the purpose of considering the organization of an ecological society. About fifty persons were present, nearly all of whom were enthusiastically in favor of forming such a society. Over fifty others who could not be present had notified the Secretary of their interest in the movement. In view of these facts it was definitely voted to organize under the name The Ecological Society of America. The new society has an initial membership of more than one hundred botanists and zoologists interested in ecology. The constitution adopted declares that membership "shall consist of persons interested in ecology," that an annual meeting and field meetings shall be held and fixes the annual dues at $1.00. The officers chosen were *President*, Prof. V. E. Shelford, University of Illinois; *Vice-President*, Prof. W. M. Wheeler, Harvard University; *Secretary-Treasurer*, Dr. Forrest Shreve, Desert Laboratory, Tucson, Arizona.

The charter membership has been doubled since the Columbus meeting, and there is every prospect for an active and influential organization. The roster of names indicates that the collective interests of the society will be of the broadest character, embracing every phase of the relation of organisms to their environmental conditions. The Ecologi-

cal Society represents the union and co-operation of men who are interested in animal and plant material, in marine and terrestrial organisms, in the broader floristic and faunistic problems, and in the precise experimental study of organisms or the exact measurement of environmental conditions. Such an organization will be able to do much toward emphasizing fundamental problems of general ecology, and toward placing this science in a position correlative with that of general physiology.

The constitution admits of great freedom with regard to the holding of field meetings, and it would be difficult to overestimate the value that they may be made to possess. There will be an added stimulus to travel, there will be profit for every ecologist in seeing new regions under the guidance of men who know them well, and there will be profit for the science of ecology if the students of plants and animals can unite frequently for a consideration of the biota as an indivisible unit.

There will be a field meeting at Chicago in June, under the leadership of Dr. H. C. Cowles; one on the Pacific Coast in August, probably at San Diego. The Secretary will give early announcement of the details of these and of any others that may be initiated by different groups of members. The first regular annual meeting will be held in New York during the next Convocation week.

The Secretary is gathering information from the members as to their past ecological work and that in progress, their specialties, their willingness to undertake identification of material, their knowledge of various geographical areas and kindred topics, all to be published as a Handbook of the Society.

The membership of all interested in ecological work is desired.

[From circulars issued by the Secretary, Dr. FORREST SHREVE, Tucson, Arizona; temporary address, 2753 Maryland Ave., Baltimore, Md.]

OBITUARY.

Miss ADELE MARION FIELDE died in Seattle, Washington, February 24, 1916. Born in East Rodman, New York, March 30, 1839, and graduated from a New York State Normal School in 1860, she taught in her native State for some years and then went out as a Baptist missionary, first to Siam in 1866, and later to China, especially in Swatow. Having become deeply interested in the theory of evolution she returned to America in 1883 and, at the suggestion of Dr. David Starr Jordan, pursued studies in biology in Philadelphia, especially

at the Academy of Natural Sciences. Here she made the acquaintance of Dr. Edward J. Nolan, librarian of the Academy, who has paid a warm tribute to her memory in the columns of the Philadelphia *Public Ledger* for February 28, 1916. Dr. Nolan relates that it was Miss Fielde's desire for work in biology that led to the foundation of the Biological Department of the University of Pennsylvania, although she never became a student therein.

She returned to China in September, 1885, but in October, 1892, engaged in science teaching in New York and studied and lectured during the summers of 1900-07 at Wood's Hole These years witnessed her chief entomological work—on the senses, activities and behavior of ants. She set forth the view that "the antennae of the ant are a pair of compound noses, certain segments having each a special function," restating it in a paper *On certain vesicles found in the integument of ants* in the *Proceedings of the Academy of Natural Sciences of Philadelphia* for January, 1915, accompanied by a list of twenty-three papers which she had published, chiefly in the same *Proceedings* and in *The Biological Bulletin,* on this group of insects. Her interest in the olfactory sense developed by these researches is to be seen in two other short papers in the *Proceedings* for 1915, one concerning dogs, the other entitled *A new hypothesis concerning butterflies.*

These were not Miss Fielde's only contribution to entomology, however, for during her second period of residence in China she addressed to the Academy brief communications on the preparation of *Fishing lines from the Silk-Glands of Lepidopterous Larvae* by the Chinese (*Proceedings,* 1886, pp. 298-9), *On an Aquatic Larva [Hydropsyche?] and its Case* (1887, pp. 293-4), *An Aquatic Insect, or Insect-Larva having jointed dorsal appendages* (1888, pp. 129-130, plate viii) and *On an Insect-Larva Habitation* (*l. c.,* pp. 176-177), all recording observations made at Swatow.

P. P. C.

Correction. ENT. NEWS, vol. xxvi, p. 445, 13th line from bottom, for "1892" read "1852."

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TO CONTRIBUTORS.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" for each number into the hands of the printer four weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form and without covers, will be given free, when they are wanted; if more than twenty-five copies are desired, this should be stated on the MS. The receipt of all papers will be acknowledged. Proof will be sent to authors for correction only when specially requested.

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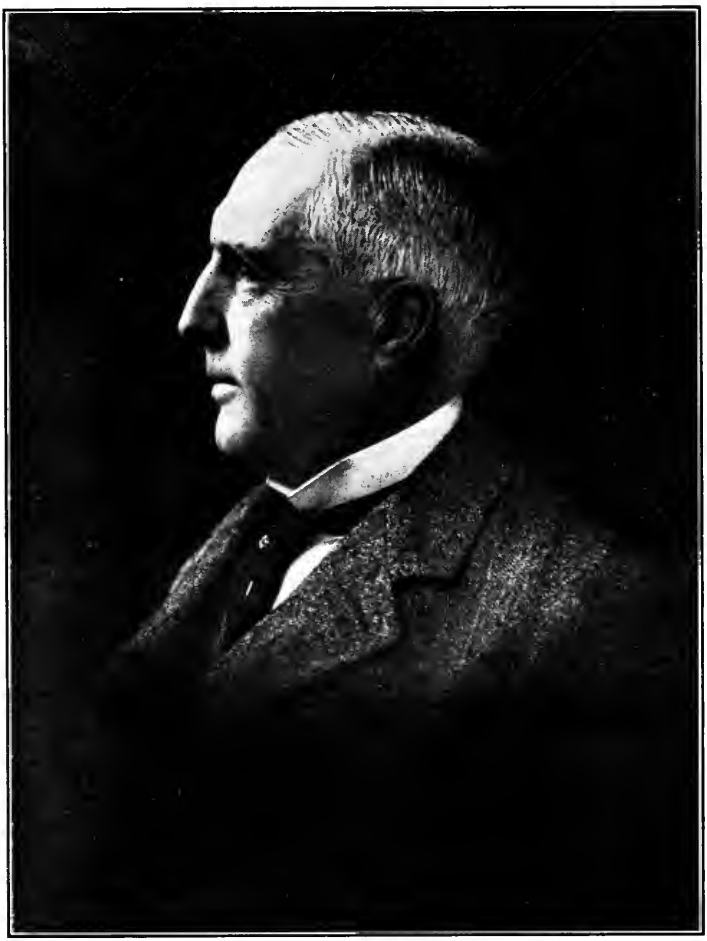

DR. FREDERICK DUCANE GODMAN.

FOUNDER AND EDITOR OF THE 'BIOLOGIA CENTRALI-AMERICANA.'

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XXVII. MAY, 1916. No. 5.

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The Completion of a Great Work.

(Plates X, XI.)

In the News for November, 1915, page 422, the appearance of the Introductory (and final) volume of the *Biologia Centrali-Americana** was announced in a quotation from *The Times Literary Supplement* of London and we then expressed the hope of presenting a more extended notice of the Introduction at a later date.

The News for December, 1905 (vol. xvi, pp. 317-322) gave a notice of the *Biologia* as a whole in the state to which it had then arrived: fifty completed and eight incompleted volumes. Other notes on progress made have appeared from time to

* Biologia Centrali-Americana, Zoology, Botany and Archæology. Edited by Frederick Ducane Godman and Osbert Salvin, M. A., F. R. S. Introductory Volume. By Frederick Ducane Godman, D. C. L., F. R. S. 1915. 4to. Pp. viii, 149. 2 pls. 8 maps.

time in this journal, and may be found by consulting the annual indices.

In our notice of 1905 (*l. c.*, p. 322) we quoted an announcement from the paper covers of the original parts in which the *Biologia* was published: "The Editors will give at the conclusion of the Work an Introductory Volume, wherein the physical features of the country will be described and illustrated with maps." We continued: "Mr. Champion informs us, however, that this has become doubtful, owing to the death of Mr. Salvin." Fortunately the doubt has cleared away and the volume before us is a realization of the Editors' hopes.

The contents of this Introductory Volume are as follows: A preface (pp. vii-viii), and the Introduction proper (1-86) by Dr. Godman. Resumés on the Origin, etc., of the Fauna and Flora of Central America by R. I. Pocock for the Mammalia, Arachnida—Opiliones and Acari excepted —, Chilopoda, Diplopoda and Prototracheata (87-104, 118-144), by C. Tate Regan for the Reptilia, Batrachia and Pisces (105-117) and by W. B. Hemsley for the Plants (145-149).

The first twelve pages of the Introduction are largely autobiographical and recount the early life of both editors, their meeting as students at Cambridge, their visits to Central America and to Mexico, the inception of the *Biologia* and some details of the manner in which the materials on which it is based were brought together and worked out. Salvin and Godman were very close contemporaries, the former born in 1835, the latter in January, 1834. Salvin visited Guatemala, British Honduras and Panama in 1857-58, 1859-60, 1861-63 and 1873-4. Godman accompanied Salvin on the trip of 1861 and went through Mexico from El Paso to Yucatan in 1887-1888. By their own exertions and those of collectors whom they employed, the two associates brought together in London "a very large amount of material especially among the birds and insects" from both Central and South America. Yet Dr. Godman tells us: "It was not until the year 1876 that it was suggested that the *Biologia* should be undertaken, and three years later (September, 1879) the first part appeared."

Our method of publication was to bring out six quarto parts a year; each part to contain twelve sheets made up of various subjects with six colored plates, the plates and letterpress so numbered and paged that the parts might ultimately be broken up and bound together in their respective volumes when completed. In this way it was possible to keep several subjects in progress at once, and the plan answered well. We were, however, unable to adhere to the original scheme of completing the work in 60 parts, owing to the ever increasing amount of material received from our collectors—an amount so great that 215 Parts of Zoology alone have been required, the dates of issue extending over a period of 36 years. Even now some families of insects, the Crustacea, &c., have not been dealt with—though this is chiefly attributable to the fact that no experts on these subjects were available.

On arrival in England, the various consignments were opened, every specimen labelled, with its exact locality, and the name of the collector attached. The animals sent were then sorted into their respective orders and families and as occasion offered, handed over to specialists to be worked out. It was obviously impossible that we could undertake every subject, but the birds and the butterflies we set aside for our own share of the work. The names of the various authors who kindly helped us will be a sufficient indication of our good fortune in securing the services of so many eminent men all of whom joined the enterprise with great spirit (p. 8).

For several years after my return from Mexico [in 1888], Salvin and I continued diligently to work out the material on hand and the ever-increasing amount sent over by our collectors. Salvin's failing health finally obliged him to relax his efforts, and though he still came to London as formerly, he was unable to take the same active part in the work and the difficulty of concentrating his attention on any one subject became increasingly great. He died suddenly at Hawksfold, Fernhurst, Sussex, June 1st, 1898, leaving me alone to complete the *Biologia*.

The severance of a friendship such as ours had been for forty-four years was a terrible blow to me, for we were more intimately connected than most brothers, and, besides the personal loss, I missed his knowledge and experience in all things connected with our book (p. 10).

Plates I and II, portraits of Dr. Godman and of Salvin respectively, illustrate this highly interesting personal portion of the Introduction.

Pages 13 to 43 are concerned with the "Physical Features, etc., of the Area treated," based mainly on the observations of

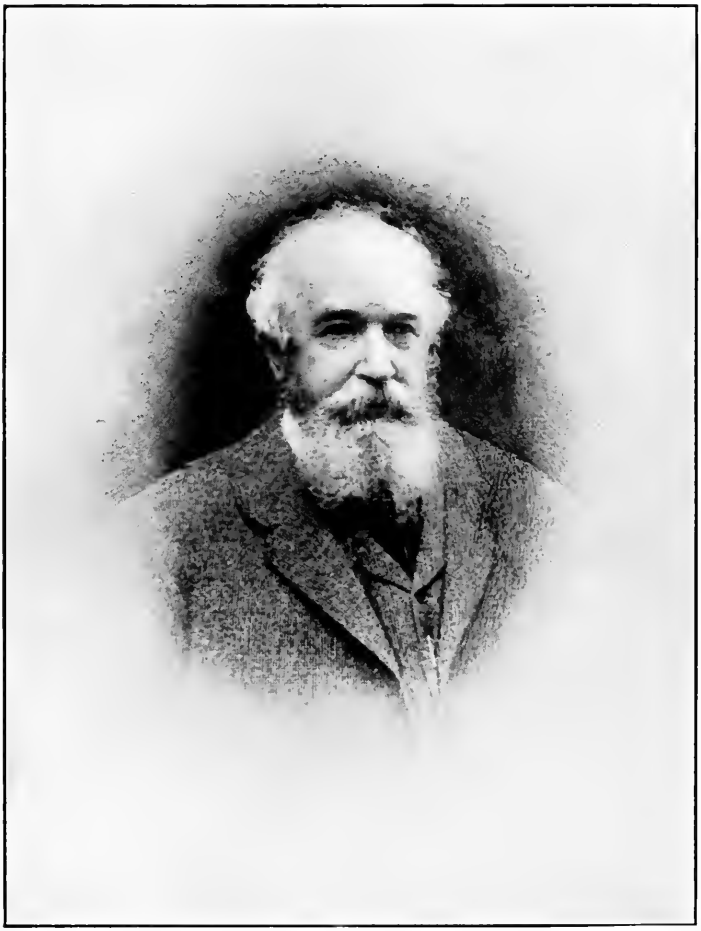
the Editors and their collectors although including descriptions from other (but by no means all available) sources. Pages 44-45 briefly enumerate the "Sources from whence our material was obtained"; pp. 46-54, "Itinerary of Mr. G. C. Champion's travels in Central America, 1879-1883," much of which appeared first in the NEWS for February, 1907 (vol. xviii, pp. 33-44). A "List" and "Analysis of Contents of each" of the 51 volumes on Zoology, 5 on Botany and 5 on Archaeology, which constitute this vast undertaking, fill pages 55 to 86.

In the Preface, dated June, 1915, Dr. Godman remarks:

> It had been our intention at the termination of the work, and after a careful study of the Zoological and Botanical material accumulated from this hitherto little known but exceedingly rich country, to have summarized the result and discussed its bearing on the interesting subject of geographical distribution. Salvin's death after a long illness, and my own advancing years and ill-health, compelled me to abandon this project, and I should have been obliged to content myself with the conclusions arrived at by the various contributors in their respective Introductions had it not been for the assistance of Messrs. R. I. Pocock and C. Tate Regan [whose essays are cited above]..... As regards the Insecta generally, which occupy such a large portion of the work, so little is as yet known of the fauna of other tropical regions that no satisfactory comparison can be made.

Of special interest to entomologists is the fact that of the 51 volumes of Zoology, 4 are devoted to Arachnida, 1 to Myriopoda and 38 to Insecta (18 Coleoptera, 3 Hymenoptera, 7 Lepidoptera, 3 Diptera, 4 Rhynchota, 1 Neuroptera, 2 Orthoptera). All the insects from Mexico and Central America and the Editors' collections of butterflies have been presented to the British Museum. "Our own general collection of butterflies probably included nearly 100,000 specimens and the beetles alone from Mexico and Central America perhaps double that number." The other insects, as presented up to 1906, were estimated as 17,525 Diptera, 10,000 Hymenoptera, 5543 Heteroptera. Subsequent gifts include 3000 Odonata, 5500 Homoptera, 6293 unworked parasitic Hymenoptera (p. 12).

The eight maps with which the Introductory volume ter-



OSBERT SALVIN,

1835-1898.

FOUNDER AND EDITOR OF THE 'BIOLOGIA CENTRALI-AMERICANA.'

minates comprise (1) a key map and (2) an orographical map of Mexico and Central America, on a scale of 1: 12,000,000 (1 inch = 189 statute miles), five (3-7) maps of portions of this area on a scale of 1 : 3,000,000 (1 inch = 47.35 stat. mi.) and (8) a map of part of Guatemala showing Mr. Champion's route 1879-1881 (1 inch = 15.5 stat. mi.), all beautifully executed.

This Introductory Volume is dedicated "To My Beloved Wife, Alice Mary Godman, who has taken the deepest interest and given me much assistance and sympathy in the completion of this work," and special acknowledgment is made in the preface to Mr. G. C. Champion and Mr. A. Cant for "valuable assistance" and "very important help."

Cervophthirius crassicornis (N.) (Anoplura).

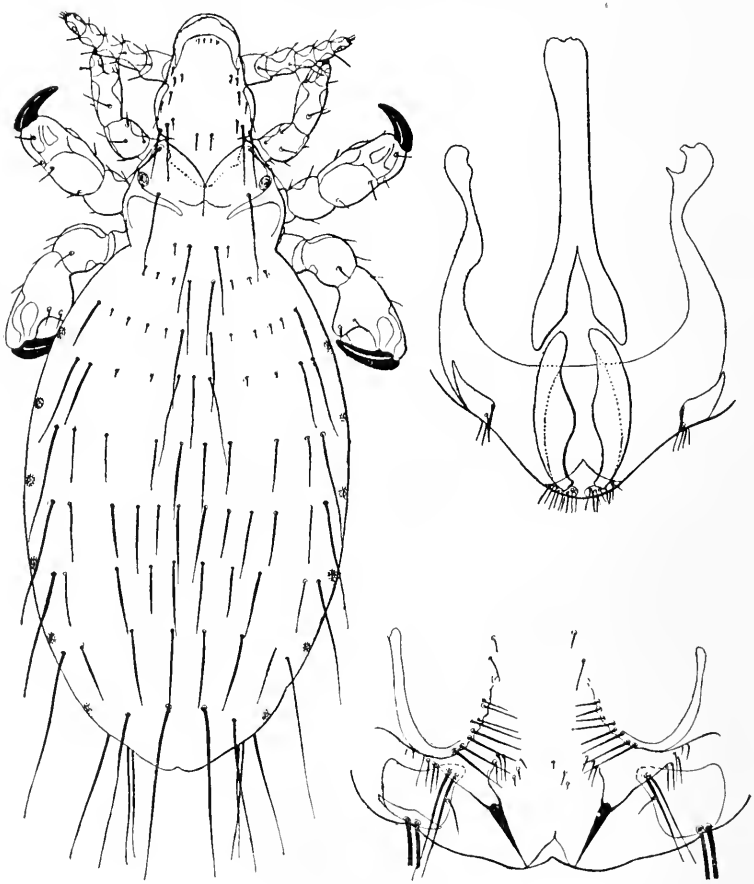
By G. F. Ferris, Stanford University, California.

Through the kindness of Professor W. B. Herms, of the University of California, the Department of Entomology of Stanford University has recently received some specimens of an Anopluran from the black-tailed deer, *Odocoileus columbianus,* taken at Laytonville, Mendocino County, California. I regard the species as identical with one *Haematopinus crassicornis* N., which has previously been recorded only from *Cervus elaphus,* the "noble stag," of Europe, the last record being that of Giebel in *Insecta Epizoa* (1874). The rediscovery of the species in North America being a matter of some interest, I had prepared a short paper for publication and was on the point of sending this to press when there came to hand a paper which necessitates an entire readjustment of my own.

The description and figure given by Giebel leave much to be desired, but there are certain peculiarities about the species that could not well be overlooked and the identification is reasonably certain. The species has nothing to do with *Haematopinus* and I regard it merely as a rather peculiar member of the genus *Linognathus.* However, Mjöberg (Entomologisk Tidskrift, Vol. 36, pt. 2-4, p. 282, Dec., 1915) has established

a genus, which he calls *Cervophthirius,* for a very closely related, if indeed not the same, species taken from *Cervus tarandus* in Sweden.

This genus differs from *Linognathus* only in the sharp posterior-lateral angles of the head and in the presence of but one row of hairs on each abdominal segment. I have available for study six species of *Linognathus* and have concluded from



Cervophthirius crassicornis (N.).

Female. (Drawing made from specimen which has been cleared in caustic potash.)

(Above) Genitalia of male. Only the more heavily chitinized parts are shown. (Below) Genitalia of female.

these, and from the illustrations of others, that the number of rows of hairs on the segments of the abdomen is hardly a suitable character upon which to split up this genus, in fact the knowledge of the genus is at present so slight that any attempt to divide it is likely to lead only to confusion. The new genus having been established, however, may be retained.

In his description of the new genus and species, Mjöberg compared them with *Solenopotes capillatus* Enderlein, a genus and species from *Bos taurus,* which were obviously based upon immature specimens. I have at hand an immature specimen of *Linognathus vituli* L., which in general appearance and in the chaetotaxy of head and abdomen agrees very closely with the description and figure of *S. capillatus.* The shape of the head does not agree, but immature specimens are very liable to distortion and are not to be too closely depended upon. The abdominal spiracles do not protrude, as they are supposed to do in *Solenopotes,* but they are disproportionately large and it is worthy of note that the figure of *L. vituli* given by Giebel in *Insecta Epizoa* indicates the abdominal spiracles as protruding. Taking all these things into consideration, I am forced to regard *Solenopotes* as a synonym of *Linognathus,* and *S. capillatus* as a synonym of *L. vituli.*

Satisfactory progress in the study of the Anoplura depends at present very largely upon the satisfactory fixing of the status of certain species which were described before the necessity for careful and full descriptions and accurate figures was fully realized, and I therefore take this opportunity to present a description and figures of *Cervophthirius crassicornis.*

The description follows. The only fully mature female available is not in satisfactory condition for measurement and this is consequently omitted.

Head about twice as long as wide. Anterior margin very roundly convex. Temporal angles moderately prominent, temporal margins nearly straight and parallel. Posterior-lateral angles sharp and prominent. Occiput much produced into the thorax. Extending across the head in front of the antennae is a conspicuous, curved, chitinized area and along each temporal margin is a narrow chitinized area. Chaeto-

taxy of the head as follows: A median group of four very small spines just behind the transverse area, four slightly larger near the base of each antenna, three along the inner edge of the chitinized area of the temporal margins, two long hairs and a short one at each posterior lateral angle and a median pair of two small hairs on the occiput. On the ventral side a single hair near the base of each antenna.

Antenna conspicuously long, the first segment longest and widest, the remainder becoming successively smaller.

Thorax shorter and considerably wider than the head and with convex lateral margins. A single long hair on each "shoulder" and one just in from each mesothoracic spiracle. Sternal plate irregularly shaped, longer than wide. Legs very large and stout, of the type common to the genus.

Abdomen elongated oval, each segment with a single row of hairs. First segment with a median group of four hairs, the outer ones very small, the inner ones quite long. Second segment with two long median hairs and with four very small hairs between each of these and the margin. Third segment with two long median hairs, four very small hairs between each of these and the margin and a long hair close to the margin. Fourth segment with three long median hairs, two very short hairs and two long hairs near each lateral margin. Five with median group of four and lateral groups of three long hairs. Six, seven and eight with median groups of five or six and lateral groups of two. Nine with five very long hairs. Chaetotaxy of ventral side very similar except that there is no row of hairs on the eighth segment.

Spiracles rather small. Gonapods blunt and rather short, each with a fringe of short hairs along its inner margin. Immediately behind each gonapod is a long sharply-pointed process with three or four hairs on each side at its base. A group of two or three long hairs at each posterior lateral angle of the ninth segment.

Description of male. Much smaller than the female and with a slightly reduced number of hairs on the abdomen, but in other respects very similar. Genitalia very heavily chitinized, the basal plate long and slender, about twice the length of the parameres. Genital plate lyriform.

Triphleps insidiosus Say Sucking Blood (Hem., Het.).

One day near the end of October, while collecting insects at White Heath, Illinois, I had the experience of being bitten by a specimen of *Triphleps insidiosus*. A companion also had the same experience. The species is well known as being of predaceous habits, but I do not recollect having seen records of it attacking man.—J. R. Malloch, Urbana, Ill.

Gall Midges of Certain Chenopodiaceae (Dip.).

By E. P. Felt, Albany, New York.

The discovery in 1913 of a species (*Aplonyx sarcobati* Felt) referable to an European genus and at that time unknown outside of the Mediterranean region, was most interesting. The rearing early this year of a closely allied genus, described below, from greasewood, adds to the interest, and on investigating the distribution of these gall midges and their close allies, it is noteworthy that none have been found outside of the Mediterranean region and the arid plains of the West. The conditions obtaining in the former section are suggestive in that they may throw some light upon probable revelations following further exploration. In the Mediterranean region, species of *Aplonyx* and *Stefaniella* have been reared from *Atriplex*, *Dibaldratia* and *Stefaniola* from *Salsola*, *Baldratia* and *Baldratiella* from *Salicornia*, while in America *Aplonyx* has been reared from *Sarcobatus* and *Protaplonyx* from greasewood, (?) *Sarcobatus vermiculatus*.

All of these genera are closely related in that they present the typical *Lasioptera* aspect. They may be distinguished by the simple or feebly dentate claws and a distinct tendency toward reduction in both the antennal and palpal segments, the former ranging in number for the seven genera above named from six to fourteen and being mostly twelve or thirteen, while five of the genera have but one palpal segment, *Stefaniella* two, and *Protaplonyx* four. There is also in this group of genera a marked tendency toward an aciculate, chitinous ovipositor.

The Chenopodiaceous flora of our great plains is at least moderately abundant and it is reasonable to suppose that there is a number of new species and possibly new genera in addition to the one described below, awaiting discovery. These saline- or alkaline-loving plants present certain characters in common and as in the case of *Aster* and *Solidago*, appear to have a peculiar midge fauna.

PROTAPLONYX n. g.

The genus has the typical *Lasioptera* wing, the normal short mouth-parts, 12 or 13 antennal segments, the third and fourth not coalescent or at least separated by a distinct constriction; quadriarticulate palpi, heavy simple claws and an aciculate ovipositor in the female. Type *P. hagani* n. sp.

Protaplonyx hagani n. sp.

The small flies described below were reared January 4, 1916, in large numbers from small, folded, swollen leaflets of greasewood (? *Sarcobatus vermiculatus*) by Mr. Harold R. Hagan, of the Agricultural Experiment Station, Logan, Utah, from material collected October 25, 1915, on the Austin farm, Wellington, Utah, in a locality near Price.

Gall. The insects appear to prevent the unfolding and cause a swelling of the leaflets, producing somewhat irregular, slightly distorted growths about 12 mm. long and with a diameter of 1.5 mm. Apparently one or more larvae may occur in each of the infested leaflets.

Larva. Length 2.5 mm., moderately stout, reddish orange. Head small, tapering to a narrowly rounded apex. Antennae bi-articulate, the basal segment disk-like, broad, the terminal segment with a length nearly four times its diameter and tapering to a narrowly rounded apex; segmentation moderately distinct; skin coarsely shagreened; posterior extremity produced as a pair of sublateral, somewhat irregular, tapering, finger-like processes with a few short, coarse setae apically.

The small larva in the preparation has a length of .75 mm., is short, stout, with both extremities broadly rounded and with no sign of the conspicuous caudal appendages described above. The skin is coarsely shagreened and unfortunately the head is concealed.

Pupa. Length 1 mm., reddish brown, the wing cases extending to the fifth abdominal segment, the leg-cases to the seventh abdominal segment, the dorsum of the abdominal segments in the male at least, thickly set with short, stout, triangular, chitinous spines.

Male. Length .75 mm. Antennae extending to the base of the abdomen, sparsely haired, dark brown; 12 segments, the third and fourth nearly free, the fifth with a length one-fourth greater than its diameter; the terminal segment, evidently composed of two, closely fused, with a length nearly three times its diameter and tapering apically to a broadly rounded apex. Palpi; first segment indistinct, second with a length about twice its diameter, slender, the third nearly as long as the second, the fourth a little longer than the third, dilated and broadly oval.

Mesonotum dull black, the submedian lines sparsely haired. Scutellum and postscutellum dark reddish brown.

Abdomen nearly naked, reddish brown, darker basally; genitalia dark brown. Genitalia; basal clasp segment short, stout; terminal clasp segment moderately long, swollen at the base and tapering apically. Harpes moderately long, swollen basally and tapering to an irregularly rounded, sparsely setose apex.

Wings hyaline, costa reddish brown, the third vein uniting with the thickened costa just before the middle, the whitish discal spot small, the fifth vein joining the posterior margin at the distal third, its branch near the basal third; halteres yellowish white apically, pale straw basally.

Coxae dark brown, legs mostly brownish straw; claws moderately slender, strongly curved, simple, the pulvilli as long as the claws.

Female. Length .75 mm. Antennae short, dark brown; 12 segments, the third and fourth narrowly fused, the fifth with a length one-fourth greater than its diameter, the terminal segment with a length nearly three times its diameter, narrowly rounded apically and evidently composed of three closely fused segments. Palpi; first segment short, irregular, the second narrowly oval, with a length over twice its diameter, the third one-half longer than the second, more slender, slightly swollen distally; terminal segment about two-thirds the length of the second, narrowly oval.

Mesonotum dull black, the submedian lines sparsely haired. Scutellum and postscutellum dark reddish brown.

Abdomen reddish brown, the basal segments dark brown, the stout ovipositor a little darker than the distal segments. Ovipositor when extended probably as long as the body, the terminal portion slender and tapering to a narrow, aciculate apex. Other characters as in the male.

Type: Cecid. a2709, State Museum, Albany, New York.

A Hermaphrodite of Andrena cressoni Robt. (Hym.).

On April 25, 1915, while collecting bees from the blossoms of plum trees at White Heath, Illinois, I obtained a specimen of *Andrena cressoni* that presents in itself certain characters of both sexes. The entire head including the color of the clypeus and sides of face is that of a male. The head is symmetrical and the antennae are both typically male. The thorax is rather stouter than that of the normal male. The abdomen is typically female and the genitalia including the weak sting is of that sex. The hind legs are identical with those of a normal female, the scopae being well developed. In the great majority of cases hermaphroditism is evidenced longitudinally; here the division is transverse.—J. R. Malloch, Urbana, Ill.

Some new Species of Athysanus and Related Genera (Homoptera).

By E. D. Ball, Logan, Utah.

(Continued from page 176)

Platymetopius trilineatus n. sp.

♂. Resembling *slossoni* in general appearance but much larger and with a dark face and a longer and definitely trilineate vertex, in the male. Length 5 mm.

Vertex longer than in the male of any known species, three times as long as basal width or length of eye, face definitely concave in profile. Elytra narrow, appressed, outer anteapical definitely shorter than the central one. Third apical cell very broad with a partially formed supernumerary cell at base. Male valve enlarged, gibbous, the margin concave to just before the blunt rounding apex, plates together broader than valve or pygofers, lateral margin concave at base, then slightly convexly rounding to the broad blunt slightly divergent apices, extending one-third their length beyond the valve and slightly exceeded by the stout pygofers.

Color: milky white and pale brown, similar to *slossoni*, vertex with a definite median white stripe extending nearly half-way back from apex and two of equal width arising just outside of this at apex and extending back just inside the black margin to just before the end of the median stripe where they almost articulate with a pair of slightly curved stripes and which in turn articulate with a pair of narrow approximate lines at the base, the whole forming an almost continuous pair of light lines from apex to base curving outward on disc. Remainder of surface composed of alternate black and white vermiculations, washed with brown at the base. Pronotum and scutellum irrorate with light brown, seven stripes on the former and the apical dots on latter white. Elytra milky white, the nervures brown, the apical and costal ones black, whole surface irrorate with pale brown except the sutural and costal margins, circular spots alongside all cross nervures and the narrow margins next the nervures. Face uniformly irrorate with brown and scarlet, omitting a white line under the vertex margin set off by black vermiculations.

Described from two males taken at Pasadena and Santa Margarita, California, by the writer. The exceptionally long trilineate vertex will at once separate this species from all others except *slossoni*, from which the dark face and widely different genitalia will at once distinguish it.

Platymetopius nigricollis n. sp.

Form of *brevis* nearly but longer, with a blunter head. Green with the head, face and below black. Length 3.5-4 mm.

Vertex in the female slightly obtusely rounded, scarcely one-third longer at apex than against eye, about equalling the pronotum; male still shorter and narrower. Face as seen from the side convex, front broad and short. Elytra compressed, venation obscure, third apical narrow. Female segment moderately long, margins parallel at the sides, the median half of posterior margin roundly produced. Male valve rather narrow, long-oval, plates together narrow, long-triangular, their acute apices exceeding the valve by one-half its length.

Color: vertex black, minutely irrorate with white, three ivory white dots at apex and an irregular basal margin ivory white. Pronotum unicolorous, green, or with a few minute black dots. Scutellum green with two black spots at base in some specimens. Elytra green, nervures unicolorous, surface peppered with minute black dots, omitting the usual circular spots, reflex nervures scarcely dark marked. Face finely heavily irrorate with dark brown or black. Below black.

Descibed from two females and two males from Mojave, California, and St. George, Utah, collected by the writer. The short black head on the definitely green body renders this a striking species. In life there was a definite golden cast that partly disappears in the dry specimens.

Platymetopius brevis var. **torridus** n. var.

♀. Form of *brevis* but with the entire insect of a fulvo-testaceous cast.

Vertex with three apical ivory dots and usually a narrow light margin on each side of the median line anteriorly. Disc irrorate with testaceous. Pronotum and scutellum fulvo-testaceous, usually unmarked. Elytra uniformly washed with fulvo-testaceous except for the usual circular spots which are milk white in striking contrast; sometimes the nervures and reflex veinlets are pale sanguineous.

Described from four females from Mojave and Calexico, California. The color of this variety is so much higher and more uniform that it would scarcely be recognized as belonging to this species as described. It is possible that all the material from the Western deserts may prove to be distinct from the Jamaica examples.

Chlorotettix delta n. sp.

♂. Size and general appearance of *tethys* but with a much sharper head. Pale green with a slightly tawny cast towards the tips of the wings. Length 4.5 mm.

Vertex right-angled, the margins straight, apex with the front sharply conical, length very slightly less than the basal width, nearly equalling the pronotum. Elytra long and narrow as in *lusoria,* giving a trim wedge-shaped appearance to the insect. Venation distinct, regular, the nervures slightly raised.

Genitalia: male valve short obtusely rounding. Plates narrow appressed, equilaterally triangular, their apices produced as minute slightly separated finger-like processes as long as the plates and equalling the rather broad and foliacous pygofers.

Color: pale green, eyes dark, the usual indented arcuated line on pronotum. Apex of vertex and tips of elytra with traces of tawny.

Described from a single male from Arizona. The conically pointed head and distinct genitalia render this a strikingly distinct form among the smaller species of this genus.

Neocoelidia ramona n. sp.

Length 3.5-4 mm. Resembling *lactipennis,* slightly narrower and with a longer vertex and more definite nervures. Female segment two-thirds as long as its width, apical margin slightly rounding. Male plates nearly three times as long as their basal width, triangularly narrowing on basal half, then rapidly roundly narrowing and together forming a single finger-like process which equals the length of the long and slightly curved pygofers.

Color: pale creamy to dirty straw, vertex creamy, a black spot on apex, a narrow median light line bordered by a pair of narrow brown ones enlarged in three points. Pale specimens may have these lines reduced to an anterior dot and a posterior crescent. Pronotum dirty straw, scutellum paler with a pair of marginal black spots in the male. Elytra pale, milky subhyaline—the female with pale brown nervures, obscure at the apex and along costa, the male smoky subhyaline with heavy brown nervures except on apical cells. Tergum and venter black in the male giving a dark cast through the elytra.

Described from two females and two males from Ravenna, California, collected by the writer. From *candida* this species can be separated by the absence of anteapical cells in the elytra, from *lactipennis* by the distinct nervures, while the male plates are longer and narrower than in any other known species.

Neocoelidia orovila n. sp.

Length 4.5-5 mm. Resembling *candida* but more slender, slightly larger and lighter colored than *ramona* with a shorter vertex. Female segment rather long, posterior margin truncate. Male plates slightly over twice longer than wide, gradually narrowing to the blunt tips.

Color: vertex light creamy, a black apical spot, three pairs of brown dots along median suture, the posterior pair sometimes connected. Pronotum creamy, scutellum creamy with two black marginal dots. Elytra creamy with brown nervures, tergum and venter pale.

Described from two females and two males from Beaumont, Chico and Oroville, California, collected by the writer. The lighter, larger male will readily separate this species from *ramona,* while the venation will easily separate it from *reticulata* and *candida.*

Neocoelidia pentagona n. sp.

Resembling *obscura* but slenderer, with a longer head and indistinct nervures. Length 6-7 mm.

Vertex almost perfectly pentagonal, the anterior margin carinate, disc almost flat, vertex as long as pronotum, longer than its basal width, pronotum short, deeply, angularly emarginate posteriorly. Elytra long, narrow, venation indistinct, a rather small outer anteapical cell present. Male plates nearly three times as long as their basal width, gradually narrowing and slightly surpassing the pygofers. Pygofers with the dorsal margins semi-circular, slightly produced as a tooth at the apex.

Color: bright straw or creamy, a black dot on apex of vertex, faint but rather broad submarginal and median orange stripes on vertex, the median one sometimes continuing on to pronotum and scutellum. Elytra pale, slightly greenish subhyaline, nervures concolorous.

Described from two females and two males from Medford, Oregon, collected by the writer. The long carinate vertex and lack of ornamentation are quite distinctive characters in this group.

Neocoelidia triunata n. sp.

Resembling *pentagona* but smaller and with a shorter vertex. Pale straw with blood red markings. Length 5.5-6 mm.

Vertex flat carinate, long, anterior margin slightly wider than long. Male plates appressed, together tubular, tapering, very long, resembling a slender Indian club, exceeding the pygofers.

Color: pale straw, vertex with a black dot at apex, a semi-circle just back of this, a triangular spot against the anterior corner of each eye and a median dot on posterior margin, blood red. Pronotum with three stripes, the median one extending across scutellum, the lateral ones arising behind the eyes and slightly widening to the outer angles of scutellum. Elytra pale subhyaline straw, with a marginal red mark on each side, the tergum showing through. Nervures indistinct.

Described from four examples from Logan Canyon, Utah, collected by the writer. The blood-red markings will at once separate this species from any other described.

Neocoelidia coronata n. sp.

♀. Resembling *pulchella* in size and form, smaller and slenderer, creamy with scarlet markings. Length 6.5 mm.

Vertex acutely angled, the apex blunt, twice longer than its basal width, disc flat, the anterior margin carinate. Angle with face much more acute than in *pulchella*. Pronotum short, the margins parallel. Elytra long, venation obscure, a single anteapical cell, apical cells long. Female segment of medium length, posterior margin broadly rounding. Pygofers very short.

Color: creamy with scarlet markings, vertex lacking the customary apical black spot, a broad median stripe from the apex to just before the base, a marginal stripe against the eye on each side, extending halfway to apex where they are joined by a transverse stripe, the marginal stripe triangularly expanded opposite the eye and almost reaching the median one, the whole marking on vertex suggesting a scarlet crown. Pronotum with three parallel stripes connecting along the anterior margin and extending across the scutellum, the median one forking before the apex. Elytra creamy, a broad scarlet stripe extending along sutural margin, the apical cells slightly infumed.

Described from a single example from Central America. The striking pattern will at once separate this species and justifies its description from an unique.

Some Neotropical Parasitic Bees (Hym.).

By T. D. A. COCKERELL, Boulder, Colorado.

Hypochrotaenia pilipes (Cresson).

It appears from the account given by Ducke that the genus *Nomadosoma* Rohwer, 1911, is identical with Holmberg's (1886) *Hypochrotaenia*. The type of the former is *Pasites pilipes* Cr., and of the latter *H. parvula* Holmbg.

POLYBIAPIS gen. nov. (Nomadidae).

Allied to *Nomada*, but resembling wasps of the genus *Polybia;* wings long, with only two submarginal cells (first t. c. absent), the first s. m. fully three times as long as second, receiving first r. n. a considerable distance from its end; metathorax long, very oblique; maxillary palpi long and slender,

six-jointed; labial palpi four-jointed, the two small joints rather stout. Type *Polybiapis mimus* sp. n.; also includes *P. polybioides* (*Nomada polybioides* Ducke), which is much smaller and has less yellow.

Polybiapis mimus sp. n.

♀. Length a little over 10 mm.; anterior wing 9; black, the pleura and first abdominal segment dark brown; bright yellow markings as follows; small spot on labrum; mandibles except apex; clypeus except upper margin and very broad side bands; subquadrate (longer than broad) supraclypeal patch; broad lateral face-marks which narrow above, extending to top of eye; broad band (narrowing above) behind eyes; malar space; two longitudinal distal stripes and obscure lateral (marginal) bands on mesothorax; greater part of tubercles, small spot behind tubercles; large subtriangular patch on anterior inferior part of pleura; smaller, more suffused patch on posterior middle of mesopleura; large area on mesosternum; axillar spots; rather small spots at sides of scutellum; two transverse marks on postscutellum; large marks on sides of metathorax; band along sides of first abdominal segment, and very narrow one (slightly interrupted) on apical margin; narrow bands on second and third segments, and slender ones at sides of fourth and fifth; and two broad bands on venter.

Pubescence scanty, brownish above, white beneath; eyes greenish; face smooth and polished; antennae entirely black, third joint longer than fourth; vertex coarsely punctured; mesothorax smooth and shining with scattered punctures, and a deep median groove; scutellum flattish, with a median sulcus; tegulae dark reddish, polished with a small yellow spot anteriorly; wings strongly reddened, though not very dark, the apical region paler; nervures and stigma ferruginous; b. n. meeting t. m.; coxae with yellow keels, those on middle and hind coxae very large and sharp, the latter black anteriorly; legs suffusedly yellowish in front, mainly dark brown behind, but the femora with a more or less evident posterior yellow band, very large and distinct on middle femora; tarsi bright ferruginous, middle and hind ones long; abdomen extremely minutely and densely punctured; sides of apex with black hair, but last segment with a short fringe of silver hair.

Hab.—Corcorado, Rio de Janeiro, Brazil, May 13, 1912 (*G. E. Bryant*; Brit. Museum). This is a beautiful case of "mimicry."

Odyneropsis batesi sp. n.

♂. Length about 11 mm.; black, with the sides of face, upper border of prothorax, metathorax except median band, under side of thorax and large part of coxae, more than basal half and sides of first abdominal

segment, and most of under side of abdomen, all covered with appressed silvery white hair; labrum large and broad; labial palpi very long, third joint short and stout, fourth long and cylindrical; tongue very long, extending about 2 mm. beyond labial palpi; maxillary palpi rudimentary, apparently 1-jointed; clypeus dull, granular, with a median keel, failing below; facial quadrangle much longer than broad; antennae long, brownish-black, third joint about half as long as fourth; mesothorax densely rugoso-punctate; scutellum bilobed, axillar teeth large; legs with white hair; spurs pale ochreous; small joints of tarsi pale ferruginous; tegulae large, black, punctured; wings basally hyaline, more than apical half fuliginous; b. n. going far basad of t. m.; three submarginal cells, first r. n. joining second near end; abdomen finely and densely punctate, without bands or spots.

Hab.—Ega, Brazil. (British Museum, from the Farren White collection). On account of the locality, and the remarkable "mimicry" of a wasp, it is appropriate to dedicate this species to Bates; who, indeed, very possibly collected the specimens. In Friese's key to *Rathymus,* in which he includes *Odyneropsis,* this falls next to the much larger *O. apicalis* Ducke, which occurs in Mexico.

The Genus Parnassius in America (Lep.).

By Henry Skinner.

(Plate XII)

Four species have thus far been described from North America. As in the European species, a number of names have been proposed for the variations of these very plastic butterflies. To consider the various forms in a rational manner it is necessary to fix the types of some of the earlier names, as some confusion has been caused by authors not knowing what certain names actually represented. We need more knowledge as to the distribution of these insects and also date of capture and altitude of the localities where the specimens are taken. Lepidopterists are not agreed as to the retention of names based on one sex or on size of individuals, this variation in size being usually due to difference in the altitude where the specimens are taken.

Parnassius clodius was described by Ménétries in 1855 and the locality given is California. It is well figured by W. H. Edwards in his *Butterflies of North America.* Two forms of

this Californian species were noted and both were figured by Mr. Edwards; the one he called *clarius* is not the European *clarius* and he subsequently changed the name to *baldur* Edwards. *Baldur* is immaculate on the secondaries above except for the two red spots. *Clodius*) has a submarginal line of curved lines parallel to the margin. The females of the two forms differ very little, if at all, from each other.

Menetriesii Henry Edwards differs very little from the normal form. From the figure of the type it will be noted that the two red spots on the upperside of the secondaries are a trifle smaller than in the general run of specimens. It is a rather common occurrence to find that red and yellow in insects are interchangeable and in some of the species of *Parnassius* the spots may be either red or yellow. Dyar has called the *clodius* with yellow spots, *altaurus*. I believe the name should be dropped. Workers in some of the other orders do not believe in naming color phases. Mr. Oberthür has described and figured a remarkable aberration of *clodius* under the name *lorquini*. There is a dark border to the primaries and two black dashes in the cell, one near the middle and the other at the end. The secondaries are immaculate above. The writer described a *Parnassius* under the name *immaculata* which may be an aberration of *clodius*. It was taken July 30th, 1905, by Mr. J. W. Coxey, on the Fire Hole River, near Old Faithful Geyser, in the Yellowstone National Park, Wyoming.

H. Stichel in 1907 published a revision of the Parnassinae in the *Genera Insectorum*, and introduces some new names for American variations. He gives the name *claudianus* to specimens from the coast region of Washington, British Columbia and Vancouver Island. These do not differ in any way from specimens found in California and figured by Edwards. *Gallatinus* Stichel I also consider to be a synonym of *clodius*. It is represented by the figures of *clodius* given by Elrod in his *Butterflies of Montana*.

On plate I of his *Butterflies of the West Coast*, W. G. Wright gives a number of figures that show some of the variations of *clodius*. *Lusca* Stichel is an aberration with the lower

red spot on the hind wing nearly obsolete. It is practically the same thing as *menetriesii* Hy. Edw.

Clodius is found in California, Washington, Oregon, Utah, Wyoming and British Columbia. In the collection of the Academy of Natural Sciences of Philadelphia are five specimens from Corfield, Vancouver, June 25th, males, and a female, July 2nd. Three males from California without accurate data. One female labelled Columbia River (Peale collection). Of the *baldur* form there are specimens from Umatilla, Oregon; Fort Klamath, Oregon, July 27th; Kaweah, California; Mt. Shasta, California, July 14th; Ogden, Utah, July 16th, and City Creek Canyon, near Salt Lake City, Utah, July 4th.

Systematic work goes through a period of evolution first. A number of names are proposed and then the value and relationships of these names are studied, some are retained and others rejected. Of the species under consideration the two names that really seem well warranted are *clodius* and *baldur*, the relationship being subspecific. Whether the names of aberrations should be retained is a matter open to discussion.

Smintheus was described and figured by Doubleday and Hewitson in 1847. The locality cited is the Rocky Mountains. This species has also been given a number of names. *Behrii* Edw. is the variety with yellow spots instead of red. The name *sayii* was given to the female by W. H. Edwards. It is a pure synonym. *Hermodur* Hy. Edw. was described from a dark specimen of the female from Colorado. W. G. Wright named a form *niger* which is characterized by having the red spots of the inferior wings reduced to small black spots. He also called some large specimens *magnus*. We possess specimens from British Columbia that agree with his figures. This name hardly seems warranted.

Nanus Neumoegen is a small form with the upper spot of hind wing obsolete and the lower one reduced to a point. It is much like Wright's *niger* only smaller, and may have been described from extreme specimens. A series from the original locality would probably show much variation. The localities mentioned in the original description are "Fort Calgary" and

"Spence's Bridge," British Columbia. Mr. Charles Schaeffer says there are two specimens labelled type, a male and a female, in the Neumoegen collection, now the property of the Brooklyn Institute of Arts and Sciences. The male is labelled "British Columbia," and the female "Fort Calgary." There are also four specimens in the Jacob Doll collection, two males and a female from Laggan and one female from the Bullion Mts., Colorado, the latter collected by David Bruce. Mr. Schaeffer very kindly sent me the photographs of the male and female types and the female from British Columbia. Having considerable doubt about *smintheus* var. *nanus* having been taken at Calgary, Alberta, I wrote to Mr. F. H. Wolley Dod and received the following reply: "*Smintheus* occurs at Laggan and Banff, both at the eastern side of the divide. Arthur Hudson, who formerly collected with me, claims to have seen, but not captured it, about 25 miles southeast of Calgary. He is not improbably correct, and it may occur even a few miles nearer than that. In Geddes' days 'Calgary' might have meant anywhere within 50 miles or even more."

Size in *smintheus* appears to be largely governed by altiture. *Mendica* Stichel is the small form which so far as I know, is only found at high altitudes. It is figured by Mr. Edwards in volume I of his *Butterflies of North America,* pl. 4, f. 1, 4, 5, as taken on the top of Berthoud's Pass, Colorado (11,300 feet altitude), August 16th. We possess fifteen specimens of this small form, all taken at very high altitudes in Colorado, Bullion Peak, July 25th, and Berthoud's Pass, August 22nd. The exact relationship of this to *nanus* remains to be seen. *Smintheus* appears to vary more in size than does *clodius.* The females of *smintheus* vary considerably in color, some being much darker than others. The white in the centre of the red spots of the inferior wings is also quite variable in specimens found at one time in a given locality, and at times are present on one side of the butterfly and absent on the other. The form called *apricatus* by Stichel I have not seen and only know it from the figure in *Grossschmetterlinge der Erde.* The locality given is Kadiak.

We have specimens of *smintheus* from British Columbia,

northernmost point, and from the top of the Las Vegas Range, Rocky Mountains of New Mexico, the southernmost. *Smintheus* has been recorded from California, Nevada, Utah, Colorado, New Mexico, Montana and British America, although I have not seen specimens from California or Nevada.

Smintheus variety *hermodur* Henry Edwards. This was apparently described from a single female as the author says "this extremely interesting insect was generously given to me by my friend Dr. James S. Bailey, of Albany." The locality given was Southern Colorado. The females in *smintheus* in certain localities are quite dark and it is a question whether *hermodur* should have any standing. The specimen figured is from the Henry Edwards collection, now in the American Museum of Natural History, and is numbered 2791 in the Edwards collection and bears label in Henry Edwards' writing *"Parnass. hermodur*, type, Colorado." I am greatly indebted to Dr. Frank E. Lutz for photographs of *hermodur, thor* and *menetriesii*. In the collection of the Academy of Natural Sciences of Philadelphia are specimens of these dark females from Colorado and Montana. William H. Edwards figures a large form of *smintheus* under the name *hermodur,* in the third volume of his *Butterflies of North America*. The examples figured were from the Judith Mountains in Montana. These are evidently a larger form. Mr. W. H. Edwards accepted the name *hermodur* to cover all the dark females.

Parnassius eversmanni. Very little is known about this species in America. The sexes are dissimilar in appearance and have therefore been given different names. There are a number of good figures of both sexes. *Thor*, described by Henry Edwards, has been treated as a variety, but is only the female. The females appear to differ more than the males. I give a figure of the type of *thor* and it is now possible to compare it with the figures given in the European literature. The records for the species are meagre. William H. Edwards records it from the Ramparts, Alaska, two hundred miles below Fort Yukon, June 15th. Dr. W. J. Holland received nine males and one female, taken in the mountains, between Mis-

sion and Forty-mile Creeks, N. E. Alaska, July 20th-24th. The female described by Henry Edwards was taken 800 miles up the Yukon River, Alaska. At the time it was described, he probably did not know the female *eversmanni* or the figure of the female by Menetries. The species has some varietal names in Europe that are based on one sex or on very slight geographical differences.

Parnassius nomion Fisch. This species has been recorded from Alaska, but I have not seen the typical form. We possess two specimens of *nomion nominulus* Standerger that bear merely the label "Alaska." We need additional material with exact data to have a good understanding of the status of this species in North America.

Time alone will elucidate the value of the many names proposed for the variation of the very plastic species of this genus. At the present time I see no use for names based on sexual differences or on individual variation. One may often take a number of specimens of a single species, in a given locality, in a short space of time, and find that each one is different in markings from the others. For the benefit of American students, I append the references to our species published since the appearance of the supplement to my *Synonymic Catalogue of North American Rhopalocera* (1904). I have briefly indicated in the above account of the species what some of the names actually represent. Eventually the species will be placed on a firmer foundation. Dealers in butterflies in America have lamented the fact that we do not run to varietal names as is the case in Europe where there is a good market for these slight variations.

LITERATURE.

H. Stichel, Genera Insectorum, Parnasiinae, 1907.
eversmanni, p. 13, pl. 1, f. 3, ♂.
thor H. Edw. is treated as a subspecies.
baldur Edw. p. 14, pl. 2, f. 4, ♂ is treated as a subspecies.
lusca, Stichel, p. 14, as a new form.
menetriesii Edw. p. 14, as a form.
lorquini Oberthur, p. 14, as a form.
claudianus Stichel, p. 15, as a new subspecies and cites the figure of *clodius* Verity, Rhop. pl. 22, f. 17-19 (1907).
gallatinus Stichel, p. 15, as a new subspecies. He refers to Elrod's figures of Montana specimens.

mendica Stichel, p. 20, new form.
hermodur H. Edw., p. 20, as a subspecies.
sayii Edw., p. 20, as a doubtful subspecies.
nanus Neum., p. 20, as a doubtful subspecies.
behrii Edw., p. 21, as a subspecies.
niger Wright, p. 21, as a form.
magnus Wright, p. 21, as a subspecies.

H. Stichel, in Grossschmetterlinge der Erde, Fauna Americana, 1907.
apricatus Stichel, p. 48, pl. 17*d*. Described in Berlin Ent. Zeit., Vol. 51, p. 87, pl. 2, f. 13. ♂, ♀, 1906 (Kadiak Isld.).
The following are figured on pl. 17 of the Fauna Americana; *claudianus*, ♂, ♀; *clodius*, ♂, ♀; *behri*, ♂; *apricatus; sayii; menetriesii; baldur*, ♂; *hermodur*; *smintheus*, ♀; *lusca*. The figure of *behri* does not represent the yellow-spotted variety described by Edwards.
eversmanni, ♂, ♀, are figured in Grosssch. der Erde, Fauna Palaearctica, Vol. I, pl. 10.

Roger Verity, Rhopalocera Palaearctica, 1909-1911.
nomion, p. 64, pl. 13, f. 6-13.
var. *nominulus*, p. 67, pl. 14, f. 15, 16.
var. *smintheus*, p. 70, pl. 16, f. 18-23.
eversmanni, p. 93, pl. 22, f. 6-9.
clodius, p. 95, f. 17-19.
apricatus, p. 106.

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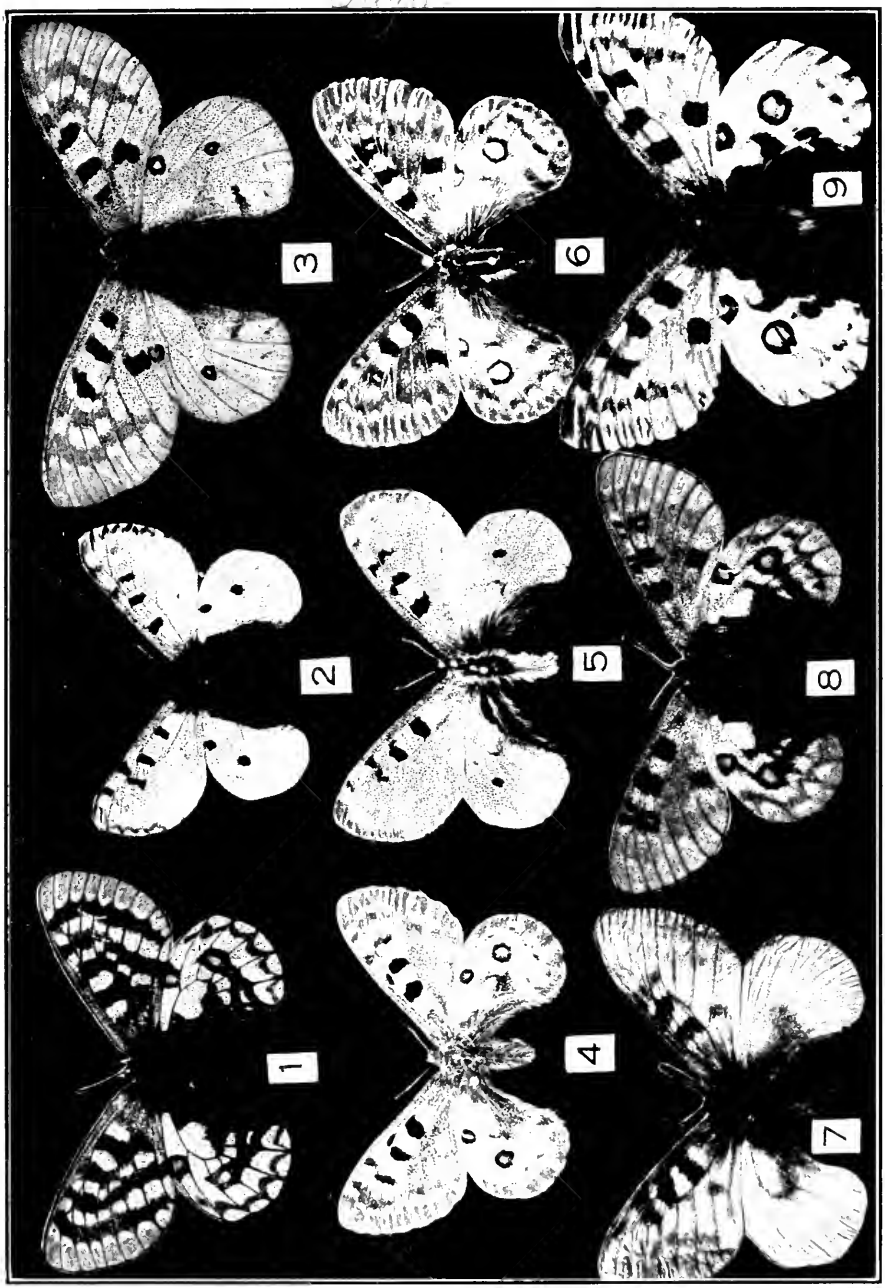
nominulus Staudinger, Iris, 7, 241, 1894.
nomion Oberthur, Etud. Comp. 9, p. 85, pl. 264, 1914.
immaculata Skinner, Ent. News, 22, 108, 1911.
smintheus Doubl.-Hew. Newcomer, Ent. News, 21, 316, 1910.
(life history)
Wolley Dod, Can. Ent. 40, 188, 1908 (Laggan & Banff, Alberta).
clodius Mén., Cat. Mus. Petr. 1, 73, 1855.
Edw., But. North Amer., figs. 5, 6, ♂, 1871.
Wright, But. West Coast, pl. 1, f. 1, b, 1905.
Stichel, Grossschm. der Erde, Faun. Amer., pl. 17, d, 1907.
claudianus Stichel, Gen. Insector. Parnassiinae, p. 15, 1907.
Stichel, Grossschm. der Erde, Faun. Amer., pl. 17, c, 1907.

Explanation of Plate XII.

1. *P. thor* Hy. Edws. Alaska. Type. ♀.
2. *P. mendica* Stichel. Colorado.
3. *P. menetriesii* Hy. Edws. Cotype. Utah. ♀.
4. *P. nanus* Neumoegen. Ft. Calgary. Type. ♀.
5. *P. nanus* Neumoegen. British Columbia. Type. ♂.
6. *P. nanus* Neumoegen. British Columbia. ♀.
7. *P. immaculata* Skinner. Yellowstone Natl. Park. Type. ♂.
8. *P. hermodur* Hy. Edws. Colorado. Type. ♀.
9. *P. nominulus* Staudinger. Alaska. ♂.

There are two specimens of *menetriesi* in the American Museum of Natural History marked type. One bears number 2783 in the Edwards collection and has the name on it in the writing of Henry Edwards. The locality is Truckee, Sierra Nevada, California. This may be taken as the type. It is practically identical with the figure of the cotype shown on the plate.



PARNASSIUS IN AMERICA—SKINNER.

1. THOR, 2. MENDICA, 3. MENETRIESII, 4-6. NANUS, 7. IMMACULATA, 8. HERMODUR, 9. NOMINULUS.

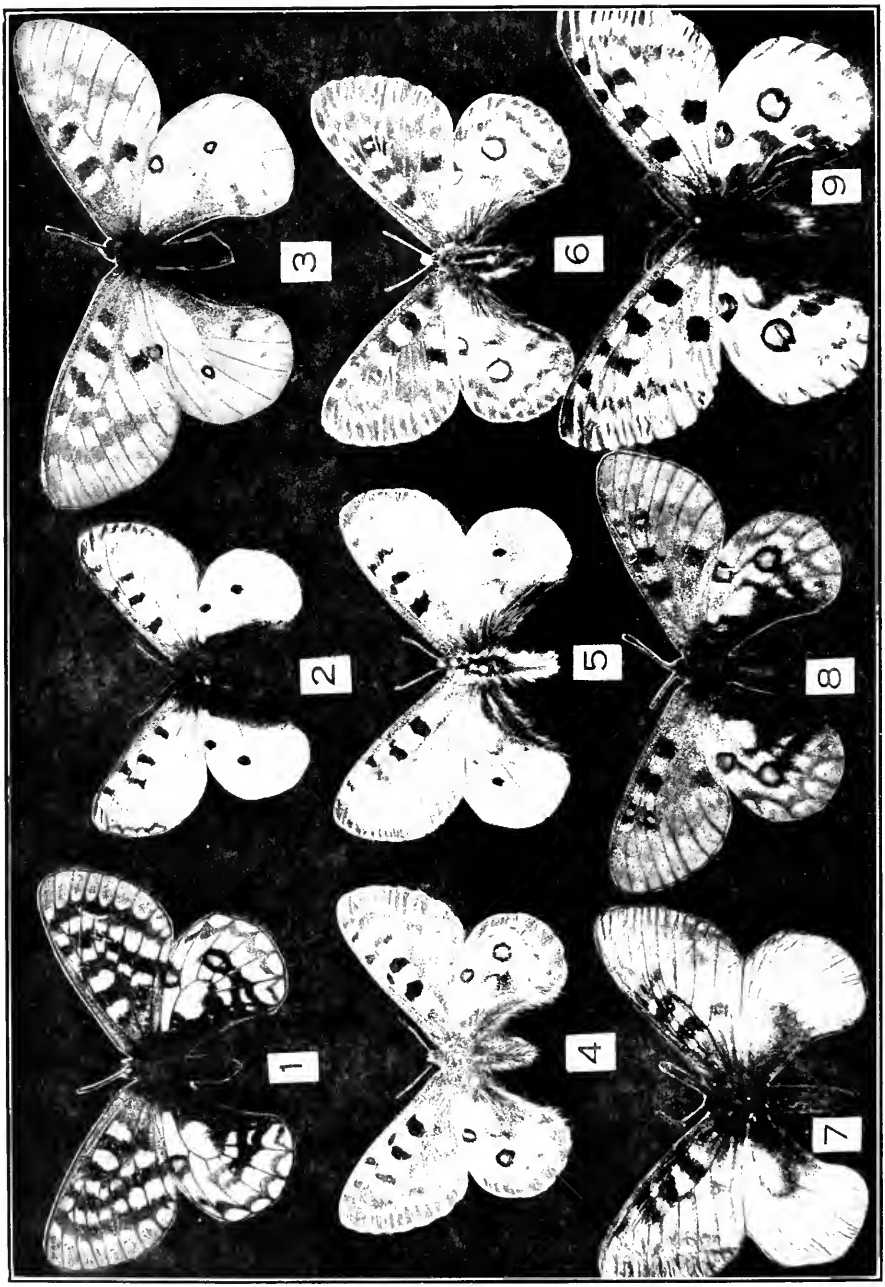


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Plate XII issued with this number is to replace Plate XII of the May number.

Description of Two new Tachinids (Dip.).

By Charles H. T. Townsend, Bureau of Entomology, Washington, D. C.

The following species are described at this time in order to allow the use of the names in forthcoming economic papers.

Doryphorophaga aberrans n. sp.

Length of body, 6 to 7.5 mm.; of wing, 4.5 to 6 mm. Differs from *D. doryphorae* by facialia not ciliate, at most some bristles on lowest one-third; ocellar bristles vestigial or wanting; abdomen thickly silvery pollinose; front golden posteriorly; tegulae of ordinary size.

Four males, Blacksburg, Virginia; three reared from *Leptinotarsa decemlineata* Say, and one from *Blepharida rhois* Forst. (W. J. Schoene).

Holotype, No. 20126 United States National Museum.

This is an eastern form. *D. doryphorae* is from the Mississippi valley and westward.

Euphorocera floridensis n. sp.

Length of body, 11.5 mm.; of wing, 8 mm. Differs from *E. tachinomoides* as follows: Parafrontals and parafacials deep golden, also orbits. Abdomen without any red on sides; the posterior black of intermediate segments produced forward in a triangle on each side to near front margin, heavy on second segment, these forming with median vitta a black trident on those segments.

One male, Gainesville, Florida; reared from *Anticarsia gemmatilis* Hubn. (J. R. Watson).

Holotype, No. 20127 U. S. Nat. Mus.

Certain Features Found in the Genus Panchlora, with other Observations and the Description of one new Species (Orthoptera, Blattidae).

By Morgan Hebard.

In studying material of this genus introduced into the United States, it has become necessary to examine all the series in the Philadelphia collections, a total of 247 specimens, representing at least 24 species.

The genus is undoubtedly difficult, but were the males described with full reference to the supra-anal and subgenital plates, cerci and styles, only rare specimens showing some de-

gree of aberration from the normal type would prove to be difficult to determine. As the matter stands, however, scarcely anything of use can be found in the literature on the genitalia of the numerous described species. Those of distinctive marking and coloration can usually be located, but among the descriptions of the plain green forms (with or without minute dots on the wings and with immaculate antennae and no dark lines on pronotum or tegmina) seldom anything of diagnostic value may be found. It is evident that the types of the species, thus insufficiently described, must be studied before the nomenclature of the plain forms of the genus may be put on anything like a secure basis. In the meantime, we only urge that, in studying such material, the male genitalia be always carefully considered. The females offer scarcely any genital features; as a result, while the sexes of the more distinctively colored specimens are rather easily associated, those of some of the plain green species are difficult in the extreme.

Male Genital Characters.

The supra-anal plate in different species has the distal margin weakly convex, transverse, weakly angulate-emarginate or strongly emarginate. Though constant in most species, this margin varies in at least one very widely distributed form from very weakly convex to distinctly obtuse-angulate emarginate. The cerci are of subequal width throughout with apex broadly rounded, distinctly tapering with apex sharply rounded, or tapering to last joint which is slender and elongate, while differences in length are also found in different species. Very little variation is found in these appendages in the majority of species, but in one widely distributed form not only do they vary in length, but also in proportionate diameter. The subgenital plate has the distal margin between the styles transverse, triangularly produced with apex rounded, triangularly produced but weakly emarginate mesad, and weakly convex to strongly produced sinistrad and so asymmetrical in different species. Very little variation is found in this feature. The styles are elongate cylindrical, varying

from minute to relatively large in different species, reaching from about one-sixth the distance to the cercal apex to nearly the apex of those appendages.

Female Genital Characters.

The degree of production and median emargination of the supra-anal plate is not a feature of diagnostic value, while the cerci, which Shelford has stated to agree with those of the opposite sex,[1] we find to be much less specialized than in the males and in the great majority of species useless as a diagnostic character. The subgenital plate is also generally similar in most of the species but in one before us, *thalassina,* it is found to be very much more deeply concave mesad than is usual.

Overestimated Characters.

The width between the eyes is always less in the male sex than in the female: the character is not of considerable help in all or even many of the species, as Shelford has implied,[2] but only in those in which decided differences in this feature occur. On the whole, if slight differences were employed in sorting series, these would prove not only unsatisfactory but dangerous diagnostic features.

In the female sex, some species have the transparent margins of the pronotum and tegmina much clouded or even solidly opaque; the males of these species show this condition to a very much less degree or not at all.

Minute dark brown dots are found on the tegmina in a number of species. The number of such dots is individually variable, and they are found both present and absent in individuals of the same species. Overestimation of the value of the number and position of such dots has unquestionably led to the erection of a number of synonymic names.

Distinctively Marked Species.

In the species having the antennae annulate, the pronotum with narrow lateral black lines, or other distinctive features of

[1] Trans. Ent. Soc. London, 1907, p. 463, (1908).

[2] Trans. Ent. Soc. London, 1907, p. 464, (1908).

coloration or marking, not only are genital features to be found but also the character of the antennal annulation, cephalic, pronotal and tegminal color pattern and general coloration, afford excellent diagnostic features. In a number of these species, general size and form and width of tegmina prove to be of excellent value in further distinguishing the species.

Nomenclature.

The names,[3] in the order in which they have been proposed, are, for the plain green species: *nivea, chlorotica,*[4] *viridis, virescens,*[5] **exoleta, *prasina, *cubensis, antillarum,*[6] *poeyi,*[7] *glauca,*[8] *peruana, luteola, lancadon, *thalassina, punctum.*

For the species having the antennae annulate and the pro-

[3] An asterisk before a name in the present list indicates that the species is represented in the material before us without question of determination.

[4] This name must be considered unidentifiable. The original description and figure are both wholly inadequate for locating the species. The type is no longer in existence and was described from the Cape of Good Hope, a locality either in error or the type was an adventive specimen, for none of the plain green species of *Panchlora* are found native in Africa. In any case, description, figure and locality, all are valueless.

[5] Shelford, who has examined the types of both *nivea* and *virescens,* places the latter name in the synonymy under *nivea.*

[6] This name is an evident synonym of *cubensis*; the description shows no feature of real diagnostic value. In the extensive series before us from the West Indies, but a single species of plain green *Panchlora* is found.

[7] This name is also a synonym of *cubensis,* (see footnote 6). The type is a male, the types of *cubensis* and *antillarum* females; the sexual differences led Saussure to describe the present specimen as distinct.

[8] Brunner has, in our opinion, correctly synonymized this name with *prasina.* Saussure and Zehntner have resurrected *glauca* in the Biologia, with apparently only the type of that species before them, giving there for the first time "oculi plus quam eorum latitudine remoti" as is true for *prasina.* The name *glauca* was evidently based on a small example of *prasina,* showing an unimportant variation in the subgenital plate. We have now before us an example of *prasina* larger than any other specimen in our series of the genus and other smaller specimens of which the smallest is no larger than the type of *glauca.*

notum without narrow dark lateral lines: *hyalina* of Saussure, *nigricornis*, **acolhua*, **fraterna*, **montezuma*, *cribosa*, *festae*, *translucida*.[9]

For the species having the antennate annulate and the pronotum with narrow dark lateral lines: *quadripunctata*,[10] *pulchella*, *azteca*, *zendala*, **mexicana*, *moxa*, *erronea*, *tolteca*, *najas*, *latipennis*, **nigriventris*.

Kirby has, in addition, placed *alcarazzas* in the present genus with a query.

Order of Linear Arrangement of Species.

In the linear arrangement of the species of the genus we consider that those which we term the plain green species should properly appear before the more distinctively colored forms. Of the plain green forms we would place first the species having in the males the distal margin of the subgenital plate transverse, next those having this margin triangularly produced, here including the few more distinctively colored species also showing this feature, and last those species having this margin produced sinistrad and asymmetrical, after which follow the majority of the more highly colored species which also show this condition.

The following small plain green species must shortly be recorded in a paper by Mr. James A. G. Rehn. As it is evidently new, we offer the following description.

Panchlora bidentula[11] new species.

The present species belongs in the second division of the genus as arranged above.

Type: ♂ ; Igarapé Assu, Pará, Brazil. January 17, 1912. (H. S. Parish.) [Acad. Nat. Sci. Phila. Type No. 5295].

[9] This name has been proposed by Kirby for the species described as *hyalina* by Saussure, which Kirby considered preoccupied by *Blatta hyalina* of Stoll. As Stoll's description contains not a single character of specific diagnostic value and as the type is not extant we consider his name unidentifiable and in consequence *hyalina* of Saussure must stand.

[10] Selected as type of the genus by Kirby, Synon. Cat. Orth., I, p. 154, (1904).

[11] In allusion to the minute mesal productions of the margin of the male subgenital plate.

Size small, form moderately slender. Head with eyes very broad in front; separated by a very brief space in width less than one-tenth the greatest diameter of the eye. Pronotum and tegmina of normal form, the clear margins of these parts somewhat tessellate with greenish and in consequence partially opaque. Tegmina and tegminal veins very delicate. Femora with normal hairs and spines extremely delicate. Supra-anal plate subrectangulate, decidedly transverse but still produced beyond the apex of the produced subgenital plate, dorsal surface weakly concave and covered with short hairs; lateral margins straight and longitudinal to rather broadly rounded disto-lateral angles, between these the distal margin is truncate, transverse with a minute mesal emargination. Cerci small, extending very slightly beyond distal margin of supra-anal plate, tapering very gently and evenly to flattened, narrow and rather sharply rounded apex. Subgenital plate transverse, symmetrical, weakly triangularly produced distad, the lateral margins not strongly convex to brief mesal portion which is weakly concave, this concavity on each side terminated by very minute triangular projections of this margin. Small cylindrical styles situated on this margin at the inner margin of the base of the cerci and equal to about one half the cercal length.

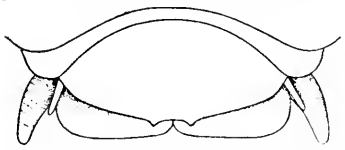

Fig. 1.—*Panchlora bidentula, n. sp.* Ventral outline of cerci and subgenital plate of type. (Greatly enlarged.)

The female of the species is unknown.

Measurements (in millimeters).

♂♂	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen
Caparo, Trinidad. *Paratype*	12.7	3.6	4.5	13.2	4.4
Igarapé Assu, Brazil, TYPE	12.3	3.4	4.4	12.2	4.
Igarapé Assu, Brazil. *Paratype*	12.3	3.5	4.4	12.7	4.3

Coloration. Dorsal surface light lumiere green fading to hyaline distad on tegmina. Lateral margins of pronotum and field of tegmina hyaline, weakly obscured with greenish. No traces of lateral cream colored lines on pronotum and tegmina, so often found in the plain species of *Panchlora*. Eyes very dark brown, the very brief interocular space ferruginous; head otherwise unmarked. Antennae antimony yellow, immaculate. From one to two minute and inconspicuous brown dots are present on the tegmina in their distal half.

Specimens Examined: 5; 5 males.

Caparo, Trindad, VI, 1913 (S. M. Klages), 2 ♂,[12] [A. N. S. P.]; VIII, 1913 (S. M. Klages), 1 ♂, *paratype* [Hebard Cln.].

Igarapé Assu, Pará, Brazil, I, 17, 1912 (H. S. Parish), 2 ♂, TYPE and *paratype* [A. N. S. P.].

[12] In these specimens the caudal margin of the subgenital plate is slightly uneven mesad; in one the minute projections are not decided, in the other they are suggested merely by angulations of the margin.

Descriptiones Hymenopterorum Chalcidoidicorum Variorum cum Observationibus. III.

By A. A. Girault, Glenndale, Maryland.

Eupelmus inyoensis new species.

♀. Closely allied to *juglandis* Ashmead but differs in having the middle tibiae metallic except at each end (hence the legs concolorous except the knees, tarsi and tips of tibiae) and the caudal tibiae all distinctly metallic. Distal three tarsal joints black. The abdomen is somewhat more slender than with *juglandis* and the postmarginal vein is only slightly longer than the stigmal (much longer in *juglandis*). Otherwise about the same. Differs from *brevicaudus* Crawford in the coloration of the legs only.

♂. Similarly colored. Compared with types of the named species.

Described from five females on tags in the United States National Museum labelled "428 Inyo County, California."

Types: Catalogue No. 20130, U. S. N. M., the above specimens, an antenna on a slide.

Eupelmus coccidis Girault.

Differs from *limneriae* Howard only in bearing no metallic on the caudal tibiae. One female among the type material of *brevicaudus* Crawford and similarly labelled; the caudal femur was nearly all metallic centrally. There is slight metallic laterad at apex of cephalic femur.

Pseudomphale ancylae new species.

♀. Like *lixivorus* Crawford but a third smaller and differing most noticeably in that the distal *half* of each tibia is white not merely the tips. Differs also in the following particulars: Segment 2 of the abdomen is distinctly longer being about half the length of that region and moreover it does not show a broad cross-stripe of scaliness distad (and which widens laterad) as does the other species but its distal half bears rather dense, exceedingly delicate pin-punctures; the other abdominal segments dorsad do not show a distinct, rather coarse scaliness; the petiole is somewhat longer than in *lixivorus* and the propodeum glabrous (except within the grooves). Scutellum subglabrous.

Postmarginal vein very slightly longer than the short, usual stigmal; funicle joints subglobular, 1 a little the longest, a little longer than the pedicel, club with a distinct terminal spine. Mandibles bidentate and with four or five minute teeth within.

♂. The same but the club is solid, the funicle 4-jointed (three ring-joints), the joints 3 and 4 subequal, globular, longer than the pedicel, 1

somewhat longer than wide, the scape short and dilated ventrad, the flagellum clothed with rather dense, soft greyish hairs.

Described from one pair reared from *Ancylus nubeculana,* Winchester, Virginia, April 1, 1915 (B. R. Leach).

Types: Catalogue No. 20131, U. S. N. M., the above pair on tags, the heads and a pair of female wings on a slide.

Pseudomphale steirastomae new species.

♀. Differs from *metallicus* Ashmead in that the cephalic femur is concolorous (in the type female, the cephalic legs yellow except coxae in the other species) and the tibiae are distinctly marked with black; in *nigrocyaneus* Ashmead, the tibiae are all white and the propodeum mostly glabrous; closely allied with *lixivorus* Crawford but differs in having the cross-stripe of scaliness on segment 2 of the abdomen distinctly shorter and less distinct, the eyes are larger; *floridanus* (which differs from *microgaster* mostly in the male sex) has the tibiae all white, the propodeum glabrous and the second abdominal segment with minute pin-punctures (except broadly at base); from *brasiliensis* in having the tibiae dark, the second segment of the abdomen shorter (only somewhat less than half the length of the abdomen not three-fourths its length as in *brasiliensis*) and the different sculpture of the latter; from *ancylae* in the different coloration of the legs, the scaly propodeum and the different sculpture of the second abdominal segment; from *hypatia* in the scaly propodeum only. Of the stature of *hypatia.*

The pedicel is elongate, somewhat longer than funicle 1; funicle 3 is somewhat closely attached to the club so that region superficially appears 3-jointed (transition, no doubt).

♂. Similar; its funicle 4-jointed, the joints short, the scape dilated. Three ring-joints. Funicle 1 subequal to the club (more or less) nearly twice longer than wide, the others subquadrate. Mandibles bidentate and with four or five comblike teeth following the acute second tooth.

Described from six males, four females reared from the larvae of *Steirastoma depressum,* Erin, Trinidad, British West Indies, January, 1913 (F. W. Urich).

Types: Catalogue No. 20132, U. S. N. M., one female, three males on tags and a head of each sex on a slide.

Pseudomphale graciliventris new species.

♀. Of rather small size for the genus. Similar in stature and so forth to *atroscapus* Girault but the abdomen is more slender and graceful and differs in sculpture, there being no distal cross-stripe of scali-

ness, as in the Florida species, but instead there is a similar area of dense minute pin-punctures (extending broadly over half way to base along the meson); the second abdominal segment is a little longer. Also the funicle joints are somewhat longer, 1 somewhat longer than the pedicel.

♂. Similar (but segment 2 of abdomen occupying the entire surface?); funicle 4-jointed, the club solid, the scape distinctly compressed. Funicle 1 somewhat longer than the pedicel, 4 subequal to the pedicel.

Described from one male, seven females reared from an egg-mass of a Cassidid, Erin, Trinidad, British West Indies, March, 1914 (F. W. Urich).

Types: Catalogue No. 20133, U. S. N. M., five females on tags, male and female antennae on a slide.

Psilophrys pulchripennis Ashmead. Genotype of *Habrolepopteryx* Ashmead.

Mandibles rather long, with three acute, subequal teeth; head shaped as in *Berecyntus;* scrobes forming a distinct semicircular depression; frons moderately narrow; club 3-jointed. Funicle 1 twice longer than wide. Frons subprominent; eyes not very large, longer than the cheeks. Knees, tips of tibiae (broadly in cephalic tibiae), tarsi and the long middle tibia, lemon yellow. General habitus of *Paracalocerinus australiensis* Girault except the ovipositor. From types in the U. S. N. M. The generic description is otherwise correct.

Habrolepopteryx pulchripennis Ashmead, **aeneiscapus** new var.

♀. Similar to the genotype but the scape is concolorous.

Types: Catalogue No. 20134, U. S. N. M., the specimens on tags. From two females, part of the type of the typical form.

Paracalocerinus americanus new species.

♀. Agrees with the description of *australiensis* but the ovipositor is extruded somewhat farther, the oblique eye-spots on the fore wing are larger, their distance from the wing apex is much greater, the cephalic one against the short postmarginal vein (as in the genotype) and besides the fore wing bears a conspicuous longitudinal hyaline streak along the middle from a point between the oblique eye-spots (where it is narrowest) to apex (where it is broadest). The postmarginal vein is slightly longer than the stigmal (the marginal linear, six or more times longer than wide). The frons a little narrower than in the genotype, the scrobes longer and more distinct (the head is somewhat as in *Habrolepopteryx* but the inflexion is less) yet not very long, the mandibles stouter. Funicle 1 smallest, somewhat like a

large ring joint, 2 longest, somewhat longer than wide, 3 quadrate, longer than 1, the others wider than long. The pedicel is somewhat longer and the sculpture of the body is finer than with the Australian species.

Described from one female in the U. S. N. M., from Onaga, Kansas (Crevecoeur).

Type: Catalogue No. 20135, U. S. N. M., the thorax on a tag; rest of the body on a slide (including wings) with a female of *australiensis* (Kuranda, Queensland, forest, September, A. P. Dodd).

(Eupelmus) Aphidencyrtus schizoneurae (Ashmead).

The tibiae are dark, the mandibles as in *aphidiphagus*, that is, the third tooth truncate. The type female is in bad condition, without wings. The frons is wider than usual.

Holcencyrtus physokermis new species.

♀. Length, 1.10 mm. Dark metallic green, the wings hyaline, the venation dusky, the blade of the wing very slightly infuscated distad and caudad of the marginal vein; knees, tarsi and apex of the tibiae pale, middle tibiae more broadly pale at tip, distal tarsal joint dusky.

Pedicel somewhat longer than wide at the apex, subequal in length to joints 1 and 2 of the funicle which are subquadrate; funicle 6 no longer than 1 yet somewhat wider; club two-thirds the length of the funicle and somewhat wider, its joints larger than those of the funicle.

Head and thorax densely scaly, the vertex, scutum, axillae and scutellum with scattered minute setigerous punctures which are not dense yet rather numerous. Axillae slightly separated. Mandibles of tolerable length, their teeth short, equal, the first two acute, the third obtuse but not broad. Head (cephalic aspect) quadrate, the frons broad, not prominent, the eyes ovate, not large, slightly longer than the cheeks. Face inflexed. Pronotum transverse linear.

Marginal vein quadrate or a little longer than wide, thick, the postmarginal and stigmal veins subequal, a half or more longer than the marginal. Hairless line not closed caudad, with six or more lines of cilia proximad of it (these cilia enclosing proximad a triangular naked space). Costal cell broad (with four or five lines of discal cilia). Fore wings ample, densely, finely ciliate.

Ovipositor inserted distad of middle, the abdomen from its insertion, obliquely truncate.

Proximal tarsal joints not long (longest in the middle legs, shortest in the cephalic ones).

♂. The same but the marginal vein is over twice longer than wide, somewhat longer than the postmarginal or stigmal; cephalic and middle legs, caudal femora and tarsi (except last joint), a cinctus on caudal

tibiae joint below the knee and tips of caudal tibiae and the antennae except the pedicel and dorsal edge of the scape, pale lemon yellow. Scape short, convexed distinctly beneath; pedicel globular; funicle joints narrowed at each end, shorter than the solid club, clothed with long, scraggly hairs, subequal, 6 thickest, two and a half times longer than where widest.

Described from one male, twelve females reared from *Physokermes picea*, Madison, Wisconsin, May 12, 1915, June 30 (F. A. Fenton).

Types: Catalogue No. 20136, U. S. N. M., one male, six females on a slide (with other male encyrtids); two females on a slide as paratypes.

Encyrtus ensifer Howard.

The mandibles are only *bidentate*, the second tooth broadly truncate.

Xenocrepis mexicana new species.

♀. Length, 1.55 m.. Dark metallic blue, the wings hyaline, the venation fuscous, the knees, tibiae (except sometimes the caudal tibia just below the knee, a fuscous band), tarsi and scape pale yellow; rest of antennae blackish, the pedicel lighter.

Head and thorax densely scaly punctate, the dorsal abdomen glabrous except distad where there is delicate scaliness. Head wider than the thorax, rather thick, the occiput obscurely margined. Antennae inserted a little above the middle of the face; pedicel a little longer than wide, barely longer than funicle 1 which is very slightly longer than wide, 3 quadrate, 5 slightly wider than long; the three ring-joints all short, 1 a little the shortest. Flagellum filiform, the club joints subequal to funicle 1. Mandibles 4-dentate.

Postmarginal vein elongate, nearly as long as the slightly thickened marginal, nearly twice longer than the slender stigmal.

Propodeum finely punctate, with lateral carinae, no median, from lateral aspect with a short, subglobose neck, conical, much longer at the meson than at the spiracle, the latter small, cephalad. Parasidal furrows only cephalad. Abdomen with a very short petiole from beneath the propodeal neck, slightly longer than the rest of the body, pointed conical, not produced beneath, its second segment longest, occupying somewhat over a third of the surface.

Cephalic femur not swollen.

♂. Similar except that the body is weaker and the tibiae metallic except at each end.

Described from ten males, four females on tags in the U. S. N. M., labelled "*Scymnophagus townsendi* Ashmead, 6427° = 6. Townsend. Issued November 30, 1894. Type No. 12725, U. S. N. M."

Types: Catalogue No. 12725 U. S. N. M., the above specimens and a slide bearing a head of each sex, a male first femur and three female caudal legs.

The species is parasitic on a Scymnid larva which preys upon *Lecanium oleae* on orange, San Luis, Mexico. Also at Monterey, Mexico, from the larva of *Azya orbigera*. The scutellum has a delicate cross suture near its apex.

Polynema piceipes Girault.

The legs are concolorous as the name indicates.

Collecting Papaipemae (Lep.).

By Alex Kwiat, Chicago, Illinois.

My object in writing on this subject is not particularly to recount my own experiences but to serve as a guide to others, who, by its aid, might become interested and succeed in adding to our knowledge of the various species of *Papaipema* and their life histories.

A great deal of careful and painstaking work on this group has been done by Mr. Henry Bird and others during the last eighteen or twenty years and the results published from time to time. My intention is merely to summarize a few of the known facts so that anyone who wishes to do so can seek intelligently for the larvae of species whose food plants and habits are known and rear them to maturity. Anyone working along the lines suggested will not only add materially to his collections but also may discover new species and the life histories of others hitherto unknown.

In general the larvae of the Papaipemae are borers in the stems or roots of persistent annuals or perennial plants and, in at least one instance, in the young shoots of an indigenous tree.

The moths appear rather late in the year, the earliest species about August 15th and the latest about October 5th. They are sluggish of habit and seldom fly far from their breeding place. This sluggishness and the late period of flight accounts for their scarcity in collections.

Eggs are deposited on or near the food plant and hatch the

following spring and by the middle of May, in some instances, the work of the young larvae may be observed. A wilted or yellowing leaf or stunted growth often tells the tale and almost invariably the presence of frass at or near the opening by which the larvae entered, indicates its whereabouts. Often a leaf will wither from some other cause in which case the absence of frass renders further search needless. Where no indication but the presence of frass is mentioned, it will be found that affected plants are usually stunted or shorter than those unaffected.

The larvae are readily recognized by their characteristic markings up to the penultimate stage. They are usually of a brownish color with five longitudinal pale stripes. These stripes are in some species continuous throughout, in others with only the dorsal stripe continuous and in a third group with all stripes interrupted at the first four abdominal segments by a dark-purplish brown band which encircles the body and is a character appearing more or less strongly on all the larvae during the earlier stages.

Pupation sometimes takes place in the burrow but more often in the ground and the pupal period lasts from four to five weeks.

It may be assumed that a species is found or is likely to be found wherever its food plant occurs. Where the life history is unknown, I have shown as habitat, the places where captures have been reported.

The species are here listed alphabetically and no attempt is made to indicate synonymy, the latest authentic name only being given.

anargyrea Dyar.—Life history unknown. Habitat, Colorado.

angelica Smith.—In "stem" and "root" of *Psoralea macrostarcha*. Habitat, California.

appassionata Harvey.—In root of Pitcher Plant (*Sarracenia purpurea*). Pupates in ground August 1st to 10th. Evidence, orange-colored frass. This larva usually changes to a new plant early in July.

arctivorens Hampson.—In stem and root of Burdock (*Arctium lappa*); also in thistles (*Cirsium hillii, lanceolatum* & *arvense*). Pupates in ground about August 10th. Evidence, frass.

astuta Bird.—In stem and root of Stone Root or Horse Balm (*Collinsonia canadensis*). Pupates in ground August 1st-10th. Evidence, white frass and dry stalk.

aweme Lyman.—Life history unknown. Habitat, Manitoba.

cataphracta Grote and var. **fluxa** Bird.—Very general feeder in Burdock, Thistle, Parsnip and other plants, in stem and root. Pupates in its burrow about August 10th. Evidence, dwarfed or sickly plant, often breaking at opening.

cerina Grote.—In stem of *Lilium superbum*. Pupates in ground about August 1st. Evidence, small hole and little frass.

cerussata Grt. & Rob.—In stem and root of Ironweed (*Vernonia noveboracensis*). Pupates in ground about August 5th. Evidence, frass and burst and often bent stem.

circumlucens Smith.—In stem and root of Dogbane (*Apocynum androsemifolium* and *canabinum*); also in *Baptisia tinctoria* and other plants. Pupates sometimes in burrow, more often in ground, about August 1st. Evidence, wilted or brown foliage in July or if stem is very thick it merely bends at the opening. There is much frass of a reddish color.

duovata Bird.—In stem and root of *Solidago sempervirens*. Pupates in burrow about August 15th. Evidence, several openings in stem.

duplicata Bird.—In root of Stone Root (*Collinsonia canadensis*). Pupates in burrow about August 15th. Evidence white frass and dry stem.

errans B. & McD.—Life history unknown. Habitat, Arizona.

erubescens Bird.—In Thistle (*Cirsium occidentale*). Pupates in burrow about July 25th. Evidence, frass.

eupatorii Lyman.—In lower stem and root of *Eupatorium purpureum*. Pupates in burrow August 1st to 10th. Evidence, frass.

frigida Smith and var. **thalictri** Lyman.—In root of Meadow rue, (*Thalictrum*). Pupates in ground about August 1st. Evidence, very slight, little frass. Not rare.

furcata Smith.—In young shoots of Ash. Pupates in ground about July 20th. Evidence during July, dried black terminal leaves. The fresh shoot is first entered and when the larva leaves it a new burrow is made, often a considerable distance lower, in the preceding year's woody growth. Here only a clean cut hole is visible, as the frass, being unusually dry, drops to ground and scatters. If the terminal work is evident, a slight bending of the woody portion will cause a sharp break at the point where the larva is to be found. Should be located early but not taken in until shortly before pupation, as ash stems dry too quickly and larvae will not thrive.

harrisii Grote.—Lower stem and root of *Heracleum lanatum*. Pupates in ground about July 25th. Evidence, hole in stem and frass.

humuli Bird.—In stem of Hops often as high as 20 feet from base. Occupies a cigar-shaped gall which serves as evidence. Pupates in ground about July 20.

impecuniosa Grote.—In stem of *Aster umbellatus*. Pupates in stem about August 20th and is usually tightly wedged in burrow. Evidence, frass. Also feeds in Sneezeweed.

imperspicua Bird.—Life history unknown. Habitat, Franconia, New Hampshire, and Buffalo, New York.

inquaesita G. & R.—In sensitive fern (*Onoclea sensibilis*). Enters frond stem and bores to end of advancing root stock. Pupates in ground about August 1st. Evidence, orange-colored frass and during June the withered leaf.

insulidens Bird.—Life history unknown. Habitat, Vancouver Island.

limata Bird.—Life history unknown. Habitat, Pullman, Washington.

limpida Gr.—Lower stem and root of Burdock at Montreal, Quebec. Pupates in burrow or ground about July 15th. As burdock is not native in America this species must have some other indigenous food-plant. Type was from Illinois.

lysimachiae Bird.—In stem of loose-strife (*Lysimachia quadrifolia*). Pupates in the ground, August 12th to August 18th. Evidence, brown leaves and stem.

marginidens Gn.—In stem and root of *Cicuta maculata*, also *Rumex* and Cosmos and Burdock. Pupates in ground about July 20th. Evidence, fallen top or branch and frass at base. In burdock only frass.

maritima Bird.—In base of stalk of *Helianthus giganteus*. Pupates in burrow about August 15th. Evidence, large gall-like swelling at base and frass. Habitat, Atlantic coast of New York and New Jersey.

merriccata Bird.—In root of Mandrake or May Apple. Pupates in ground about August 10th. Evidence, yellow leaf and frass.

necopina Grote.—In base of stalk of *Helianthus tuberosus* and *H. rigidus*. Pupates in burrow or ground about August 1st. Evidence, swelling at base of stem and frass.

nelita Strecker and var. **linda** Bird.—In lower stem and root of *Rudbeckia laciniata*. Pupates in ground July 15th to August 10th. Evidence, frass.

nepheleptena Dyar.—In stem and root of Turtle-head or Snake-head (*Chelone glabra*). Pupates in ground about August 15. Evidence, white frass.

nephrasyntheta Dyar.—In root of *Eryngium yuccifolium.* Pupates in burrow or soil about August 15th. Evidence, yellow leaf blades and much brown frass.

nitela Gn. and var. **nebris** Gn.—The commonest of all. Feeds in stems of Ragweed (*Ambrosia trifida*) and over-runs into Burdock, corn and other plants. Pupates in stem about August 10th. Evidence, frass and holes in stem.

ochroptena Dyar.—Life history unknown. Habitat, Denver, Colorado.

pterisii Bird.—In stem and root of common Brake Fern (*Pteris aquilina*). Pupates in ground July 20th to July 30th. Evidence, yellow leaf and orange colored frass.

purpurifascia G. & R.—In root of Columbine (*Aquilegia canadensis*). Pupates in ground July 15th to August 15th. Evidence, frass.

rigida Grote.—In root of *Heliopsis helianthoides,* also in *Helianthus decapitalis* and *Zizia* sp. Pupates in ground about August 5th. Evidence, frass.

rubiginosa Bird.—In stem and root of *Heracleum lanatum* and *Angelica atropurpurea.* Pupates in ground July 20th to August 5th. Evidence, frass.

rutila Gn.—Life history unknown. Habitat, Illinois.

sciata Bird.—In root of Speedwell (*Veronica virginica*). Pupates in ground about August 15th. Evidence, frass and sometimes dry or broken stalk.

silphii Bird.—In root of *Silphium terebinthinaceum, S. laciniatum* and *S. perfoliatum.* Pupates in ground about August 10th.

speciosissima G. & R.—In root of Regal and Cinnamon ferns (*Osmunda regalis* and *cinnamomea.*) Pupates in ground about August 1st. Evidence, slight, sometimes a dry leaf, usually only frass and this a rusty-brown mud-like deposit.

stenocelis Dyar.—In root of fern (*Woodwardia virginica*). Pupates in ground about August 10th. Evidence, frass.

unimoda Smith.—Life history unknown. Habitat, Colorado.

verona Smith.—Life history unknown. Habitat, Winnipeg, Manitoba.

Some instruction as to the necessary equipment and the proper method of handling the larvae is essential. A strong jack knife, a garden trowel (the writer uses a steel intrenching tool, such as were carried by our soldiers in Cuba) and a botanical collecting case or, in place of this, an ordinary grip, are indispensable. A number of small vials or test tubes of ¼ inch diameter and about 2 inches long are very useful. These tubes should be corked and numbered for identification. They

will serve each for one larva, if it should leave its burrow when disturbed. To induce it to return to the burrow is a waste of time. Then, too, if it is desired to transfer a larva to a fresh food plant, the tube with the larva in it can be placed over the end of the fresh plant and the larva is thus forced to feed there, instead of exhausting itself by wandering around in search of its former home or some other plant more to its liking.

In general it is advisable to gather the larvae as late as possible before pupation takes place. Some species, however, are more easily detected in the earlier stages, and these have been noted in the list; such can be located early and taken in later. The time for taking them in is also limited so, as soon as July sets in and even before, it behooves the collector to "get busy." Care must be taken to keep the various food plants in separate boxes and specimens should be labeled with the name of the plant in which it is bred. A goodly number of boxes is therefore needed and they should be deep enough to contain 4 inches or more of loose soil or leaf mould and still leave about 6 inches clear above the soil.

It is best to take some root with the food plant whenever possible. It is also advisable to cover the soil with sphagnum moss (which can be obtained from any florist) to prevent its drying out as much as possible. The soil should be kept moist but never very wet. If the plant in which the larva was found is frail, it is best to supply a new plant at once. When the larva pupates in its burrow and the plant begins to dry and shrivel so as to pinch the pupa, the latter should be removed and placed on the soil and covered with moss.

These moths when mounted, usually become greasy, to prevent which, we break off the abdomens after the specimens are completely dry (not merely rigid), whether they show signs of grease or not, and immerse them in pure gasoline or benzine for one week, replacing them with the aid of Lepage's glue. Needless to say that the bodies must not be mixed. Small vaseline jars or jelly glasses are handy to use for the gasoline. Four to six bodies of different colors or sex can be placed in each at one time and the gasoline used only once. While in

use these jars should be kept in a dark place to prevent fading of colors.

As an indication of what may be done in the group, I need only state that in two seasons, the writer, with Mr. Emil Beer, of Chicago, who co-operated throughout, successfully reared to maturity 19 of the species listed above, all from the immediate vicinity of Chicago.

In conclusion I wish to acknowledge my indebtedness to Mr. Otto Buchholz of Elizabeth, New Jersey, who first supplied me with a list somewhat similar to that here given, and also to Mr. Henry Bird, who supplemented the efforts of Mr. Buchholz with valuable suggestions.

Tribolium confusum Duval as a Museum Pest (Col.).

During the late summer and fall of 1914, a sack of bran which had been partly used in grasshopper poisoning became the breeding place for the small flour beetle, *Tribolium confusum* Duval. From this bran, which hung in the attic, the beetles became generally diffused throughout the laboratory, finding their way into the temporary insect boxes. Aside from being a menace to the collections by crawling about in the boxes knocking off legs, antennae, wings, etc., and small specimens off points, they made further depredations by actually eating specimens. Many smaller insects were eaten in the boxes, which work was, no doubt, that of this insect and at one time the writer discovered five of the adults within a cavity in the abdomen of a moth eating vigorously.

This insect was found breeding in boxes of stored unpinned Lepidoptera by Mr. Wm. B. Turner, of this Station. Many larvae were present, some inside the bodies of the moths, others about on the bottom of box and in crevices. That they had been feeding was quite evident from the fragmentary matter sifted down to the bottom of the box. Pupae and newly emerged adults were present also. (Mar., 1915).—H. L. Parker, Bureau of Entomology, Division of Cereal and Forage Crop Insect Investigations, Hagerstown, Md.

Eleodes tricostatus Say in Missouri (Col.).

Blaisdell in his Revision of the Eleodiini (U. S. Nat. Mus. Bul. 63, '09) writing of this species mentions having no records of specimens from Missouri, Arkansas, Minnesota or Louisiana. Stoner (Ent. News, xxiv, 81) has recorded this species from about Fergus Falls, Minnesota, where I have also taken it in considerable numbers. Within the last three years' collecting in Missouri, I found it not rare at most points in the Ozark region.—M. P. Somes, Mountain Grove, Missouri.

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., MAY, 1916.

The Biologia Centrali-Americana.

Elsewhere in this number we notice and quote from the final volume of one of the most extensive single works on natural history yet attempted—the *Biologia Centrali-Americana*.. Not the least remarkable and noteworthy feature connected with its completion is that its senior projector and editor has the happiness of beholding the accomplished deed. Many a similar work has failed, or been left in an unfinished state, owing to the death of its author, but to Dr. Frederick Ducane Godman Fate has been more kind and we can at present recall only Sir John Murray as having been equally fortunate in a somewhat comparable undertaking.

The *Biologia* affects us of the New World more than it does the nation to which its editors and most of their collaborators belong. Although the Rio Grande and the Gila form the northern boundary of the territory to which the *Biologia* is devoted, many of the plants and the animals with which it deals wander far to the north of those rivers just as on the south they extend far beyond the peaks of Darien. The Pan-American scope of science is more assured than Pan-American policies and from the very situation of the area to which the *Biologia* refers, this great work must always hold a most important and authoritative position.

We speak of the completion of the *Biologia,* yet Dr. Godman himself reminds us that various groups were unavoidably left untouched and that additional material came in from the collectors too late to be included in the appropriate volumes. The fauna and flora of Mexico and Central America is still imperfectly known, as the exploration of the lepidopterous fauna of Costa Rica by Messrs. Schaus and Barnes has recently very clearly demonstrated. The discoveries which the future has in store make it improbable that another *Biologia Centrali-Americana* of equal scope will ever be, and

the magnificent undertaking to which Messrs. Godman and Salvin have devoted their lives and their fortunes is likely to remain an incomparable monument in the study of Central American nature.

To Dr. Godman then, and to his assiduous secretary, Mr. G. C. Champion, go our hearty congratulations on the termination of the *Biologia!*

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

Rearing of Winthemia quadripustulata from Rhynchophorous Larva (Dip., Col.).

On December 5, 1914, while following the plow in a sod field near Hagerstown, Maryland, several larvae, undoubtedly belonging to the group Rhynchophora were found. These larvae were brought into the laboratory and placed in a tin box with dirt. On December 15th it was observed that some of the larvae were dead and two Dipterous pupae had made their appearance in the box. One pupa was attached to the remains of a grub. The pupae were removed to separate boxes in which the adults emerged on January 7, 1915. The adults were determined by Mr. W. R. Walton as *Winthemia quadripustulata*. Concerning the individual larva from which the fly was reared, Dr. Böving, of the National Museum, says:

"The larva looks to me as a *Curculionid*. Mr. Craighead thinks the same..... I am confident that it is no *Cerambycid* nor *Bostrychiid*."

The mid-winter activity of the parasites was probably due to the fact that they were brought into the laboratory which was well heated.—H. L. Parker, Bureau of Entomology, Division of Cereal and Forage Crop Insect Investigations, Hagerstown, Md.

A Tachinid Parasite Reared from an Adult Capsid (Dip., Hom.).

On June 26, 1915, three adults of *Miris dolobrata* Linn., were placed in a small vial which was plugged with cotton. The next morning a live dipterous maggot about 7 mm. in length was found in the vial. One of the Capsids was examined and a large hole was found in the center of the abdomen. The maggot was placed on some finely sifted earth in a small flower pot and it immediately burrowed beneath the surface. On July 11 the adult had emerged and was found alive in the cage. This was determined by Dr. A. O. Johannsen as *Phorantha occidentis* Walker. According to Aldrich (Ann. Ent. Soc. Am. 8: 81, 1915) this species was reared by F. B. Milliken from *Nysius angustatus* Uhler. To my knowledge no dipterous parasites of the Capsidae have heretofore been recorded.—M. D. Leonard, Ithaca, New York.

Homophoeta lustrans Crotch in Iowa (Coleop.).

During October, 1915, a single specimen of this beetle was taken in a sweep net at Hills, near the southeastern part of the State. The collecting was done along and near the Iowa river on various weeds,

though I am unable to state the plant on which this particular individual was found. Up to this time *Homophocta lustrans* Crotch has not been recorded from Iowa, it being a more southern species. Horn, in "A Synopsis of the Halticini of Boreal America" (Trans. Am. Ent. Soc. xvi, 1889), says of it: "Occurs in Texas." This Iowa record will bring the distribution much further north than before. There seems to be no doubt as to the identification, for the specimen agrees perfectly with those in the collection of H. F. Wickham.—L. L. Buchanan, Iowa City, Iowa.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded. The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of systematic papers are all grouped at the end of each Order of which they treat, and are separated from the rest by a dash.

Unless mentioned in the title, the number of new species or forms are given at end of title, within brackets.

For records of Economic Literature, see the Experiment Station Record. Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London.

For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

1—Proceedings, Academy of Natural Sciences of Philadelphia. **10**—Nature, London. **13**—Comptes Rendus, Societe de Biologie, Paris. **14**—Proceedings, The Zoological Society of London. **34**—Proceedings, Iowa Academy of Sciences, Des Moines. **40**—Societas Entomologica, Zurich. **46**—Tijdschrift voor Entomologie. **68**—Science, New York. **87**—Bulletin, Societe Entomologique de France, Paris. **142**—Report, Michigan Academy of Sciences, Lansing. **161**—Proceedings, The Biological Society of Washington. **166**—Internationale Entomologische Zeitschrift, Guben. **184**—Journal of Experimental Zoology, Philadelphia. **186**—Journal of Economic Biology, London. **189**—Journal of Entomology and Zoology, Claremont, Calif. **195**—Bulletin, Museum of Comparative Zoology, Cambridge. **198**—Biological Bulletin, Marine Biological Laboratory, Woods Hole, Mass. **216**—Entomologische Zeitschrift, Frankfurt a. Main. **278**—Annales, Societe Zoologique Suisse et du Museum d'Histoire de Geneve, Revue Suisse de Zoologie. **285**—Nature Study Review, Ithaca, N. Y. **322**—Journal of Morphology, Philadelphia. **324**—Journal of Animal Behavior, Cambridge. **344**—U. S. Department of Agriculture, Washington, D. C. **359**—Connecticut Agricultural Experiment Station, New Haven. **410**—Journal, Washington Academy of Sciences. **447**—Journal of Agricul-

tural Research, Washington. **469**—Annual Report and Transactions, Manchester Microscopical Society. **477**—The American Journal of Tropical Diseases and Preventive Medicine, New Orleans. **507**—Occasional Papers, Museum of Zoology, University of Michigan. **523**—Bolletino delle sedute della Accademia Gioenia di Scienze Naturali in Catania. **524**—Technical Bulletins, Entomology, University of California, Berkeley. **525**—Meddelanden fran Statens Skogsforsoksanstalt, Stockholm. **526**—Ectoparasites, ed. by Jordan & Rothschild, London. **527**—New York College of Forestry at Syracuse University.

GENERAL SUBJECT. Cook, O. F.—Determining types of genera, **410,** vi, 137-40. **Pierce, W. D.**—A new interpretation of the relationship of temperature and humidity to insect development, **447,** v, 1183-91. **Mottram, J. C.**—Some observations on pattern-blending with reference to obliterative shading and concealment of outline, **14,** 1915, 679-92.

PHYSIOLOGY AND EMBRYOLOGY. Browne, E. N.—A comparative study of the chromosomes of six species of Notonecta, **322,** xxvii, 119-47. **Hegner, R. W.**—Experimental studies on the relation between the structure and development of the eggs of chrysomelid beetles, **142,** xvi, 49-54. **Lewis & Robertson.**—The mitochondria and other structures observed by the tissue culture method in the male germ cells of Chorthippus curtipennis, **198,** xxx, 99-124. **Shull, A. F.**—Parthenogenesis in Anthothrips verbasci, **142,** xvi, 46-48.

MEDICAL. King, W. V.—Anopheles punctipennis, a host of tertian malaria, **477,** iii, 426-32.

ARACHNIDA, ETC. Andre, E.—Anomalie de l'appareil buccal d'Ascaris megalocephala, **278,** xxiv, 251-3. **Francaviglia, C.**—(See under Hemiptera). **Hilton, W. A.**—Mites from the Claremont Laguna region, **189,** viii, 35-6. **Hirst, S.**—On the "Harvest bug" (Microtrombidium autumnalis), **186,** x, 73-7. **Turner, C. H.**—Notes on the feeding behavior and oviposition of a captive American fake spider (Eremobates formicaria), **324,** vi, 160-8. **Willis, H. G.**—Spiders [Notes on], **469,** 1914, 50-9.

Banks, N.—Revision of Cayuga Lake Spiders, **1,** 1916, 68-84. New Californian mites [5 n. sps.], **189,** viii, 12-15. **Chamberlin, R. V.**—Results of the Yale Peruvian expedition of 1911. The Arachnida, **195,** lx, 177-299.

NEUROPTERA, ETC. Legendre, J.—Sur un nouveau mode d'elevage de Pediculus vestimenti, **13,** lxxix, 203-4. **Snyder, Tho. E.**—Termites, or "white ants," in the U. S.: their damage and methods of prevention, **344,** Bul. 333.

ORTHOPTERA. Francaviglia, C. (See under Hemiptera).

HEMIPTERA. Stoner, D.—Notes on Iowa Pentatomoidea, **34,** xxii, 347-54. **Baker, A. C.**—Identity of Eriosoma pyri, **447,** v, 1115-1119. **Francaviglia, C.**—Emitteri ed Ortotteri parassiti dell'orecchio umano; Acari parasiti dell'orecchio umano, **523,** 1915, 14-20; 21-27. **Lundbeck, W.**—Some remarks on the eggs and egg deposition of Halobates, 13 pp. (Mindeskrift for J. Steenstrup, xxvii, Kobenhavn).

Van Duzee, E. P.—Review of the genus Macrotylus [4 n. sps.], **189,** viii, 5-11. Synoptical keys to the genera of the No. American Miridae [5 n. g.; 3 n. n.]. New or little known genera and species of Orthotylini [2 n. g.; 5 n. sps.], **524,** i, 199-216; 217-227.

LEPIDOPTERA. Dolley, W. L., Jr.—Reactions to light in Vanessa antiopa, with special reference to circus movements, **184,** xx, 356-420. **Ebner, A.**—Interessante Catocalenzucht, **166,** ix, 131-2. **Mallonee, A. M.**—Frogs catching butterflies, **68,** xliii, 386-87. **Shufeldt, R. W.**—Nature-study and the common forms of animal life.—V. [Insects], **285,** xii, 115-24. **Tragardh, A. I.**—Bidrag till kannedomen om tallens ach granens fiender bland smafjarilarna, **525,** 1915, 813-874.

Fruhstorfer, H.—Eine neue neotropische Nymphalide, **40,** xxxi, 14. Neue neotropische Nymphalide, **216,** xxix, 97-98.

DIPTERA. Buttrick, P. L.—A mosquito survey at the mouth of the Connecticut river, **359,** Bul. 189. **Garnett, H.**—A note on Simulium, **469,** 1914, 37-40. **Jobbins-Pomeroy, A. W.**—Notes on five N. Am. buffalo gnats of the genus Simulium, **344,** No. 329.

Malloch, J. R.—The generic status of Chrysanthrax Osten Sacken, **161,** xxix, 63-70. **Jordan & Rothschild.**—Contribution to our knowledge of American Siphonaptera [2 n. g.; 5 n. sps.], **526,** i, 45-60. **Rothschild, N. C.**—Further notes on Siphonaptera fracticipita, with descriptions of new gen. and sps. [1 new sp.]. On Neopsylla and some allied genera of Siphonaptera [2 n. gen.; 6 n. sps.], **526,** i, 25-29; 30-44.

COLEOPTERA. Andrews, E. A.—Color changes in the rhinocerus beetle, Dynastes tityrus, **184,** xx, 435-56. **Blackman, M. W.**—Observations on the life history and habits of Pityogenes hopkinsi Swaine, **527,** Tech. Pub. No. 2, 11-66. **Du Porte, E. M.**—Death feigning reactions in Tychius picirostris, **324,** vi, 138-49.

Grouvelle, A.—Descriptions de deux Telephanus de la Jamaique, **87,** 1916, 84-7. **Swaine, J. M.**—A new species of Pityogenes, **527,** Tech. Pub. No. 2, 8-10.

HYMENOPTERA. Brun, R.—Le probleme de l'orientation lointaine chez les fourmis, **278,** xxiv, 355-88. **F.**—The recent mortality among bees, **10,** xcvii, 7-8. **Wasmann, E.**—Nachtrag zu "Eine neue Pseudomyrma aus der Ochsenhorndornakazie in Mexiko," **46,** lviii, 125-131.

Cockerell, T. D. A.—Bees from the northern peninsula of Michigan [2 new]; Some bees from British Guiana, **507,** No. 23; 24. **Wheeler, W. M.**—Ants collected in Trinidad by Roland Thaxter, F. W. Urich and others, **195,** lx, 323-30.

OBITUARY.

The death of THEODORE PERGANDE on March 23, 1916, in Washington, is announced in *Science* for April 7. He was born in Germany seventy-six years ago, came to America at the outbreak of the Civil War and served in the Federal Army. He became assistant to Prof. C. V. Riley, then State Entomologist of Missouri, and accompanied the latter to Washington in June, 1878, so that he was the oldest scientific assistant, in point of continued service, in the Bureau of Entomology at the time of his death. Among his published writings are: *Habits of Thrips* (Psyche 1882 [1883]), *The Cotton or Melon Plant Louse* and *Observations on Certain Thripidae* (Insect Life, 1895), *The Plum Plant Louse* (Bulletin No. 7, Div. Ent., U. S. Dept. Agr., 1897), *A New Coccid on Birch* (with H. G. Hubbard) and *The Peach Lecanium* (Bulletin 18, 1898), *List of Coccidae Collected by Mr. A. Busck in Puerto Rico*, 1899 (with T. D. A. Cockerell) (Bull. 22, 1900), *The Life History of Two Species of Plant Lice Inhabiting both the Witch Hazel and Birch* (Bull. 9, Tech. Series, 1901), *The Southern Grain Louse, Toxoptera graminum* (Bull. 38, 1902), *On Some of the Aphides Affecting Grains and Grasses of the United States* (Bull. 44, 1904) and *North American Phylloxerinae Affecting Hicoria (Carya) and Other Trees* (Proceedings Davenport Acad. Sci., 1904). To the NEWS he contributed a *Description of a New Species of Idolothrips* (1896), *Description of Two New Genera and Three New Species of Aphididae* (1906), and a rhymed effusion, *A Happy Family of Bugologists* (1908).

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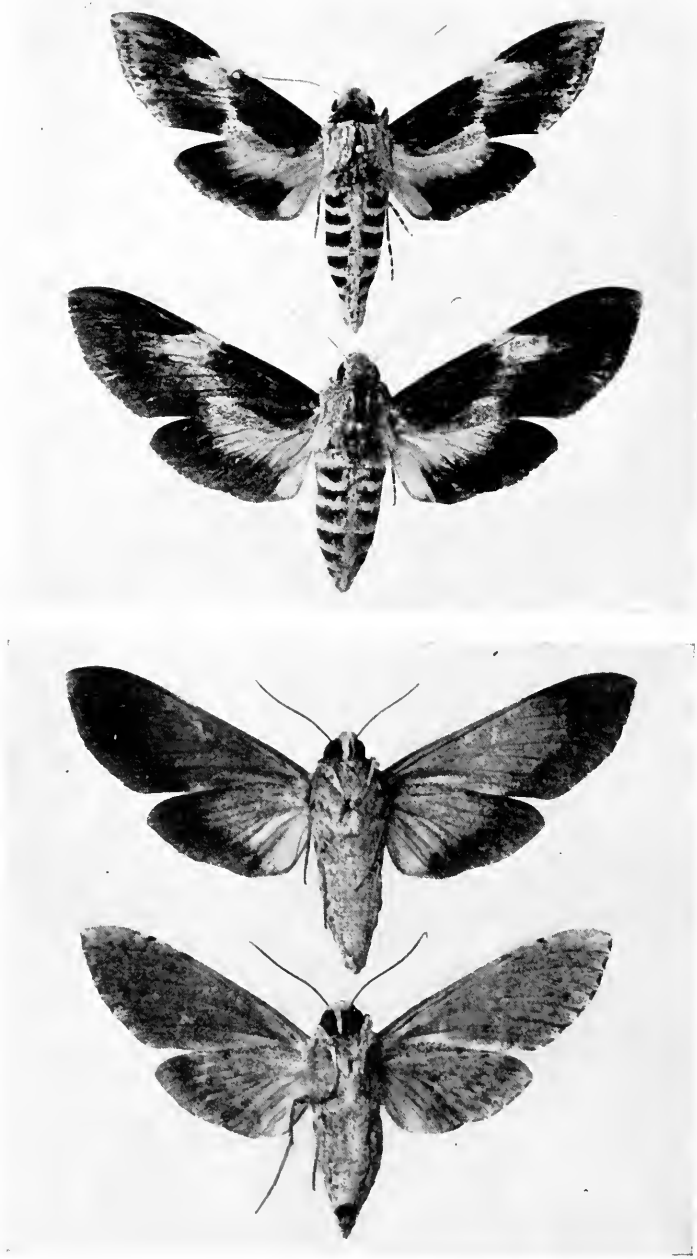

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ISOGNATHUS RIMOSA WOODI, 1. ♂, 2, 3, ♀.
I. RIMOSA RIMOSA, 4. ♀.—RAMSDEN.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

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The Status of Isognathus congratulans and a New Form of I. rimosa from Cuba (Lep.).

By CHARLES T. RAMSDEN, Guantánamo, Cuba.

(Plate XIII)

Drs. Rothschild and Jordan in their monumental work, "A Revision of the Lepidopterous Family Sphingidae," London, 1903, page 357, say under *Isognathus congratulans*: "♂ bands of abdomen distinct. Forewings, above, for the greater part blackish brown. *This may be an extreme form of rimosa.* [The italics are mine.] In Tring Museum 1 ♂ from Cuba; also in Berlin Museum."

Unfortunately the Tring Museum did not have a long enough series to determine whether it was a good species, or only an extreme form of *rimosa,* as Drs. Rothschild and Jordan suspected.

During a recent visit of William C. Wood, Esq., of New York City to Guantánamo, we went over the series of more than fifty specimens of *rimosa rimosa,* and *congratulans* in my collection and, after deliberate and careful study, came to the conclusion that *congratulans* did not have specific standing, for the following reasons.

In the above mentioned series were intergrades from *rimosa rimosa* to *congratulans,* not one, but several of them. The specimens of this series were all taken at light in Guantánamo, the dates ranging over a number of years.

However, it was Gundlach who first noticed that there was no specific difference between them, and he mentions the fact in his work, "Contribución á la Entomologia Cubana," Habana, 1881, where, on pp. 215-218 he discusses *Dilophonota rimosa.* I herewith translate the part referring to *congratulans,* as follows: "In 1858 I found, at Santiago de Cuba, an individual which I considered a different species, and named it *congratulans.* I made this known to Mr. Grote, who also considered it a new species, describing it as such in the Annals of the Lyceum of Natural History, New York, Vol. viii, November, 1865. The type was not returned to me. Through Mr. Grote's carelessness this specimen, together with specimens of other new species belonging to me, went with the collection of the unfortunate Mr. Robinson, when it was given to the Central Park Museum of New York. This I learned from a letter of Mr. Grote.

In 1878, I reared a batch of caterpillars of this species and found among the moths some dark colored individuals that I must consider the same as my *congratulans,* and for this reason, I consider this name applicable only as a dark form of *rimosa.*"

Gundlach then goes on to describe *congratulans* as follows: "It differs in having the forewings so dark that one cannot see the ashy ground color of the type [by "type" he means *rimosa*], in another example of my collection the lighter ground color of the type is slightly evident."

There can be no doubt from the above as to the status of

congratulans, as Gundlach bred, not only the dark as well as the normal form of *rimosa,* but also the intermediate, all from the same batch of larvae, and my more recent series, with its several intermediates, seems to confirm the fact.

Besides the above there is a third, and still undescribed form of *rimosa* from Cuba. This differs so much in color as well as in pattern from *rimosa rimosa,* that I am almost tempted to give it specific rank. This may be decided later; for the present it may be known as:—

Isognathus rimosa woodi n. subsp.

Differs in general appearance from *rimosa rimosa* in having the ground colour of the forewings blackish instead of greyish.

Male: Expanse (one wing) 42 mm. Female: Expanse (one wing) 46 mm.

♂. Upperside. Forewings blackish-brown divided perpendicularly into two parts by a greyish-white band which begins as a broad costal patch, just beyond the cell, narrowing at the center of the wing, and again broadening into another patch at the inferior margin.

Hindwings with marginal band entirely blackish-brown, nearly black, otherwise as in *rimosa rimosa.*

Underside. Forewings and hindwings with a broad marginal blackish brown band, perceptively darker toward its interior edge. Remainder of wings similar to *rimosa rimosa.*

♀. Similar to ♂, but dark portions of wings are intense and uniform in color.

Body same as *rimosa rimosa.*

Types ♂ and ♀ deposited in the collection of the Academy of Natural Sciences of Philadelphia. Paratypes in the collection of the author. Specimens taken, ♂, July 12, 1911; ♀, May 3, 1914, at electric light, Guantánamo, Cuba.

These specimens have long lain in my cabinet, and it is at the instance of that enthusiastic, and far too modest student of the Sphingidae, my very good friend, Mr. William C. Wood, of New York City, that I have decided to describe this insect, which I take pleasure in naming for him.

EXPLANATION OF PLATE XIII.

Figs. 1-3. *Isognathus rimosa woodi,* n. subsp.; 1. ♂, and 2. ♀, upper sides, 3. ♀, under side.

Fig. 4. *I. rimosa rimosa,* ♀, under side.

The Lines of Descent of the Lower Pterygotan Insects, with Notes on the Relationships of the other Forms.

By G. C. Crampton.*

It is a rather interesting fact that those structures which are apparently of no vital importance to the organism, are frequently of the greatest value as indications of relationships between the larger groups (orders, etc.) of insects. This may perhaps be explained by the fact that structures which are of vital importance to the organism would be the ones most directly concerned in the struggle for existence, and would therefore be the ones most acted upon and most profoundly modified by natural selection—or, as a Lamarkian would express it, these structures would be the ones most frequently employed, and would therefore be the ones the most profoundly changed by use.

The nature and arrangement of the thoracic sclerites furnish examples of such structures, which are of little or no vital importance to the organism (since they are practically wanting in some forms), yet are among the most important characters for determining the relationships of the different groups of insects, since they remain as "true to type," or as little modified, as any structures of the body; and in most instances have furnished the clues which were followed out and verified by the study of other structures.

Other structures which have proven to be of considerable value in determining the relationships of the lower insects are: the character of the antennal segments, the nature and location of the compound eyes, the outline of the head, the character of the mouthparts (particularly of the labium), the nature of the terminal abdominal segments and their appendages (the female external genitalia being especially "true to type," or but little modified) and the appendages of the thorax. Conclusions based largely upon an examination of the wings alone, which is apparently necessary in the study of fossil insects, may lead to entirely erroneous results, unless verified by the study of other sets of structures, and this may in some

* Contribution from the Entomological Laboratory of the Massachusetts Agricultural College, Amherst, Mass.

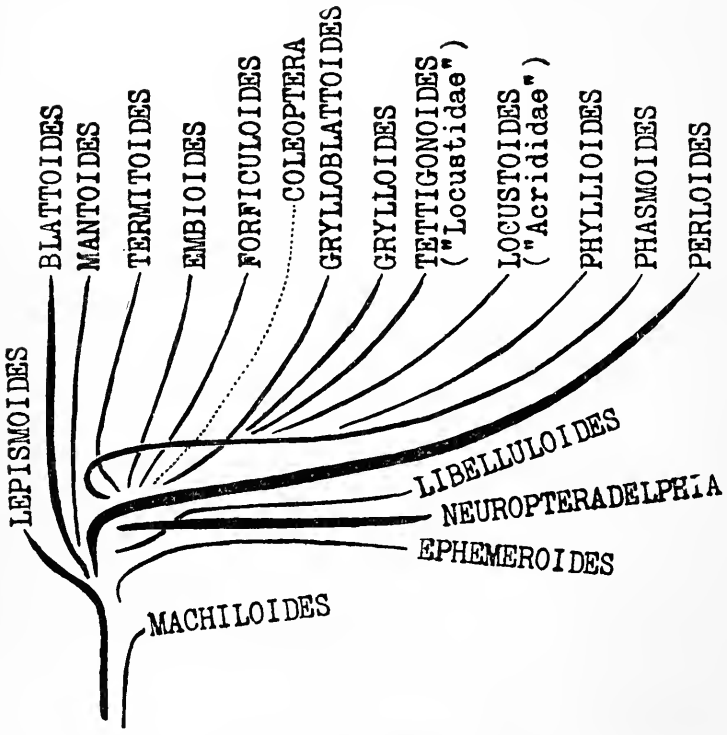
measure account for the marked difference in the lines of descent here given, and those depicted in Handlirsch's "*Fossilen Insekten.*"

It is an almost hopeless task to attempt to determine the lines of descent in the different groups of insects, unless one is able to compare together the most primitive representatives of the groups in question, or to make a study of the annectent forms combining in themselves characters common to several groups. On this account, I am deeply indebted to Mr. A. N. Caudell, Mr. C. C. Gowdey, Maj. A. D. Imms, Dr. K. Jordan, and Dr. E. M. Walker for the use of valuable specimens such as *Grylloblatta, Timema, Arixenia, Labidurodes, Embia,* etc., which have been of the greatest service in furnishing clues to the relationships of the lower insects, and without which the present work could not have been carried on with any degree of certainty or satisfaction. The clues furnished by these primitive or annectent insects have been further carried out and verified by a comparative study of the principal structural features in the different groups of lower insects; but the detailed discussion of these structures may be more profitably taken up in a series of articles, in which they can be more fully treated than in the present paper—which is therefore offered as a brief resumé of the results obtained from the more extended study of the insects in question. Furthermore, the present discussion is largely limited to the consideration of the lower groups of winged insects, since the rather complicated interrelations of the lower insects must be clearly understood, before one can proceed to the study of the higher forms.

The accompanying diagram is offered merely as an expedient to aid in visualizing the points brought out in the following discussion, rather than as an attempt to portray the actual relations of the various groups, since it is practically impossible to depict correctly the true relative positions of the different lines of descent, in a diagram drawn in one plane. It requires a figure of *three dimensions* to portray the fact that several groups approach each other from different angles, and if an attempt were made to represent this in a diagram

drawn in one plane, there would result such an intricate crossing of lines as to render it practically incomprehensible and therefore useless.

Since the termination "-oidea" has always been restricted to



groups of the rank of a *super-family* (e. g. Muscoidea, Ichneumonoidea, etc.), Handlirsch and his followers have done violence to established usage in employing the termination "-oidea" to designate groups to which they would attribute the rank of an *order*. On the other hand, the method of designating the different groups by some familiar term (which immediately calls to mind the typical or well known representatives of the group as a whole) is self-explanatory in a diagram, and therefore has much to recommend it. On this account, I have used the termination "-oides" (rather than the

pre-empted termination "-oidea") in connection with the name of a well known or typical family merely as a convenient expedient to designate the different groups shown in the diagram. With the exception of the Grylloids and Tettigonoids (which form the Orthoptera, in the restricted sense), I would regard all of these groups as of the rank of an order, and have therefore referred to them in the text, by terms ending in "-ptera" (e. g. Dermaptera, Plecoptera, etc.) in accordance with general entomological usage.

As is shown in the diagram, the Phyllioid forms, or Phylliidae, are closely related to the Phasmoid group, or Phasmidae, yet occupy a position somewhat intermediate between the Phasmidae and the true Locustidae—which are usually incorrectly called "Acrididae." Although the Phyllidae are closely related to the Phasmidae, they are as distinct from them as the Neuroptera are from the Mecoptera, and should therefore be classed in a distinct order, the *Phyllioptera*, as was mentioned in a previous publication (Entomological News, Vol. 26, p. 347). It may be remarked, however, that the distinctive characters there given, apply chiefly to the females, since the males of the Phylliidae (e. g. those of *Phyllium scythe*) have long antennae, and well developed hind wings.

The true Locustidae (usually termed "Acrididae") occupy a position intermediate between the Phylliid-Phasmid group, and the Gryllid-Tettigonid group, as indicated in the diagram. Phasmoid forms, such as *Timema*, have retained many characters suggestive of the ancestral condition of the Locustid group, thus suggesting that the Locustid line of development may lead toward the Phasmid line of descent, while that of the Gryllid-Tettigonid group, although closely paralleling the Locustid line of development, may lead toward the Grylloblattid line of development; but this point may be better taken up under the discussion of the relationships of the Gryllidae and Tettigonidae. The reasons for considering the Locustoid forms as representing a distinct order, the *Diphtheroptera*, have already been given (Ent. News, Vol. 26, p. 348) and need not be further considered here.

As is indicated in the diagram, the line of descent of the Tettigonidae (which are usually incorrectly termed "Locustidae") closely parallels that of the Gryllidae, the more primitive members of the two groups being very closely related, although the more highly modified members of the two lines, are quite widely divergent. The Grylloid and Tettigonoid forms comprise the order *Orthoptera* (in the restricted sense) which occupies a position somewhat intermediate between the Phasmid and the Grylloblattid lines of descent and is also related to the Perlids. A study of the extremely interesting insect *Grylloblatta campodeiformis* Walk., led me to believe that the Gryllids and Tettigonids approach more closely to the Grylloblattid line of descent, while the true Locustids ("Acrididae") approach rather more closely to the Phasmid line of descent; but an examination of an extremely primitive Grylloid insect from Thayetmyo, Burmah (which bears a slight resemblance to an Ephemerid!) would indicate that the Gryllids also approach the Phasmid line of descent, and such primitive Tettigonoid forms as *Phasmodes* (the *Prophytoptera*—Ent. News, Vol. 26, p. 348), are remarkably Phasmid-like, so that it is doubtless more correct to consider the Grylloid-Tettigonoid group as arising from forms intermediate between the Phasmoid insects and the Grylloblattoid insects (which also approach the Phasmid line of descent).

Certain Phasmoid insects, such as *Timema,* have retained many characters suggestive of the Perlid group, and many other facts indicate that the Phasmid line ultimately leads back to that of the Perloid insects. The Phasmid line of descent also converges toward that of the Grylloblattids, and at the same time approaches the Mantoid group in some respects, although the Mantoid insects have followed a somewhat different course of development. In order to show in the diagram, that the Phasmoid line not only leads back to the Perloid line, but also approaches the Mantid line, and is likewise connected with the Grylloblattoid line by intermediate forms, it was necessary to swing the Phasmoid line around from its position near the Mantoid line, and over the other

lines of descent, in order to bring it into a position in which it could be shown in the diagram that the Locustids, Gryllids, etc., sprang from forms intermediate between the Phasmid group and the Grylloblattid group. In thus swinging the Phasmid line around over the other lines of descent, it became impossible to show that the Phasmid line also converges with that of the Grylloblattids, etc., upon the Perloid line of descent, so that it should be understood that the Phasmid and Grylloblattid lines are much more intimately related than is shown in the diagram. The Phasmid group (called the *Cheleutoptera,* Ent. News, Vol. 26, p. 348) forms a distinct order of insects, second in importance only to the Perlid group, from the standpoint of phylogeny, since it is paralleled by, or is approached by, so many other lines of descent; and in some regards it is fully as important as the Perloid line itself, although I am inclined to consider that the Perlids, as a whole, are more primitive than the Phasmids.

As was mentioned above, the Grylloblattid line of development parallels, or converges toward that of the Phasmids, and both lead back to the Perlid group. This, however, does not mean that living Grylloblattids were descended from living Perlids, but is merely a way of expressing the fact that the Perlids have departed as little as any group, from the ancestral condition characteristic of the common ancestors of the Grylloblattids, Perlids, etc. As is shown in the diagram, the Grylloblattoid, Forficuloid and Embioid lines all converge toward the Perloid line. It could not be shown in the diagram, however, that the Grylloblattids are quite closely related to the Termites, and at the same time that their closest affinities are with the Forficuloid and Embioid (with the Phasmoid) lines among the more primitive forms, although it is indicated that the Gryllids, Tettigonids, etc., occupy a position intermediate between the Grylloblattoid and the Phasmoid lines of descent. The Grylloblattoid line is much more closely paralleled by the Embiid and Termitid lines of descent than is indicated in the diagram, since a comparison of a wingless female *Embia major* with the wingless female *Grylloblatta* suggests a very

close relationship between the two; but for that matter the lines of descent of the Perlid, Phasmid, Grylloblattid, Forficulid, Embiid and Termitid groups all converge as we trace them further back, so that it is extremely difficult to tell which are the most closely related. The Grylloblattid group forms a distinct order termed the *Notoptera* (Ent. News, Vol. 26, p. 347), which are among the most interesting and important of the annectent forms surviving to the present day.*

As shown in the accompanying diagram the *Coleoptera* are rather closely related to the Forficulids, and also to the Embiids and Grylloblattids, but ultimately lead back to the Perlid line of descent. Indeed, the Coleoptera are a much more ancient group than is usually thought to be the case, and although some of the representatives of the group are quite highly specialized, others show undoubted affinities with the lower insects as shown in the diagram. The *Apocoleoptera* (Platypsylloides) or Platypsyllidae form a distinct order, arising as an offshoot from the main line of descent of the Coleoptera, and in some respects they resemble the parasitic Forficuloid group Hemimeridae. Whether this is due to a convergence in form as the result of similar modes of life, or is due to the fact that the Coleopteron and Forficuloid lines of descent closely parallel each other, is not clear.

The Forficulid line of descent parallels that of the Embiids and Grylloblattids rather closely, as is shown by a comparison of the rather primitive Forficulid *Labidurodes*, with specimens of *Grylloblatta* and *Embia major* Imms. Furthermore, such primitive Forficulids as *Arixenia*, show undoubted Perloid affinities, and the Embiid, Forficulid, Grylloblattid and Perlid lines of descent are to be considered as paralleling each other extremely closely. Together with the other groups just mentioned, the Forficulids converge toward the Termitid and Phasmid lines of development (the Phasmid *Timema* having retained certain characters suggestive of those found in the

* The color of these insects is likewise extremely primitive, yellow to brown-yellow being apparently the original color of the ancestral Pterygota, while the paler shades (white or tinge of gray) are more characteristic of the Apterygotan forms.

Forficulid *Labidurodes*). I have not seen specimens of *"Hadotermes japonicus"* described by Hagen 1868 (Proc. Bost. Soc. XI, p. 399), but Sharp (Insects, Part I) states that this insect described by Hagen as a Termite, is really a Forficulid, so that this Forficulid must be very similar to the Termites, if Hagen was deceived by it. The *Hemimerus*-like forms represent an off-shoot from the Forficuloid line. The Hemimeroides are not represented in the diagram, but their affinities are undoubtedly strongly Forficulid, though they may perhaps represent a distinct order called *Dermodermaptera* by Verhoeff. The term Dermaptera, applied to the Forficulids, may possibly be restricted to another group of Orthopteroid insects, on the grounds of priority; if this be necessary, the later term *Euplexoptera* might be applied to the Forficulid group.

The Embiidae as a whole, are extremely closely related to the Perlids, perhaps more nearly than to any other group of insects. The wingless females of *Embia major* Imms are exceptionally favorable for comparison with the wingless females of *Grylloblatta* and *Timema,* and their unusually large size and well pigmented sclerites makes the study of their structural details a comparatively simple matter, although the more primitive genus *Clothoda* would doubtless be of greater importance from the standpoint of the determination of the genealogy of the group. A study of *Embia* has convinced me that the Grylloblattoid, Embioid, Forficuloid, Termitoid and Phasmoid lines of descent all converge upon the Perloid line. Furthermore, the Embiids combine characters common to the Termites and Forficulids (with the Grylloblattids), so that they may be considered as occupying a position somewhat intermediate between the Forficulids and Termites, as shown in the diagram, although their closest affinities are with the Perlid group. I formerly (Ent. News, Vol. 26, p. 346, etc.) applied Packard's term, Platyptera (used in the restricted sense) to the Embiid order, but I find that the designation Platyptera was applied to the Diptera by Meigen, 1803, and to the Pisces by Cuvier 1837, long before Packard applied it to the Orthopteroid insects, so that it is necessary to change the term

Platyptera to *Euplatyptera,* in referring to the Embiid group.

As was mentioned above, the Termites occupy a position somewhat intermediate between the Grylloblattid-Embiid-Perlid group and the Blattidae, and in many respects, they approach very closely to, or parallel the Blattoid line, in their phylogenetic development. I have been unable to study such primitive Termites as *Mastotermes,* but I feel certain that these will show marked affinities with the Grylloblattid-Embiid-Perlid group, since those Termites which I have been able to examine all indicate a close relationship to this group, and I think that the Termitid line leads back to the Perlid rather than to the Blattid line of development, as is indicated in the diagram. As will be discussed later on, the Blattid and Perlid lines ultimately approach each other quite closely, so that the resemblances of the Termites to the Blattids may possibly be explained as the retention in both lines, of characters inherited from the common ancestral group from which sprang the ancestors of the Blattids, Termites and Perlids. The affinities of the Termites to the Blattid group may, on the other hand, be much closer than is indicated in the diagram; but this point can be definitely determined only upon the examination of the most primitive representatives of the Termitid group, which are not at present accessible to me. Since this group froms a distinct order, the term *Isoptera* should be applied to it. Although I have been unable to obtain specimens of the rare order *Zoraptera,* described by Silvestri, I would judge from the figures of these insects, that they form an off-shoot from the main Termite stem, and have departed but little from the rest of the Termitoid group.

Since the Perlid line of development is approached or is paralleled by so many other lines of descent, it forms one of the most important of the lower groups of winged insects, the only other lower group which rivals it in this particular being the Phasmid group. The Perlids as a whole are as primitive as any winged insects, and, with the Blattids, must be regarded as the nearest living representatives of the ancestral winged insects, since the group as a whole is as little modified as any known winged forms. The nearest relatives of the Perlids

are the Embiids (and Forficulids) but the Phasmid, Grylloblattid and Termitid lines all appear to converge toward the line of descent of the Perlid group, such forms as *Timema, Grylloblatta,* etc., being very similar in many respects to the more primitive members of the Perlid group. Such Orthoptera-like Perlids as *Eustheuia* would doubtless be of great interest from the point of view of the study of the rather close relationship of the Perlids to the Orthopteroid forms; but, unfortunately, I have been unable to procure specimens of this interesting genus for study. The Perlid group constitutes the order *Plecoptera,* and, as will be discussed further on, the Perlid and Blattid lines of descent converge as we follow them further back, and ultimately approach the line of descent of the Lepismids. Indeed, such immature Plecoptera as nymphs of *Peltoperla* are surprisingly *Lepisma*-like, indicating a rather close relationship between the two groups, although we are dependent upon *immature* forms to furnish the "connecting links" between the ancestors of the Perlids and the ancestors of the Lepismids, while in the Blattid group, even the *adult* forms have departed but little from the condition characteristic of the ancestral Lepismids; so that the Blattids are probably somewhat closer to the Lepismids than the Perlids are.

The Mantoid line of descent parallels that of the Blattoid group quite closely, and also approaches the Perloid line near the point at which the Blattoid line draws near to that of the Perlids, as is shown in the diagram. Certain Mantoid forms, such as *Mantoida luteola* exhibit affinities with the Neuropteroid forms; but this is to be expected, since the Mantids and Neuroptera both approach the Perlid line of descent, and would therefore have many characters in common. On the whole, however, I would place the Mantoid line somewhat closer to the Blattoid line, than to the Perloid line of descent, as is indicated in the diagram. The Mantoid forms constitute a distinct order, which may be termed the *Eudictyoptera,* since both Mantids and Blattids were formerly grouped together in the order Dictyoptera. The reasons for regarding the Mantids as a distinct order will be given elsewhere.

As may be seen from the diagram, the Blattoid line of de-

scent is the most direct of the developmental lines leading from the ancestors of the Lepismids to those of the winged forms, and even in the adult stages, the Blattids have preserved many characters common to the ancestors of the Lepismids and Blattids of today. The Blattid line of development is very closely paralleled by that of the Mantids, and ultimately the lines of descent of the Blattids and Perlids converge, if we trace them back far enough. Indeed, it would appear that those features wherein the most ancient Blattoid forms differ most from their modern representatives, are those in which they approach the closest to the Perloid forms, so that the two lines of descent in all probability sprang from ancestors similar enough to be grouped in a single family, although their modern representatives have followed rather widely divergent lines of development. The Blattid line of development is rather closely approached by that of the Termites; but the Termite line of descent appears to lead back to that of the Perlids rather than to the Blattid group. The Blattids are enough different from their nearest relatives to be grouped in a distinct order, and were therefore designated as the *Palaeoptera* in a previous paper (Ent. News, Vol. 26, p. 349).

The foregoing statements may be briefly summed up as follows: The Phylliidae are closely related to the Phasmidae and also to the true Locustidae (usually termed "Acrididae"). The true Locustidae ("Acrididae"), Tettigonidae ("Locustidae"), and Gryllidae arose from forms intermediate between the Grylloblattid and Phasmid lines of descent. The Phasmid, Grylloblattid, Forficulid, Embiid and Termitid lines of descent all converge upon that of the Perlidae, although the Forficulid and Embiid groups are somewhat nearer to the Perlidae than are the other groups. The Perlids, as a whole, are the most primitive of the groups thus far mentioned, but are not more primitive than the Blattidae. The Mantid line of development closely parallels that of the Blattid group, and approaches the Perlid line of development near the point at which the Blattid and Perlid lines of descent converge. The ancestors of the forms giving rise to the Blattid and Perlid lines of develop-

ment were doubtless similar enough to be grouped in a single family, or sub-family, whose ancestors in turn, if traced further back, would be similar enough to the ancestors of the Lepismid group, to be classed in a single family with them. In the same way, if we continue to trace the lines of descent still further back, the ancestral groups would be successively more and more inclusive (i. e. the ultimate ancestral types become more and more alike, the further back we go) until we at length reach the ancestral stem-family containing the similar forms which were eventually to give rise to the various Apterygotan and Pterygotan lines of descent with all their subdivisions and ramifications.

In a recent issue of the Zeitschrift f. wiss. Insektenbiologie (Bd. XI, 1915, Heft 9-10, pp. 269-273) I expressed the opinion that there were several lines of descent leading from the ancestors of the Apterygota to those of the Pterygota*, and I further suggested that the similarities in structure between the Protura (or "Myrientomata") and the Plecoptera, or between the Dicellura and the Dermaptera would indicate that there have been lines of descent leading from the ancestors of the Protura to those of the Plecoptera, and from the ancestors of the Dicellura to those of the Dermaptera. The study of new material (such as nymphs of *Peltoperla*, specimens of Lepismids from the Galapagos Islands, etc.) not available at that time, however, has led me to interpret these facts in another way. While I still believe that there are numerous lines of descent leading from the ancestral *groups* which gave rise to the ancestral Apterygota to those *groups* which gave rise to

* This paper, which was submitted for publication more than two years ago, recently appeared in the "Zeitschrift" despite my request to withdraw it. Furthermore, since the proof sheets were never sent me for correction, the article is full of obvious typographical errors, such as the total absence of capital letters in the title, misspelled words in the text (e. g. "sence" for sense), and even the omission of certain words which have totally altered the meaning of certain of the statements (e. g. on page 271 the statement "the Apterygota are no more to be regarded as degenerate Pterygota, than Amphioxus is to be regarded as a *vertebrate*" should read—than Amphioxus is to be regarded as a *degenerate vertebrate* (!)).

the ancestral Pterygota, I do not think that there was as direct a line from the ancestors of the Dicellura to those of the Dermaptera, or from the ancestors of the Protura to those of the Plecoptera, as my former statements would lead one to infer, and I would prefer to explain the similarities between the Dicellura and Dermaptera, or between the Protura and Plecoptera, as follows:

The Forficulid and other lines of development of the Orthoptera-like groups converge either toward the Perlid, or the Blattid line of development; and both the Perlid and Blattid lines ultimately lead back to, or closely parallel, the Lepismid line of descent. Ultimately we reach the more remote ancestral group containing the common ancestors of the Lepismid, Blattid and Perlid lines of descent. If we trace the lines of development of this ancestral group still further back, we find that the more remote ancestors of the forms giving rise to the Lepismid line of descent, in turn possessed many characters common to the remote ancestors of the Japygid, Proturan, and other Apterygotan groups; and the common ancestors of all these were doubtless so similar that they might be classed in a single family or even sub-family. From this common ancestral stem-family there arose the various lines of descent leading to the different Apterygotan and Pterygotan groups of insects; and since all these lines have a common origin, it is merely to be expected that the Forficulids, for example, might retain certain features which have also been retained by the Japygids, or that the Plecoptera might have retained certain features which have also been retained by the Protura, etc. The resemblances between the Japygids and Forficulids, or those between the Plecoptera and Protura, might therefore possibly be regarded as due to the retention in each, of certain features derived from their ancient common ancestral stem group, rather than due to the fact that they indicate that there are distinct lines of descent leading from the immediate ancestors of the Japygids to those of the Forficulids, or from the immediate ancestors of the Protura to those of the Plecoptera, etc. At any rate, the ancestors of the Forficulids and Plecoptera were too closely related to be descended from

two distinct groups of insects, and such annectent forms as the nymphs of *Peltoperla* serve to bring the Plecopteron line of descent very close to that of the Lepismids; so that I am inclined to believe that all of these lines of descent of the Orthopteroid insects ultimately approach very close to that of the *Lepisma*-like forms, as is shown in the diagram. It should be borne in mind, however, that since no group of living insects is descended from any other group of living insects, close resemblances are largely an expression of close parallelism in the lines of descent.

Before leaving the discussion of the lower winged insects, it is necessary to briefly touch upon the relationship of the Libellulid, Ephemerid and Neuropteron groups to each other and to the Orthopteroid groups of insects, since the Libellulids, and Ephemerids in particular, are very primitive, although somewhat aberrant types of insects. By the term "Orthopteroid" is meant all of those Pterygotan forms whose lines of development approach that of the Blattids or Perlids (e. g. the Perlids, Phasmids, Phylliids, Locustids, Tettigonids, Gryllids, Grylloblattids, Forficulids, Embiids, Termites, Mantids and Blattids).

The Libellulid group or *Panzygoptera* (i. e. Zygoptera and Anisoptera) is apparently related to both the Ephemerids and the Neuroptera (i. e. the line designated as the Neuropteradelphia) and also approaches closely to the Perlid-Embiid line of descent, as is indicated in the diagram. The Libellulids may perhaps be regarded as occupying a position intermediate between the Neuropteroid insects, such as the Ascalaphidae, etc., and the Perlid-Embiid group, but possibly ultimately approach the Ephemerid line of descent.

The Ephemerid line of descent is a rather puzzling one to trace. It approaches the Neuropteron group, and also approaches the Libellulid ("Odonatan") line of descent, but ultimately appears to draw near to the Perlid line, as shown in the diagram, although it does not parallel this line as closely as one might be led to expect from the rather close relationship between the Ephemerids and the Neuropteron group. The Ephemerids are in certain respects among the most

primitive of winged insects, although in other respects they are decidedly specialized. They are to be regarded as a markedly aberrant group related to the Neuropteroid insects, as well as to the Libelluloid and Perloid lines of development. They appear to approach as closely to the Lepismoid forms as to any of the Apterygotan insects, and the immature stages of *Heptagenia* and *Hexagenia* are strikingly Crustacea-like in certain respects (such as the mouthparts, etc.) as will be discussed in another paper. The Ephemeroid forms constitute the order Plectoptera of Packard.

The Neuropteradelphia form a section of the class Insecta, containing the Neuroptera and those insects which have descended from forms not unlike the ancestors of the Neuroptera. As was mentioned above, the Neuropteroid forms are related to the Ephemeroid group as well as to the Libelluloid group, and also approach the Plecopteron (Perloid) line of descent. The Neuropteron line of descent not only approaches that of the Plecoptera but also approaches the line of the Blattids and Mantids from another angle, which cannot be shown in the diagram, since it would be necessary to draw the Neuropteron line in a plane perpendicular to that of the diagram, in order to bring out this double relationship. The relationship of the Neuropteron group to the Plecopteron (Perlid) group is somewhat closer than that of the Neuropteron group to the Blattid-Mantid group; and the resemblance between the Neuroptera and the Blattid-Mantid group may possibly be due to the fact that both are related to the Plecopteron group—in other words the Neuroptera may be related to the Mantids through the mediation of the Plecoptera. A comparison of certain Mantid forms (such as *Mantoida luteola*) with certain Neuroptera, however, has led me to think that the Mantids, Perlids and Neuroptera may form the three apices of a triangle, each apex of which is connected with the other two by mutual bonds of relationship, so that the relationship between the Neuroptera and the Mantids is possibly more direct than through the mediation of the Plecopteron group, to which both are related.

(To be continued)

Mycetobia and the Classification of the Diptera.

By Frederick Knab, Bureau of Entomology, U. S. Dept. of Agriculture.

In a paper read at the ninth annual meeting of the Entomological Society of America, the writer proposed a new grouping of the lower families of Diptera, generally called Nematocera, dividing them into two series according to the character of the larval respiratory system.[1] In one series, Oligoneura, were placed those forms in which the larvæ showed the more primitive condition of a series of lateral spiracles, such as occurs in most terrestrial insects. In the other series, Polyneura, were grouped those forms in which the larval respiratory system had become profoundly modified in adaptation to aquatic life, a single pair of large functional spiracles occurring posteriorly. The grouping thus brought about appeared more natural also when the adult characters were considered.

In examining the available data concerning the larval spiracles, but one seeming contradiction was found. This was the genus *Mycetobia*, universally considered a member of the family Mycetophilidæ. Its larva was said to differ from all the others of that family by possessing but a single pair of spiracles, posteriorly situated, and showing a remarkable resemblance to the Rhyphidæ. This contradiction within a large and otherwise homogeneous group was already strongly felt by Osten Sacken.[2] He accepted the statements of three most careful workers,—Lyonet, Dufour and Perris—all agreeing on this point, but ended the discussion of the subject with the remark, "this is a problem yet to solve." The writer, finding *Mycetobia* the only case conflicting with his proposed grouping, became convinced that some error existed and suggested that the three great observers just mentioned might after all have been mistaken. It has now been made clear that they were correct, but the seeming contradiction has been explained in an unexpected manner, most gratifying from the view-point of the writer's ideas.

[1] The Nemocera not a natural group of Diptera. Ann. Ent. Soc. Amer., vol. 8, 1915, pp. 93-98.

[2] Berlin. Entom. Zeitschr., vol. 37, 1892, pp. 442-443.

Mons. D. Keilin of Paris, a careful student of dipterous larvæ, becoming interested in the question at issue, reinvestigated the larva of *Mycetobia*, and determined that the correspondence with *Rhyphus* is even closer than had been supposed. Evidently his suspicions were aroused that *Mycetobia* had been wrongly placed with the Mycetophilidæ, for he now suggested to Mr. F. W. Edwards of the British Museum an investigation of the imagos. The result of Mr. Edwards' study have appeared recently and tend to show that *Mycetobia* does not belong to the Mycetophilidæ, but to the Rhyphidæ, as was indicated by the larval characters.[3] For the detailed discussion of the characters upon which *Mycetobia* is referred to the Rhyphidae, the reader must consult Mr. Edwards' original paper. As this will not be generally accessible, the importance of the subject leads me to quote what he has to say regarding the wing-venation:

> The Rhyphidæ and Mycetophilidæ agree in having a costa which does not extend beyond the tip of the wing, but differ widely in that the former have a three-branched media and a discal cell, whereas the latter never have more than a two-branched media and no discal cell.
>
> At first sight it is not easy to connect the two types, but if in the wing of *Rhyphus* we suppress the third branch of the media, and with it the cross-vein forming the discal cell, a condition very much resembling that of *Mycetobia* is arrived at, and the following points of resemblance between the two genera become more apparent:—(1) the

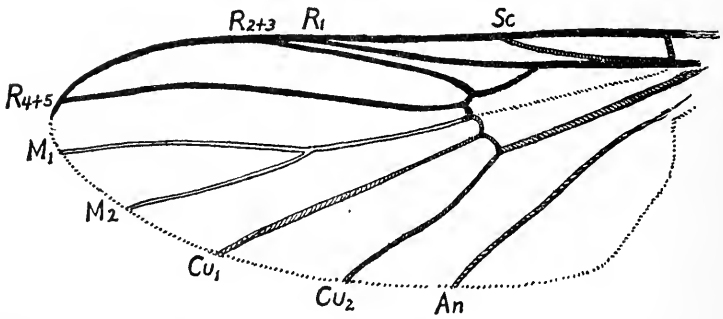


Fig. 1. *Mycetobia*, venation.

[3] On the systematic position of the genus Mycetobia, Mg. Ann. Mag. Nat. Hist., 8 Ser., vol. 17, no. 97, Jan. 1916, pp. 108-116.

radial sector forks basally to the R-M cross-vein, or, in other words, the small cross-vein is situated on the third longitudinal vein, instead of on the præfurca; (2) the lower branch of the cubitus is distinctly sinuous, the cell Cu_1 having a convexity on the lower side towards the base. The resemblance between the venation of *Mycetobia* (fig. 1) and *Olbiogaster* (fig. 2) is in some respects still more marked, and it is worthy of particular notice that in *Olbiogaster africanus* Edw., and still more conspicuously in *O. sackeni* Edw., the lowest of the three veins arising from the discal cell (M_3) is less strongly chitinized than the other two, suggesting that the venation of *Mycetobia* has arisen directly from that of *Olbiogaster* through the obsolescence of M_3.

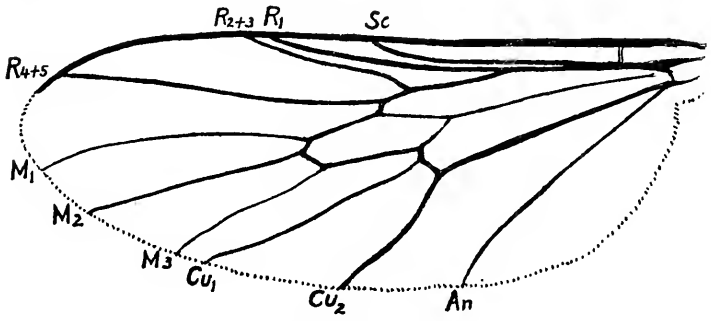


Fig. 2. *Olbiogaster*, venation.

In almost all other Mycetophilidæ the radial sector, when it forks at all, does so nearer the wing-apex than the position of the R-M cross-vein, which, besides, is usually sloping, and not straight as it is in *Mycetobia*. The only exception to this rule is the genus *Pachyneura*, in which the radial sector forks exactly at the R-M cross-vein. In all other Mycetophilidæ, with the exception of *Leiomyia* (*Glaphyroptera*) and its allies, the cell Cu_1 is concave instead of convex on its lower margin. *Ditomyia* and *Symmerus*, genera which, together with *Mycetobia*, have been made to form the subfamily Mycetobiinae, agree in both these respects with the other Mycetophilidæ, and I therefore consider that they are not at all closely related to *Mycetobia*. The genus *Mesochria*, recently described from the Seychelles Islands, is, on the other hand, closely related to *Mycetobia*. Its venation is very interesting, as the media is evanescent; it evidently represents a further stage of evolution from *Mycetobia*, in which the lowest branch of the originally three-branched media has already disappeared.

A comparison with other Diptera as regards the position of the radial fork reveals the fact that in the Tipulidæ, Culicidæ, Psychodidæ, Orthorrhapha Brachycera, and Cyclorrhapha, it always takes place

anteriorly to the R-M cross-vein, whereas in the Chironomidæ, Simulidæ, and Bibionidæ the radial sector is usually simple, but when it forks does so beyond the R-M cross-vein. An apparent exception to this rule, however, is the Bibionid genus *Eupeitenus*. It is also noteworthy that in the families of the first group the media is primitively three-branched, while in those of the second it is never more than two-branched.

Mr. Edwards disclaims having made an exhaustive investigation, but expresses the conviction that *Mycetobia* belongs with the Rhyphidæ. The writer hopes that other workers will be stimulated to take up the study of the relationships within the Diptera, and their bearings on the new ideas. With this end in view, I quote the summary at the end of Mr. Edwards' paper:

1. *Mycetobia* agrees with the Rhyphidæ and diverges from the Mycetophilidæ in the possession of a large gular plate, in the structure of the second palpal joint, in the position of the forking of the radial vein, the course of the cubital vein, and in the chitinous spermathecæ of the female. Since the venation of *Mycetobia* has been shown to be directly derivable from that of the Rhyphid genus *Olbiogaster,* it is probable that any resemblances in this respect to the Mycetophilidae are due to convergent evolution, and not to relationship. The genus *Mycetobia* (and with it *Mesochria,* though not *Ditomyia* or *Symmerus*) must therefore, on grounds of adult as well as larval structure, be transferred from the Mycetophilidæ to the Rhyphidæ.

2. It is at least possible that the characters of the gular plate and of the position of the radial fork will be found on full investigation to divide the Nematocera into two groups, and there is evidence that these groups may coincide with those founded on other characters, notably the tracheal system of the larva; this evidence, therefore, tends to confirm Knab's recent division of the Nematocera (Ann. Ent. Soc. Amer. vol. viii, p. 93, March, 1915) into Oligoneura, with peripneustic larvae, and Polyneura, with amphipneustic larvae. The genus *Pachyneura* seems to require special study, owing to the intermediate character of its venation, and *Eupeitenus* is also aberrant.

3. If, as seems probable from many considerations, the higher Diptera have been derived from the Polyneura and the Oligoneura represent an entirely distinct line of evolution, the primary division of the order should be neither into Orthorrhapha and Cyclorrhapha, nor into Nematocera and Brachycera, but into Polyneura and Oligoneura, the former including, in addition to the Tipulid-Culicid group of the Nematocera, the whole of the Cyclorrhapha and the Orthorrhapha Brachycera.

Two new dark-colored Species of the Genus Eurycotis (Orthoptera, Blattidae).

By Morgan Hebard, Philadelphia, Pennsylvania.

(Plate XIV)

Eurycotis abdominalis new species. (Plate XIV, Fig. 2.)

The present species appears to be widely separated from any of the known forms of *Eurycotis*. Its position in the genus is after the smaller and more slender species (which include the genotype, *E. mysteca*) and before the large and heavy species (in the linear arrangement of which we would put first, *E. tibialis*, here described). This insect is distinctive in the shining blackish coloration with striking vinaceous-rufous spots on each side of the metanotum and the six proximal dorsal abdominal segments. The shape of the caudal margin of the pronotum and of the lateral tegminal pads, the degree of latero-caudal production of the fifth to seventh dorsal abdominal segments and the shape of the supra-anal plate are also of decided diagnostic importance.

Type: ♀ ; Central America. (Rev. T. Heyde.) [Hebard Collection Type No. 420.]

Description of Type. Size medium large for the genus, form robust. Head much as in *E. opaca;* large, face weakly convex, ocellar spots in normal position (meso-dorsad of antennal sockets) almost obliterated. Pronotum with polished surface smooth but showing faint irregularities, evenly convex except cephalo-laterad where the convexity is more decided; cephalic margin transverse but convex ventrad, thus embracing the head, the cephalic angles thus being deflexed, these broadly rounded; lateral margins broadly convex to caudal angles which are produced caudad and sharply rounded; caudal margin transverse but rather strongly though broadly concave in each lateral third, the mesal third being broadly convex. Tegmina represented by small lateral pads extending to end of basal fifth of metanotum; surface polished but cribroso-rugulose, weakly convex except at costal margins where they are flattened; costal margin weakly convex, sutural margin strongly convex to sharply rounded apex situated on costal margin. Surface of mesonotum, metanotum and dorsal abdominal segments including supra-anal plate, as polished and smooth as pronotum. Caudal margin of metanotum very similar to that of pronotum but with produced latero-caudal angles more sharply rounded. Latero-caudal angles of fifth to seventh dorsal abdominal segments produced in increasing ratio caudad with sharp apices, these productions not nearly as decided

and broader than in *opaca*, the longest less than half the diameter there of the segment. Supra-anal plate triangularly produced; surface convex mesad, becoming somewhat more decided meso-distad, concave laterad; free margin weakly convex laterad, sharply and roundly emarginate mesad, the lateral productions thus formed rounded to an equal degree. Subgenital plate of normal form in the genus. Limbs and armament of the same normal for the genus, no indication of enlargement or flattening of the caudal tibiae.

Measurements (in millimeters) of type.

	Length of body	Inter-ocular width	Length of pro-notum	Width of pro-notum	Length of tegmen[1]	Width of tegmen	Greatest width of abdomen	Length of caudal tibia
♀	30.6	4.7	8.8	13.1	6.6	3.2	15.7	11.6

Coloration. Shining blackish brown above and below; a large, longitudinal, oval, slightly raised spot of cinnamon rufous laterad on the metanotum, and each dorsal abdominal segment with a broad lateral mark of this color, these widening caudad as their internal margins are oblique, but at the immediate caudal margin of each segment a narrow invasion of the dark general coloration occurs.

The type is unique.

Eurycotis tibialis new species. (Plate XIV, Fig. 1 and Text Fig.)

This unicolorous insect is likewise anomalous, but should be placed first among the broad species of the genus; immediately following, but in no wise closely related to *E. abdominalis.*

This species is followed in linear arrangement by *E. opaca* but differs widely from that insect in the more decidedly flattened head, distinctive lateral tegmina, less produced margins of the fifth to seventh dorsal abdominal segments (in this feature intermediate between *abdominalis* and *opaca*), distinctive supra-anal plate in both sexes and subgenital plate in male, remarkably enlarged and flattened caudal tibiae and proportionately longer caudal tarsal joints which are contained 1.24 times in the caudal tibial length, (in *opaca* 1.5 to 1.73 times.)

TYPE: ♂ ; San Francisco Mountains, San Domingo, September, 1905. (Aug. Busck.) [United States National Museum.]

Description of Type. Size medium large for the genus, form robust. Head much as in *E. opaca* but with face distinctly more flattened;

[1] A third of the tegmen is covered by the projecting latero-caudal angles of the pronotum.

large, face very weakly convex, ocellar spots represented by minute buffy dots in normal position. Pronotum with polished surface convex, this more decided mesad, microscopically punctulate particularly laterad; cephalic margin transverse but convex ventrad thus embracing the head, the cephalic angles being deflexed but not as suddenly as in *E. abdominalis,* these being broadly rounded; lateral margins broadly convex to caudal angles which are moderately broadly rounded, the lateral and caudal margins forming an angle there of very slightly less than a rectangle; caudal margin transverse but with a very weak and broad convexity indicated on each side. Tegmina represented by small lateral pads extending very slightly beyond the caudal margin of mesonotum; surface polished but microscopically punctulate, flattened with costal margin alone thickened, cingulate; costal margin very weakly convex, sutural margin very weakly concave, distad oblique truncate with sutural angle slightly the more produced.[2] Surface of mesonotum, metanotum and dorsal abdominal segments including supra-anal plate as polished and even less punctulate than pronotum. Caudal margin of mesonotum rect-transverse in mesal third, very slightly produced laterad with latero-caudal angles sharp and sub-rectangulate. Latero-caudal angles of fifth to seventh dorsal abdominal segments produced in increasing ratio caudad with sharp apices, of the form found in *abdominalis* but more decided, when compared with *opaca* the latter is seen to have these productions distinctly more slender and more strongly produced. Supra-anal plate produced, decidedly less transverse than in *opaca,* lateral margins concave proximad, distad the plate is briefly bilobate, the weak median emargination thus formed being rectangulate, the distal margin decidedly hairy but without serrulations as found in *opaca.* Subgenital plate strongly transverse, with stout and very elongate and tapering styles placed symmetrically meso-laterad in decided emarginations as is usual in the genus; median half produced, with distal margin broadly and roundly obtuse angulate emarginate, this weak but distinct. Cephalic and median limbs and armament of the same normal for the genus. Caudal femora heavier than usual; caudal tibiae also heavier than usual and very decidedly broadened just proximad of the mesal point, where on both cephalic and caudal faces a distinct oblong concave area is found, this nearer the dorsal than the ventral margin; caudal tarsal joints unusually long for the genus, contained but 1.25 + times in the caudal tibial length.

[2] The tegmina are asymmetrical in the adventive female before us; the dextral is normal, weakly oblique-truncate distad with sutural angle slightly the more produced and more obtuse-angulate, both angles rather sharply rounded; the sinistral is decidedly oblique-truncate with sutural angle decidedly the more produced and acute angulate but broadly rounded.

Allotype: ♀; San Domingo. August, 1905. (Aug. Busck.) [United States National Museum.]

Description of Allotype. Agrees with male except in the following features. Size slightly larger. Produced latero-caudal angles of dorsal abdominal segments very slightly more decided (as shown also by this sex in *opaca*). Supra-anal plate produced, narrower and more strongly emarginate mesodistad than in *opaca;* lateral margins weakly convex, mesal portion deeply subrectangulate emarginate with margins weakly convex, the lateral productions thus formed being equally convex on each side with apex rather sharply rounded. Subgenital plate of normal form in the genus. Caudal tarsal joints contained 1.28 times in the caudal tibial length (in the other female before us 1.24 + times).

Eurycotis tibialis new species. Caudal face of caudal tibia of *allotype* ♀. (x 2.)

Measurements (in millimeters).

	Length of body	Interocular width	Length of pronotum	Width of pronotum	Length of tegmen[3]	Width of tegmen[4]	Length of caudal tibia	Length of caudal tarsal joints
♂, *type.*	27.5	3.7	9.4	13.3	6.8	3.6	11.2	8.9
♀, *allotype.*	29.5	3.6	9.8	13 9	7.2	3.9	11.9	9.3
Adventive ♀.	31.0	3.7	9.8	13.7	7.4	3.8	11.2	9 0

Coloration. Very dark brown except inconspicuous minute ocellar dots, antennal sockets and soft portions of clypeus which are buffy. Pronotum, mesonotum, tegmina and metanotum almost black to blackish chestnut. Head and abdomen above and below black with a brown suffusion. Antennae auburn becoming blackish near the base. Coxae and femora almost black to blackish chestnut, the latter in the paler condition becoming darker distad; tibiae and tarsi black with a brown suffusion.

Specimens Examined: 3; 1 male and 2 females.

San Francisco Mountains, San Domingo, September, 1905. (A. Busck), 1 ♂, *type,* [U. S. N. M.].

San Domingo, August, 1905, (A. Busck), 1 ♀, *allotype,* [U. S. N. M.].

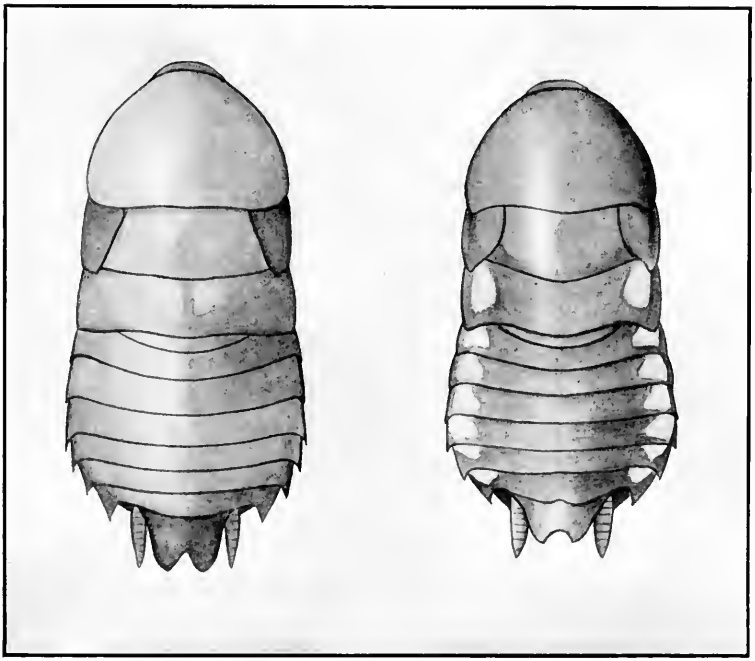
Adventive at Orono, Maine, 1 ♀, [Maine Agric. Exp. Sta. Cln.].

EXPLANATION OF PLATE XIV.

Fig. 1. *Eurycotis tibialis,* n. sp. Dorsal view of allotype. ♀. (× 2.)
Fig. 2. *Eurycotis abdominalis,* n. sp. Dorsal view of type. ♀. (× 2.)

[3] The tegmina in nearly their proximal half are concealed by the pronotum. The measurement is of total length.

[4] This measurement is taken at the margin of the pronotum.



1. EURYCOTIS TIBIALIS, ♀; 2. E. ABDOMINALIS, ♀.—HEBARD.

Butterflies of a Mountain Park in Colorado (Lep.).*

By E. L. Reed, Agricultural and Mechanical College of Texas, College Station, Texas.

During the summers of 1914 and 1915 the writer made a study of the true butterflies of Boulder Park, Colorado, and vicinity. The park is located forty-seven miles from Denver on the Denver and Salt Lake Railroad and has an altitude of 8989 feet. It is surrounded by mountains and is about two and one-half miles long by one mile wide. The floor of the park is composed mainly of dry grasslands and meadows while the surrounding mountain sides are covered with pine and spruce forests with occasional patches of aspens and alders. South Boulder Creek flows in a winding course through the park. Four gulches lead into it; South Boulder Canyon and Mammoth Gulch at the upper end, Jenny Gulch and Jenny Lind Gulch at the lower end. About the center of the park is situated the village of Tolland.

The altitude necessarily gives the park a cool summer climate, scarcely three consecutive weeks passing without frost; ice is sometimes formed in mid-summer. The mean July temperature is about 58 degrees Fahrenheit. The first part of the summer season is usually without much rainfall but the latter part has numerous showers. Throughout the summer there is an abundance of flowers.

The butterflies listed in this paper were collected in the park and the gulches leading into it. Three families are represented by twenty-four genera and forty-three species. Twenty-five of the species are exclusively montane and boreal forms. The other species are lowland types that reach the altitude of nine thousand feet or more. Twenty-six species appear in relatively large numbers each year but the other seventeen species are seldom abundant and one or more of these may be entirely absent during any one season. Those marked with an asterisk (*) are relatively abundant each year;

*This is a part of the work done at the Mountain Laboratory at Tolland, Colorado, in a course in the graduate school of the University of Colorado.

the others are seldom found in abundance. The nomenclature is that in the "Butterfly Book," by Dr. W. J. Holland, New York, 1901.

Family Nymphalidae

Anosia plexippus Linnaeus
**Euptoieta claudia* Cramer
**Argynnis edwardsi* Reakirt
* " *cornelia* Edwards
* " *eurynome* Edwards
Brenthis freija Thunberg (alpine and boreal)
" *helena* Edwards
" *epithore* Thunberg
Melitaca nubigena Behr
Phyciodes camillus Edwards
" *tharos* Drury
Grapta gracilis Grote and Robinson (alpine and boreal)
Vanessa antiopa Linnaeus
milberti Godart
**Pyrameis cardui* Linnaeus
huntera Fabricius
**Basilarchia weidemeyeri* Edwards
**Coenonympha ochracea* Edwards
**Erebia epipsodea* Butler
**Satyrus charon* Edwards
Oeneis chryxus Westwood (alpine and boreal)

Family Lycaenidae

Thecla irus Godart
**Chrysophanus helloides* Boisduval
* " *rubidus* Behr
* " *sirius* Edwards
**Chrysophanus thoe* Boisduval
**Lycaena heteronea* Boisduval
* " *lygdamas* Doubleday
* " *rustica* Edwards
* " *saepiolus* Boisduval

Family Papilionidae

Pieris napi oleracea-hiemalis Harris
" *napi pallida* Scudder
* " *protodice* Boisduval and Leconte
* " *rapae* Linnaeus
**Nathalis iole* Boisduval
**Euchloe ausonides* Boisduval
Euchloe sara julia Edwards
**Colias alexandra* Edwards
* *eurytheme* Boisduval
Terias mexicana Boisduval
**Parnassius smintheus* Doubleday and Hewitson
Papilio asterias Fabricius
* " *zolicaon* Boisduval

Entomologists at the Graduate School of Agriculture.

The prospectus for the elaborate courses of this School, to be held at the Massachusetts Agricultural College, Amherst, Mass., July 3-28, 1916, includes the following names among those who are to take part in the course on growth: Professors C. M. Child, V. E. Shelford and H. T. Fernald.

The Phasmidae of Minnesota, Iowa and Missouri (Orth.).

By M. P. Somes, Mountain Grove, Missouri.

The Phasmidae, or, as commonly known, "Walking Sticks," comprise a group of most interesting insects and since those found within our territory are of good size and simple structure they should be better known. But one species has been commonly recorded from this area. As known at present, there are four species, representing three genera. The genera may be separated as follows:

Elongate, slender wingless insects, with the mesothorax four or more times as long as the prothorax; tarsi five-jointed; middle and hind tibiae ventrally carinate to tip, without an apical areolate area; the antennae longer than the fore femora Subfamily Bacunculinae.

Hind femora in both sexes with a mid-ventral row of spines, large and strong in the female but often reduced to low knobs in the male; male cerci broadly spatulate; insects of very large size *Megaphasma* Caud.

Hind femora with but a single, subapical, ventral spine, or with but two small spines; male cerci not at all spatulate; slender insects of small or moderate size.

Hind femora of both sexes armed beneath with a subapical spine, prominent in the male, often minute or wanting in the female *Diapheromera* Gray.

Hind femora with no subapical spine beneath in either sex *Manomera* Rehn and Hebard.

The genus *Megaphasma* Caud. is, so far as now known, represented by a single species, *denticrus* Stal, the largest of our North American walking sticks and may readily be distinguished from any others within our area by the characters given in the key. The female has the mid-ventral row of spines on both middle and hind femora strong and distinct, while in the male these spines on both the middle and hind femora are all variable in size, save the prominent subapical spine. The ventral margins of both middle and hind femora are variably serrate. This species, heretofore considered as belonging to the area of the Gulf States, is not uncommon in the Ozark region and gradually scarcer to the northward. The most northern points at which we have taken this

species are Hamburg and Clarinda, Iowa. We have, however, had an insect described to us from near Fort Dodge, Iowa, by a very accurate, though non-entomological, observer, which, judging from size, must certainly have been this species. In this genus as in the following, the males are more highly colored and have the anterior femora green, while the females are almost unicolorous grayish or brownish. The immature forms are grayish, brownish or green, with the middle femora, especially in the female strongly marked with white spots. The legs of the young are quite short and decidedly stout. The species is found on shrubs and trees and does not apparently differ greatly in habits from the well-known *Diapheromera femorata.*

Diapheromera Gray is represented by two species which may be separated by the following characters:

Male cerci with a blunt basal tooth on inner margin; female cerci scarcely more than one-half as long as the eighth abdominal segment *D. femorata* Say.

Male cerci with an acute slender basal tooth on inner margin; female cerci decidedly more than half as long as the eighth abdominal segment *D. velici* Walsh.

D. femorata Say is the most common and widely distributed of American walking sticks and because of its wide range is quite variable in size and coloration. It is probable that many records of this species may include one of the two following species. It is found throughout both Missouri and Iowa, while in Minnesota it is most common in the southern and eastern portions. The immature stages are of a soft greenish color and occur on tall grasses and herbage, while later in the season the adults are found on shrubs and trees.

D. velici Walsh is much less common and tends to be rather local in distribution. It has been taken through most of western Missouri, from Joplin northward and through all of western Iowa, extending far up into the valley of the Red River of the North in Minnesota, where the writer has taken it as far north as Crookston. In the eastern portion of these three States, however, the records are more scattered. We have taken it at Spickard and Memphis, Missouri; Elmira, Central

City, Humboldt and Fertile, in Iowa, while in Minnesota, Staples is our most eastern record, though two immature specimens from Hinckley may possibly be referred here. This species averages smaller than *femorata*, especially in the males and these also tend to brighter coloration, being often quite distinctly marked with two light colored lateral stripes, the pleura being light colored in life though after drying the color is less distinct. This species tends to frequent tall grasses and low brush rather than trees and tall shrubs. It is often found on such plants as *Andropogon scoparius* Mx., *Lespedeza capitata* Mx. and *Salix humilis* Marsh.

Manomera Rehn and Hebard has, within these three States so far as known, but one species, *M. blatchleyi* Caud. In size this insect averages as about intermediate between the two species of *Diapheromera* just described, while in structural characters and appearance, it is very closely like *D. velii*, save in the fact that there is no subapical spine beneath the hind femora in either sex. The coloration of the males is usually darker than in *velii* which brings out the light colored pleura into stronger contrast. The females are scarcely distinguishable from those of *velii*, save that the front margin of the first abdominal tergite is nearly straight, while in *velii* it is arcuate. This insect has been taken as locally abundant at several points in the Ozark area and a single male was found at Center View in the northern part of Missouri. In Iowa it has as yet been taken only at Hamburg and at Moulton. It has not been taken in Minnesota and in all probability does not extend far into Iowa. Recently a well known collector told the writer that he had come to believe this insect must be parthenogenetic from the fact that while in his locality the females were plentiful, he had never taken a male. This has not been the case in our experience, as the sexes have been taken in about equal numbers. Specimens of both sexes have been compared with the type at the National Museum and show no differences.

The writer will be very grateful for any data as to new records and will be glad to examine Phasmids from these States for any interested collectors.

The Influence of Various Concentrations of Sea Water on the Viability of the Salt Marsh Mosquitoes Aedes sollicitans and Aedes cantator (Dip.).

By F. E. Chidester, Ph.D., and Raymond Patterson, B.S.

(From the Entomological Department of the New Jersey Agricultural Experiment Station, T. J. Headlee, Entomologist.)

In the course of an extensive study of the activity of the killifishes of the New Jersey coast, which was undertaken by the senior author at the request of the State Entomologist, it was deemed desirable to obtain records of the salinity, specific gravity and temperature of the water from which each collection was made. In the course of such record taking, it was noted that considerable difference in salinity existed in pools which contained mosquito larvae.

On April 18, two series of experimental jars were set up in one of the laboratories of the Entomology building. The first series of jars began with 100 cc. of sea water from Raritan Bay, with a salinity of 13 per cent. and ran down by steps of 10 cc. dilution with distilled water to pure distilled water in the eleventh jar. The object of this experiment was to determine what changes would take change in the larvae of salt marsh mosquitoes taken from pools with a degree of salinity of about 7 per cent. or 8 per cent. and forced to develop in water of a low salinity. The intention was to also subject *Culex pipiens* to a saline medium and try to change it into a salt water species.

The second series consisted of boiled down sea water, graduated in series by eight steps from 16 per cent. to 35 per cent. salinity. In this experiment the object was to determine what was the lowest toxic strength of salinity for the species used. The two series were supplemented by controls and by two jars of a 50-50 mixture of 13 per cent. sea water and redistilled water, placed at different temperatures, one kept low by running water (53° F.), the other placed in a greenhouse where the temperature ran up to 75° F. at times. The jars were covered with cheese cloth after having been supplied

with five second moult larvae and ten first moult larvae of the mosquito *Aedes cantator*. In the preparation of these experiments Mr. Raymond Patterson not only determined the species, but aided in the preparation of the jars of solution.

In the series running down from 13 per cent., it was noted that the larvae died rather quickly in the distilled water and in the higher per cents. In the series graduated from 16 per cent. up to 35 per cent. salt, all larvae died in the 22 per cent. jar and above in two days. Just as the records of these preliminary experiments were being considered and plans were being made for a more extensive series, the writer was invited by Mr. Patterson to go on a collecting trip to the marshes of Port Monmouth. On this trip we took records of the salinity of numerous pools, some of which contained no larvae. Two pools in particular engaged our attention. One with a temperature of 64° F. and a salinity of 22 per cent. contained many larvae of the species *Aedes sollicitans* of the second moult; the other pool, not ten feet away and similar in size, depth and character of bottom, with a temperature of 67° F. and a salinity of 24 per cent., contained no larvae at all. While probably of no great significance, the observation seemed at the time most important in the light of the preliminary experiments performed in the laboratory. Accordingly Mr. Patterson and the writer decided to carry on a large series of experiments to discover the effects of high salinity on the viability of mosquito larvae at different stages. Mr. Patterson was shortly forced to discontinue his work, but has aided substantially by furnishing larvae and field notes as well as by advice and information.

The records furnished by Mr. Patterson, Mr. H. I. Eaton and others indicate clearly that in the field *Aedes sollicitans* Wlk. lives and thrives in marsh water of a higher salinity than that which seems favorable to *Aedes cantator* Coq.

Extensive experiments carried on by the senior author show clearly that under laboratory conditions the viability of the larvae of the salt marsh mosquitoes in salt water depends not only on the salinity of the water from which they were taken, but also depends upon the species of larva. While rains may

lower the salinity of certain pools to such an extent that one finds larvae of several species of mosquitoes in the same pool, it has been shown conclusively that the resistance of the larvae to high salinities is different, following closely the records of the usual environments of the larvae.

There is much evidence to indicate that the distribution and time of appearance of the two dominant species of salt marsh mosquitoes is in part dependent on the amounts of salts present in the marsh waters at different distances from the sea. It is very probable that we shall find that a certain salinity is more favorable to the development of the eggs of one species than another.

Further discussion of the many experiments performed by the senior author will appear in the *Journal of Experimental Zoology* and in a technical bulletin of the New Jersey Agricultural Experiment Station.

The Sun-Dance of the Sawfly* (Hymen.).

By Phil Rau, Saint Louis, Missouri.

A narrow strip of ground, five feet wide or less, lay between the River des Peres and a high railroad embankment. It was well overgrown at this point with grass and low dock and elderberry sprouts, with some scrubby trees nearby. The sun's rays beat down strongly on this April day, and the breeze was all cut off from this spot, so it seemed a humid, sweltering hole. Here in the bright sunshine, hovering above the vegetation, were thousands of sawflies, dancing in swarms like gnats. They were in several distinct groups of a hundred or more. The individuals were in constant motion, flying about with a smooth, gliding stroke in all sorts of round figures, circles, eights, S's, etc., but keeping within the limited space of the group as if that portion of the atmosphere had an invisible wall around it.

Each separate swarm poised in the air in one spot most of the time, but occasionally a whole group would move slowly and imperceptibly, like a rolling, floating cloud, for a distance

*Identified by Mr. S. A. Rohwer as *Macrophya* sp. nov.

of a few feet. It was a voluntary motion (*i. e.,* they were not merely carried by the wind, etc.), and yet there was no more evidence of the leadership of one or more individuals in the movement than there is evidence of one particle of fog leading a moving cloud. These changes were made so gradually and smoothly that the observer could scarcely notice them until he became aware that he must change his position to watch them.

The insects were so imbued with life and activity that I at once suspected that close observation would show this to be the marriage dance of this new species, so for four hours I watched them in an effort to solve their behavior.

It was soon apparent that, whatever the origin and significance of this frolic, it might safely be called a sun-dance, for they centered their dances only in the brightest spots of sunshine, where no leaf or twig marred the light.

They were almost always on the wing, but here and there a tired individual would drop to a leaf to rest, preen her antennae, brush her abdomen or wings with her hind legs, or rest quietly until she was chased away by another eager for a mate. They were never observed to rest on the ground, although in spots along the path the vegetation was sparse enough to encourage it.

While the great mass of the insects was whirling and dancing most of the time, I did not observe among them a single copulation or an attempt toward it on the wing, but among those which fell out of the dance and dropped down upon the leaves a very playful kind of mating frequently occurred. When a female alighted, she usually enjoyed only a moment's rest before she was disturbed by a male who pursued her, running backwards and attempting to mate. Sometimes he was active enough to catch her and accomplish a brief mating on the run; at other times he barely touched her abdomen as she reached the end of the leaf and fell off, when he would fly away into the dance again.

In this species the male does not mount the female as is the manner of some insects, but they always mate by the tips of the abdomens, with their heads in opposite directions. In

spite of the reversal of position the rear insect had no trouble in keeping up the race running backward, but I sometimes suspected that the female pulled him along with her while she was trying to get away. One might watch an active group for fifteen or even thirty minutes before seeing a case of this mating.

In watching them circle about in their dance I was not able at any time to observe a male chasing any one female, but when a pair was on a leaf ready to mate, or actually mating, several others would alight on the same leaf, attempt to mate and make life miserable for the couple, and usually break up the marriage. Perhaps this accounts for the instantaneous matings, since either opposition from the female or interference by other males makes it necessary. Sometimes three or four males were together in a heap, fighting for the possession of the female, but in these cases I think the female in question must have been a very attractive one, as I shall show in one case later.

Their very behavior led me to suspect that they were polygamous, and I personally observed enough repeated matings among them to confirm this impression and to make me sure that they are freely polygamous, although in a few instances I saw among them some slight expression of preference for certain mates. One pair mated in my presence and immediately a second male came along and separated them, pushed the rightful owner to the other end of the leaf and attempted to mate. The wife was faithful to the first, however, freed herself from the impostor, went to the other end of the leaf and again mated with her husband for the usual duration of a few seconds, walked to the end of the leaf and soared off on the wing to join her comrades in the dance. (They usually walked to the end of the leaf to take flight back to their group.)

The one case observed which, I was sure, was an actual copulation was of somewhat longer duration. They were united when I discovered them; how long they had been there I know not. Others soon tried to crowd in, and still others were on the same leaf. In an instant they were all one teeming mass of struggling life, many males burying the couple.

In order to make sure that it was a case of rivalry among the males I took them to ascertain the sexes; they were so intent upon their business that with one grasp of the hand I captured all of them but three; the eleven insects captured were ten males and one female. We may only surmise the sex of the three which escaped. When I placed those captured in the vial I noticed a mass of yellow substance hanging from the abdomen of the female; it was a cluster of a half dozen eggs. Whether these had been protruded after mating, or in sweeping with my hand I had forced them out, I do not know, but this seems certain: some females are more attractive than others, and this may be in relation to the maturation of their eggs. This may show also the value of the sun dance; the playfulness and the "false matings" being merely steps to the discovery of the individuals which are physiologically ready for immediate mating.

Later in the same week I went out to this place at 4.30 in the afternoon, looking for the sun dance or sleeping behavior of these sawflies. The weather was cloudy and threatening rain. Over the low grass over which they had frolicked so lustily a day or two before none were to be seen, but many were on the box elder leaves where, I judge, they were preparing to spend the night. They were not gregarious, but there was usually one to a leaf; they walked drowsily about, occasionally slowly biting at the leaf with the mandibles. They did not penetrate the leaf deeply enough to leave a mark upon it, but it appeared that they were getting the benefit of some invisible substance from the leaf, perhaps some liquid or some fuzz, but the whole process was slow enough to assure an observer that the activities were only those of tired creatures. A little later, about 6 o'clock, many were resting motionless upon the leaves, and while I could not return during the night to see if they were still in their places, I felt confident that they were settled for the night.

One week later, May 5, I returned to the place in the forenoon when I hoped for better results, but in my search from 10 to 12 o'clock I found only three wandering individuals, all females.

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., JUNE, 1916.

A Duty of Specialists.

We recently received a letter from a specialist on a group of insects, with which none of the Editors or Advisory Committee of the NEWS are familiar, criticizing unfavorably the work of another writer on the same group published in the NEWS. The criticism was chiefly directed against the creation of synonyms by the second writer, who was taxed with ignorance of the existence of the *Zoological Record,* the *Concilium Bibliographicum* and the bibliographies given in the NEWS.

The author of the letter suggested an editorial on this subject, but at the same time appears to overlook certain aspects of the case. An exact knowledge of the species of any group of organisms is possessed only by the specialists on that group and on them devolves not only the right but also the duty of pointing out the errors committed by other students. It so happens that descriptions of alleged new species by the writer complained of have appeared in the NEWS for several years without calling forth any protest until this present. The Editors of the NEWS must take into account, as far as possible, all the various motives which actuate entomologists (who, after all, are human), and must refuse to undertake those tasks with which as non-specialists they have no business to meddle. At the same time they must remind the specialists of their own duties to be performed either by direct communication to offending authors or by frank and open criticism which the NEWS will always be glad to publish, as evidenced by its record in recent similar cases.

Index to Minnesota State Entomologist's Reports.

We have received from Prof. F. L. Washburn, State Entomologist of Minnesota, Circular No. 38 from his office, dated April 4, 1916, entitled "Index to the Fifteen Annual and Biennial Reports of the State Entomologist of Minnesota, published between 1895 and 1914, both dates inclusive, together with an appendix listing other publications of the State Entomologist and the Division of Entomology, University of Minnesota." This pamphlet of 40 pages has been compiled by O. J. Wenzel. The Index is "a combination of the indices of the fifteen annual and biennial reports of the State Entomologist of Minnesota . . . and it is hoped that it will be found useful to those possessing a complete or even partial set of the reports."

Every bibliographic work of this kind is a valuable guide in the great maze of entomological literature and the State Entomologist of Minnesota deserves our hearty thanks for this Index. Prof. Washburn asks us to state that his office, at St. Anthony Park, Minn., will be glad to mail copies to Entomologists as long as the supply lasts.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

Parallelodiplosis cattleyae Moll., in New Jersey (Dip.).

After searching various greenhouses during the past several years for this insect, I was at last definitely rewarded by finding it in orchid houses at Secaucus and Madison, New Jersey. The larval stages are passed as yellowish-white maggots in swellings near the tips of the roots of *Cattleya* and other species of orchids. This of course checks growth and disfigures the roots, sometimes causing them to die back and become black. One orchid grower informed me that a shipment of orchids received from Guatemala was so badly infested that practically all of the roots had to be trimmed off. This pest, known commonly as the Cattleya midge, is often confused by greenhouse men with the "Cattleya fly," *Isosoma orchidearum* West. (Hymen.), many of them assuming that the latter species is responsible for the root galls. The Cattleya midge is not by any means widely distributed in New Jersey greenhouses, but can undoubtedly be found in more than the two localities mentioned above, if persistently sought for.—Harry B. Weiss, New Brunswick, N. J.

Observations on Ants in South Carolina (Hym.).

On March 18, the writer noticed ants attending *Toxoptera graminum*. The ants had nests at or near the base of oat plants on which the "green bugs" were feeding. The writer's attention was attracted by the unusual number of ants and nests in the field. The ants were identified as *Iridomyrmex pruinosus* var. *analis*.

Mr. J. A. Berly, of this Division, found a number of long, slender black ants in attendance upon the same species of plant-lice. The ants were *Dorymyrmex pyramicus*, or the common black lion ant.

The writer found *Prenolepis imparis* attending the black elder aphis, *Aphis sambucifolia*, on elder. Mr. G. M. Anderson, of this Division, found the same species of ants in attendance upon the cottony cushion scale, *Icerya purchasi*.

Two species of ants, *Crematogaster lineolata* and *Prenolepis imparis*, were found attending the scale on pine, identified by Mr. E. R. Sasscer, U. S. Bureau of Entomology, as *Toumeyella pini*. *Crematogaster lineolata* was also found attending *Aphis brassicae* on an unidentified plant of the mustard family.

Prenolepis imparis were observed swarming on March 19. One peculiar thing that was very noticeable was that spider webs had caught a large number of the winged forms; as many as six or eight were found in the same web.

A remarkably large nest of the small black ant, *Dolichoderus taschenbergi*, var. *atterina*, were found near a path at Clemson College. The nest was built under and around a large clump of broom straw, a

very common weed of waste places, and was so well concealed with particles of straw brought there by the ants that only very close observation revealed its location. There must have been several thousand in the nest, as they covered the ground everywhere. The writer's attention was attracted to this nest by the trail of the ants leading across the path. A large number were observed crawling up pine trees. This genus is recorded in Wheeler's "Ants" as an aboreal type. The identifications of the ants in most cases were made by Dr. Wheeler to whom the writer is indebted, while the Aphids were identified by Professor Thomas of this Division. The following species of ants were collected and added to the South Carolina list (see *antea*, page 110): *Crematogaster victima* subsp. *missouriensis*, *Crematogaster lineolata* var. *lutea*, *Prenolepis* (*Nylanderia*) *parvula*.—M. R. Smith, Entomological laboratories, Clemson Agricultural College, Clemson College, South Carolina.

Feeding Habits of Sinea diadema Fabr. (Het.).

The nymph of this Reduviid when its attention is attracted by a moving object assumes an attitude of alert waiting. If the prey then becomes still, having the appearance of being dead, the Heteropteron will not molest it but will turn and walk away unconcernedly. If, however, the prey continues to manifest signs of life and starts to walk away, the *Sinea* will boldly stalk it, capturing it eventually. If the larva, perchance, starts toward the young *Sinea*, it does so only to meet death sooner in strong spiny arms.

On preparing to attack, the *Sinea* rears back until the body is almost vertical, the antennae point backward, the front femora point back and obliquely down away from the body; the tibiae extend upward and away from the body, forming a very obtuse angle with the femur. Sometimes the position is not so pronounced. The insect only rears slightly on its hind legs, allowing the front femora to point away from the body in a position ranging from obliquely upward to obliquely downward. The tibiae in cases like this extend outward and upward, still forming the very obtuse angle with the femora. The beak all the while remains in its normal position under the abdomen. The proper moment having arrived, the insect with a quick rush closes on its prey, simultaneously bringing the front legs down and fixing the larva firmly in the angle formed by the union of the femora and tibiae, where it is firmly held by the strong spines which are fixed to both these joints. At the same moment that this rushing attack is made, the comparatively long sharp beak of the young Reduviid is brought forward and plunged with a single quick stroke into the body of the prey. In a majority of cases the beak is found to be inserted into or near the thoracic region of the larva, and in one instance it was inserted almost into the base of the head capsule of a newly-hatched *Drasteria erechtea* larva.

If the larva attacked be large enough, it throws the young nymph about violently as it struggles to rid itself of the undesirable predator. The nymph struggles to retain its hold, however, at the same time attempting to crawl backwards in an effort to drag the prey, which it does if the latter be small enough, thus keeping the struggling larva away from its own body. In case the young nymph is thrown loose from the larva it usually gives up the attempt to capture, unless it be especially hungry or has the larva placed before it again, in which case it again attacks. Should the nymph retain its hold on the larva with the beak inserted, the prey soon ceases to struggle, giving up completely, seemingly rendered inactive by the pain of the inserted beak or perhaps by a fluid injected for that purpose.

Young *Sinea* no further advanced in development than at most the second instar have been seen to attack and capture lepidopterous larvae half an inch long. In one instance a squirming larva of *Drasteria erechtea* was held in the air in front of a young *Sinea diadema*. The nymph, about 1/8 inch long, approached cautiously and rearing back until the body was vertical, sprung off the floor almost straight upward for a distance of about one-fourth of an inch and captured the prey.

Living as this young insect does on larvae that are more or less active themselves, it is perhaps necessary that it be agile or it might as a species be materially reduced, if not drop out entirely, in the struggle for existence.

Adults feed in much the same manner.

The abundance of this species in the fields in summer together with this predaceous habit, establishes an economic factor of no little importance.—H. L. Parker, Bureau of Entomology, Division of Cereal and Forage Crop Insect Investigations, Hagerstown, Md.

Targionia dearnessii Ckll. (Hem., Hom.).

This rather conspicuous scale, though widely distributed, is not commonly noted, for some reason. It first came to my notice by a purely automatic reflex and not at all as a result of search. I was, at the time, walking briskly along a country road, in late fall, when it suddenly came to me that there had been something peculiar about a small twig I had passed in the road. Retracing my steps for perhaps a rod, I picked up the twig, possibly six inches in length, and discovered that it was rather plentifully spotted with a whitish scale, having an *Aspidiotus*-like appearance but entirely unknown to me. Upon sending it to Mr. E. R. Sasscer, of the Dept. of Agriculture, Washington, I learned that it was *Targionia dearnessii* Ckll. Examining the twig I discovered that it was *Ceanothus americanus* L., or, as commonly called, "New Jersey Tea." This was in southern Missouri, some three years ago and, not being at that time familiar with the flora there, I was uncertain whether my find was local or, perchance, dropped from a load of hay imported from elsewhere. Early the following spring search

discovered the *Ceanothus* as local and further the fact that in scattered localities it was more or less coated with this scale. Keeping the facts in mind during my numerous trips throughout the state, I found this scale on the New Jersey Tea at numerous localities in most parts of the state. Later in Iowa, I found the same to be true there and in one little prairie valley near Iowa City, it occurred in greatest profusion, literally encrusting every stem. At this spot it was noted that many of the heavily encrusted stems were weakened and killed, while upon young stems this scale produced a very characteristic deformation, the stem being flattened and distorted. While widely distributed, it is within this part of the country at least local and has usually been found only in areas of a few square feet or at most square rods, while elsewhere in the locality, though the *Ceanothus* is abundant, it is free from scale. It is parasitized to some extent but we have been unable as yet to mature the parasites. Mr. Sasscer has been kind enough to give me the following data regarding the distribution of this insect, to which I have added those noted by me. To Mr. Sasscer I am further indebted for most of the citations of literature which follow:

Targionia dearnessii Ckll.

Arctostaphylos uva-ursi, shore of Lake Huron, Canada.

Bahia sp., Stevens Creek Canon, California.

Ceanothus americanus, Weeping Water, Nebraska; Tryon, North Carolina; Great Falls, Maryland; Mountain Grove, Cedar Gap, Springfield, Hollister, Marionville, Cape Girardeau, Hematite and Memphis, Missouri; Hamburg, Onawa, Iowa City, Moscow and Keokuk, Iowa.

Ceanothus ovatus, Tarkio, Missouri; Onawa, Iowa.

Greasewood (*Larrea*), Riverside, California.

Vaccinium sp., Grand Rapids, Wisconsin.

Liatris graminifolia, Ambrosia artemisiaefolia, Cranmoor, Wisconsin.

Antennaria plantaginifolia, Arlington, Virginia.

Symphoricarpos vulgaris, Mountain Grove, Missouri.

The principal references to this insect are the following:

Aspidiotus dearnessii Ckll., Can. Ent. XXX, p. 226; p. 266, 7 (Oct. '98) n. sp. Ckll.

Aspidiotus (*Targionia*) *dearnessii* Ckll. Bul. Ill. State Lab. Nat. Hist. V, art vii, p. 395, '99.

Targionia dearnessii Leon. Gen. Spec. Diaspiti, Aspid., p. 266 (1900).

Targionia dearnessii (Ckll.). Leonhardi, Riv. Pat. Veg., VIII, p. 343.

Aspidiotus (*Targionia*) *dearnessii* Ckll. King, Can. Ent. XXXIII, p. 109.

Aspidiotus dearnessii Ckll. King, Can. Ent. XXXIV, p. 160.

—M. P. Somes, Mountain Grove, Missouri.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded. The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of systematic papers are all grouped at the end of each Order of which they treat, and are separated from the rest by a dash.

Unless mentioned in the title, the number of new species or forms are given at end of title, within brackets.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London.

For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

2—Transactions of the American Entomological Society, Philadelphia. **3**—The American Naturalist. **4**—The Canadian Entomologist. **5**—Psyche. **6**—Journal, New York Entomological Society. **9**—The Entomologist, London. **11**—Annals and Magazine of Natural History, London. **68**—Science, New York. **76**—Journal of the Cincinnati Society of Natural History. **86**—Annales, Societe Entomologique de France, Paris. **99**—Cornell University Agricultural Experiment Station, Ithaca. **102**—Proceedings, The Entomological Society of Washington. **179**—Journal of Economic Entomology. **180**—Annals, The Entomological Society of America. **181**—Guide to Nature, Sound Beach, Conn. **197**—Proceedings, Royal Society, Biological Sciences, London. **223**—Broteria, Revista de Sciencias Naturaes do Collegio de S. Fiel (Ser. Zoologica). **242**—Transactions, The Royal Society of Canada (3rd Series), Ottawa. **420**—Insecutor Inscitiae Menstruus: A monthly journal of entomology, Washington. **438**—Bulletin, Illinois State Laboratory of Natural History, Urbana. **447**—Journal of Agricultural Research, Washington. **475**—Bulletin de la Societe Vaudoise de Sciences Naturelles. **528**—Zoologica: Scientific Contributions of the New York Zoological Society.

GENERAL SUBJECT. Beebe, C. W.—Fauna of four square feet of jungle debris, **528**, ii, 107-19. **Bishopp, F. C.**—A method of keeping alcoholic specimens, **180**, ix, 94-6. **Crampton, G.**—The phylogenetic origin and the nature of the wings of insects according to the paranotal theory, **6**, xxiv, 1-39. **Dury, C.**—Natural history notes of southern Arizona, **76**, xxii, 4-13. **Hewitt, C. G.**—A review of applied entomology in the British Empire, **180**, ix, 1-34. **Martin, J. F.**—The thoracic and cervical sclerites of insects, **180**, ix, 35-88. **Russell, H. M.**—Life and works by Quaintance, Hyslop & Walton, **102**, xviii, 3-5. **Van Duzee, E. P.**—Priority in family names and related matters, **180**, ix, 89-93. **Webster, F. M.**—Obituary notice, **4**, xlviii, 73-6.

ARACHNIDA, ETC. **Chamberlin, R. V.**—Two new Texan Parajuli, **5**, xxiii, 33-6. **Hewitt, C. G.**—A contribution to a knowledge of Canadian Ticks, **242**, ix, 225-39.

NEUROPTERA, ETC. **Banks, N.**—A classification of our Limnephilid caddice flies, **4**, 1916, 117-22. **Needham & Smith**—The stone flies of the genus Peltoperla [7 new], **4**, 1916, 80-8. **Osburn, R. C.**—A migratory flight of dragonflies, **6**, xxiv, 90-2. **Williams, F. X.**—The pupa of Boreus brumalis, **5**, xxiii, 36-9.

ORTHOPTERA. **Cockerell, T. D. A.**—The fossil O. of Florissant, Colorado [2 new], **9**, 1914, 32-4. **Hebard, M.**—The genus Ceratinoptera; A new genus, Cariblatta, of the group Blattelites [1 new], **2**, xlii, 125-34; 147-186. A study of the species of the genus Stenopelmatus found in the U. S., **6**, xxiv, 70-86.

HEMIPTERA. **Baker & Turner**—Some intermediates in the Aphididae, **102**, xviii, 10-14. **Comstock, J. H.**—Reports on scale insects, **99**, Bul. 372, 601 pp. **Doncaster, L.**—Gametogenesis and sex-determination in the gall-fly (Neuroterus lenticularis), **197**, lxxxix, 183-200. **Wilson, H. F.**—Additional notes on the genus Pterocomma, **180**, ix, 103.

Ball, E. D.—New sps. of Eutettix and Phlepsius [7 new], **4**, 1916, 124-30. **Cockerell, T. D. A.**—Some grass-feeding mealy-bugs [2 new], **179**, ix, 312-13. **Davis, W. T.**—Notes on Cicadas from the U. S. with descriptions of several n. sps. [5 new], **6**, xxiv, 42-65.

LEPIDOPTERA. **Bird, H.**—Xanthoecia buffaloensis, its larval habit and occurrence within our fifty-mile faunal zone [of New York City], **6**, xxiv, 86-90. **Gerould, J. H.**—The inheritance of seasonal polymorphism in butterflies, **3**, 1, 310-16. **Gibson, A.**—The life history of Leucobrephos brephoides, **4**, 1916, 133-8. **de Joannis, J.**—Etude synonymique des especes de Microlepidopteres decrites comme nouvelles par Duponchel, **86**, lxxxiv, 62-164. **Van Zwalenburg, R. H.**—Notes on the life history of Ecpantheria eridanus, **420**, iv, 12-17.

Barnes & McDunnough—An apparently n. sp. of Phalonia, **4**, 1916, 144. **Braun, A. F.**—New sps. of Microlepidoptera [3 new], **4**, 1916, 138-40. **Mosher, E.**—A classification of the L. based on characters of the pupa, **438**, xii, 17-159.

DIPTERA. **Knab, F.**—Four European D. established in No. Am., **420**, iv, 1-4. **Richardson, C. H.**—A chemotropic response of the house fly (M. domestica), **68**, xliii, 613-16. **Townsend, C. H. T.**—Non-intentional dispersal of muscoid species by man, with particular reference to tachinid species, **102**, xviii, 18-20.

Cockerell, T. D. A.—Two D. of the genus Rhamphomyia from Colorado [new], **4,** 1916, 123-4. **Cresson, E. T., Jr.**—Studies in American Ephydridae. 1. Revision of the species of the genus Paralimna, **2,** xlii, 101-124. **Dietz, W. G.**—Synoptical table of the No. Am. species of Ormosia, with descriptions of new species [11 new], **2,** xlii, 135-146. **Johnson, C. W.**—Further studies on the Platypezidae [6 new], **5,** xxiii, 27-33. **Knab & Shannon**—Tanypezidae in the U. S. [2 new], **420,** iv, 33-36. **Malloch, J. R.**—Three new No. Am. species of the genus Agromyza, **5,** xxiii, 50-4. **Schaeffer, C.**—New D. of the family Asilidae with notes on known species [8 new], **6,** xxiv, 65-9. **Townsend, C. H. T.**—Designations of muscoid genotypes, with new genera and species [6 n. gen.]; Elucidations of New England Muscoidea [11 n. gen.; 4 n. sps.], **420,** iv, 4-12; 17-33. **Travares, J. S.**—Cecidomyias novas do Brazil, **223,** xiv, 36-57.

COLEOPTERA. Cosens, A.—Notes on hibernating ladybird beetles, **4,** 1916, 104-5. **Leng, C. W.**—Notes on Cychrini, **6,** xxiv, 39-42. **Pierce, W. D.**—Notes on the habits of weevils, **102,** xviii, 6-10. **Sanders & Fracker**—Lachnosterna records in Wisconsin, **179,** ix, 253-61.

Achard, J.—Descriptions d'especes nouvelles de Scaphidiidae, **86,** lxxxiii, 555-62. **Blatchley, W. S.**—A new gen. and sp. of Nitidulini, with descriptions of other n. sps. of C. from Indiana and Florida [1 n. g.; 8 n. sps.], **4,** 1916, 91-6. **Calder, E. E.**—Cicindela hirticollis var. rhodensis n. var., **6,** xxiv, 93-4. **Champion, G. C.**—A new genus of Pythidae from the Falkland Islands, **11,** xvii, 311-13. **Dury, C.**—Two new beetles from Cincinnati, **76,** xxii, 14-15. **Glasgow, R. D.**—Phyllophaga Harris (Lachnosterna Hope): A revision of the synonymy, and one new name, **438,** xi, 365-79. **Swaine, J. M.**—Platypus wilsoni—a new sp. of Platypus from Br. Columbia, **4,** 1916, 97-100.

HYMENOPTERA. Britton, W. E.—Further notes on Diprion simile, **179,** ix, 281-2. **Falk, H. O.**—Animal intelligence again [ants], **181,** viii, 393-97. **McConnell, W. R.**—Notes on the biology of Paraphelinus speciosissimus, **18,** ix, 97-102. **Miller, J. M.**—Oviposition of Megastigmus spermotrophus in the seed of douglas fir, **447,** vi, 65-8. **Ramsay, L. N. G.**—Note on the oviposition of Rhyssa, **9,** 1914, 20-22. **Rohwer & Gahan**—Horismology of the hymenopterous wing, **102,** xviii, 20-76. **Timberlake, P. H.**—Note on an interesting case of two generations of a parasite reared from the same individual host, **4,** 1916, 89-91.

Cockerell, T. D. A.—Sunflower insects in California and South Africa [1 new], **4,** 1916, 76-9. Descriptions and records of bees.—lxxi [14 new], **11,** xvii, 277-87. **Forel, A.**—Formicides d'Afrique et d'Amerique nouveaux ou peu connus, **475,** l. 335-64. **Girault, A. A.**—Descriptions of eleven n. sps. of Chalcid flies [1 n. g.; 7 n. sps.], **4,** 1916, 100-103; 113-6. New Encyrtidae from No. Am. [5 n. gen.; 11 n. sps.], **5,** xxiii, 41-50. Notes on two South Am. parasitic H., **9,** 1915, 213-14. **Wheeler, W. M.**—Some new formicid names. **5,** xxiii, 46-1. **Williams, L. T.**—A new species of Thripoctenus, **5,** xxiii, 54-61.

Doings of Societies.

Feldman Collecting Social.

Meeting of February 16, 1916, at the home of H. W. Wenzel, 5614 Stewart St., Philadelphia. Eleven members present; Pres. H. A. Wenzel in the chair.

The President read his annual address, which had been held over from the last meeting.

Coleoptera.—Mr. Kaeber exhibited four specimens of a rare Nitidulid, *Psilopyga histrina* LeC., which he had found at Narberth, Pennsylvania, IX-6-'15 in decayed fungus, *Mutinus caninus* Huds. Mr. Greene said he had found specimens at the same time and place. The latter exhibited a specimen of *Plagiodera versicolor* Laich. which he had collected at Normandie Park Inn, Clifton, Passaic County, New Jersey, IX-19-'15; willow is very common on this property. This is recorded from Bulls Head, Staten Island, New York, by Schaeffer, J. N. Y. Ent. Soc., xxiii, p. 236, 1915.

Hymenoptera.—Mr. Daecke said he knew this was a peculiar season but he was surprised to see on January 30th about a half dozen honey bees on flowers at a stand in Harrisburg.

Lepidoptera and **Diptera.**—The same speaker stated that he had found larvae of *Ecpantheria deflorata* Fabr. at Rockville, Pennsylvania, X-19-'15, which immediately pupated. From these two parasitic Diptera emerged, XII-9-'15, *Blepharopeza adusta* Loew. These were exhibited.

Lepidoptera.—Mr. Geo. M. Greene read an article from *Popular Science Monthly* in which it told how the Sioux Indians used the larva of a butterfly to bore the pith from ash twigs so they could be used for pipe stems.

Homoptera.—Mr. Hornig said he had found eggs of the Seventeen Year Cicada in 1912 and they are still alive.

Adjourned to the annex.

Meeting of March 15th, 1916, held this evening at the same place; eight members were present. Pres. H. A. Wenzel in the chair.

Coleoptera.—Dr. Castle exhibited two specimens of *Dorcaschema alternatum* Say, which he collected at Enterprise, Florida, May 24. General discussion followed. Adjourned to the annex.—Geo. M. Greene, *Secretary.*

Chicago Entomological Club.

Meeting of February 20, 1916, at home of Mr. Henry Ramstadt. Eleven members present.

Coleopterists discussed the Bruchidae and compared specimens.

Lepidopterists: Mr. Kwiat read an article on "Collecting Papai-

pemae" which was published in the May NEWS. The genus was discussed generally and the following species reported from the Chicago area, all but *cerina* and *inquaesita* having been bred.

cerina Grote.
cerussata G. & R.
circumlucens Smith
eupatorii Lyman
frigida Smith
var. *thalictri* Lyman
furcata Smith
harrisii Grote
impecuniosa Grote
inquaesita G. & R.
marginidens Gn.
arctivorens Hamps.
merriccata Bird
necopina Grt.
nelita Strk.
var. *linda* Bird
nephrasyntheta Dyar
nitela Gn.
var. *nebris* Gn.
ptcrisii Bird
rigida Grt.
sciata Bird
silphii Bird
speciosissima G. & R.

A. KWIAT, *Secretary.*

Newark Entomological Society.

Meetings held in the Newark (New Jersey) Public Library, February 13, March 12, April 9, 1916; Pres. Buchholz presiding; average attendance, ten members.

Dermaptera.— At the March meeting, Mr. Weiss showed a male and female of *Forficula auricularia* L., the European ear-wig, which had been taken at Newport, Rhode Island, where they had been found in considerable numbers.

Coleoptera.— Mr. Stortz at the April meeting, recorded the capture of *Lixus julichi* Casey, at Arlington, New Jersey, as early as April 2 and Mr. Weiss exhibited specimens of *Agrilus viridis* which breeds in rose stems in different parts of north Jersey and also *Exochomus 4-pustulata* from Riverton, New Jersey, this being an introduced "lady-bird" which has only been taken in this State a couple of times.

Diptera.— At the April meeting, Mr. Weiss also showed aerial orchid roots which had been deformed by the larvae of *Parallelodiplosis cattleyae*, found of course only in greenhouses in this climate.—

HARRY B. WEISS, *Rec. Secretary.*

The Ecological Society of America, Announcements.

An Illinois Section of the Ecological Society has been organized through the activity of Professors Forbes and Shelford. This local organization already contains 21 members, and is planning the prosecution of an ecological survey of Illinois.

Preliminary proposals have been made with regard to the carrying out of a soil temperature survey of the United States through co-operation of the American Society of Phytopathologists and the Ecological Society of America. Prof. L. R. Jones and Dr. J. B. Overton, of the

University of Wisconsin, have been chiefly instrumental in advocating this project. The Secretary will be glad to hear from members of the Society who have soil thermographs, and are interested in the arrangements for such a co-operative investigation.

A four-day field trip to the dunes of Lake Michigan, in the vicinity of Chicago, will be conducted from June 14 to 17 by Prof. H. C. Cowles, Prof. V. E. Shelford, and Dr. G. D. Fuller, in case a sufficient number of persons express interest in the trip. It is expected that one day will be devoted to the sand ridges and slough near Buffington and Clarke, Indiana, largely under the guidance of Professor Shelford. Other days will be devoted to the dune successions at Miller, Indiana, the moving dunes at Dune Park, the eroding dunes at Michigan City, Indiana, and those at Sawyer, Michigan, where telescoped successions and dune and climax forests are well displayed. The interest will centre in the interrelations of plants and animals, and the relation of each to the environmental conditions. The entire expense for lodging, meals, and transportation for the four days will be about $10. There will be no further general announcement of this trip. Members who plan to join it, or have even a remote prospect of doing so, are requested to communicate at once with one of the conductors. If enough favorable replies are received to justify offering the excursion a definite announcement will be made to those interested.

A field trip will be conducted at San Diego, California, on August 12 to 14, in connection with the meeting of the Pacific Division of the American Association. Prof. W. E. Ritter has invited members of the Society to visit the Laboratory of the Scripps Institution at La Jolla, near San Diego, and to examine the work and environs of that centre of marine ecological investigations. One or two days will also be spent, under competent guidance, in studying the biota of the chaparral at several favorable localities near San Diego, and in the foothills of the Cuyamaca Mountains. Further details of the San Diego trips will be announced about May 15.

Prof. A. O. Weese, of the University of New Mexico, proposes to conduct a field trip in the vicinity of Albuquerque, New Mexico, for those who may be able to stop off there on the way to or from San Diego. Several other men located on transcontinental railways have expressed a willingness to give some of their time to members of the Society who may be able to stop over with them at any time during the summer. The Secretary will be glad to have early information from those intending to be present at San Diego, and he will be glad to give information to prospective transcontinental travelers regarding possible stop-overs with other members.

The Secretary-Treasurer is no longer in Baltimore, but should be addressed

FORREST SHREVE, Tucson, Arizona.

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JULY, 1916.

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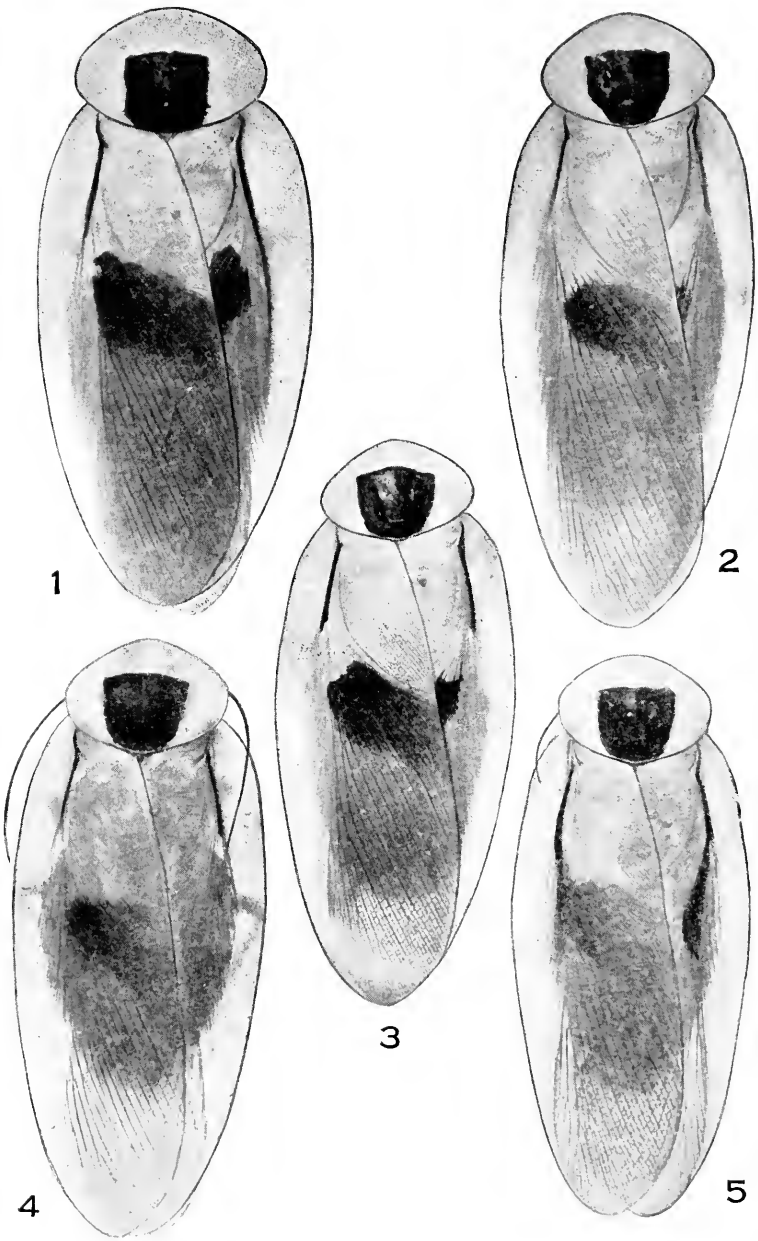

BLABERUS GIGANTEUS, 1; B. COLOSSEUS, 2-5.—HEBARD.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

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Critical Notes on Certain Species of the Genus Blaberus (Orthoptera, Blattidae).

By MORGAN HEBARD, Philadelphia, Pa.

(Plate XV.)

Recently, in studying the species of the present genus adventive in the United States, it was found necessary to examine all of the material of the genus in the Philadelphia collections and to consider carefully the literature on the subject, before these forms could be properly located. But two, *B. colosseus* (as the synonymous *mexicana*) and *B. discoidalis* (as the synonymous *cubensis*), have been recorded from this country; confusion of the first of these with the closely related *B. giganteus* has made necessary a full discussion of that species as well.

The following discussion is based upon more extensive series of the species involved than have ever been assembled at one time in the past.

Blaberus giganteus (Linnaeus). (Plate XV, fig. 1).

1758. *B*[*latta*] *gigantea* Linnaeus, Syst. Nat., Ed. X, I, p. 424. [America.]

1813. [*Blatta*] *gigantea* Stoll, Natuur. Afbeeld., Kakkerlakken, p. 2, Register p. 1, pl. Id, figs. 1 and 2. (No locality given.)

1865. *Bl*[*abera*] *stolli* Brunner, Nouv. Syst. Blatt., p. 374. [♀, Cayenne, [French Guiana].]

This species is closely related to *B. colosseus* (Illiger), differing in the distinctly broader form. The broader pronotum has, in the female sex,[1] the cephalic portion more ample, the curvature laterad of the cephalic margin less decided, thus leaving distinctly more extensive lateral margins which are subparallel for a short distance (as described for *gigantea* by Illiger). In our material the length of the pronotum is contained in its width 1.49 to 1.5 times (Saussure gives for this species 1.48 to 1.50). The tegmina are proportionately broader, with marginal fields distinctly wider, than in *colosseus*. Linnaeus gives "diametro ovi gallinacei" for this species; the series before us of *colosseus* are decidedly too slender to fit this description.

We have given Stoll's reference, as Brunner has described such material as *B. stolli*. We are satisfied that the features given by Brunner for the separation of that condition are of no specific diagnostic value, being due to recessive coloration and slight individual differences in the interocular width and rounding of the apices of the tegmina.

The great size and very pale buffy general coloration of *giganteus* and *colosseus* readily distinguish them from any other species of the genus. Both agree in numerous features of interest given here under the latter species.

Measurements (in millimeters).

♀	Length of body[2]	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen	Width of costal field	Length in width of pronotum
Cincinnati, Colombia	66.0	17.3	25 8	66.8	25.2	8.3	X 1.49+
Cincinnati, Colombia	58.2	17.2	25.7	66.2	25.8	8 4	X 1.5 +
Cincinnati, Colombia	63 0	16.6	25.0	65.3	25.0	8.0	X 1.5

[1]Lack of males of the present species is unfortunate, but it is probable that the contrast between the sexes in *giganteus* is in every way comparable with that found between the sexes in *colosseus*.

[2]The body measurement is taken to the apex of the subgenital plate; the supra-anal plate, in the present genus, extends beyond this point.

Coloration. General color of pronotum and tegmina cinnamon buff. Pronotum with a large polished blackish brown mesal spot, which narrows slightly caudad and is in full contact with the caudal margin of the pronotum.[3] Tegmina with proximal fifth of humeral trunk blackish brown; a broad band of warm sepia crosses the exposed proximal portions of the discoidal fields of the tegmina when at rest; the distal portion of the discoidal field of the sinistral tegmen, exposed when at rest, is again suffused, but less heavily, with snuff brown. Dorsal surface of abdomen shining blackish chestnut, margined laterad with cinnamon buff, all but a brief basal portion of the supra-anal plate of this color. Underparts and limbs shining blackish chestnut, the ventral surface of the abdomen with medio-lateral spots on the proximal segments and each segment with smaller latero-marginal blotches of yellow-ochre.

The specimens before us undoubtedly represent the intensive coloration of the present species. The insect probably shows all of the color variation, due to recession and intensification, found in the series of *colosseus* before us.

Specimens Examined: 6, 5 females, 1 immature male.

Cincinnati, Santa Marta, Colombia, VII, 10, 1913 (M. A. Carriker, Jr.; fundacion), 5 ♀, 1 juv. ♂ [Hebard Cln.].

Blaberus colosseus (Illiger). (Plate XV, figs. 2 to 5).

1802. *Blatta Colossea* Illiger, Mag. Insektenkunde, I, p. 186. [Demerara, [British Guiana].]

1862. *Bl[abera] mexicana* Saussure, Rev. Mag. Zool., 2e Ser., XIV, p. 233. [Mexico.]

1864. *Blabera mexicana* Saussure, Mem. l'hist. Nat. Mex., IV, p. 234. [Tampico, Tuxpan, Cordoba, etc., Mexico; New Orleans, Louisiana.]

Saussure, considering *B. gigantea* and *B. colosseus* synonymous, described *mexicana* in 1862, this name being based on Mexican material showing features of difference from *gigantea* almost exactly as had been described for *colossea* by Illiger. Saussure's more detailed discussion of *mexicana* in 1864 shows convincingly that the name is an absolute synonym of *colosseus*.

[3]In the species of the present genus showing this feature, large series almost always include examples having this spot barely reaching, or entirely failing to reach, the caudal margin of the pronotum. Overestimation of the importance of this mere individual color variation has resulted in a number of decided errors in the past literature.

The present insect is very closely related to *giganteus,* differing chiefly in the distinctly and strikingly more slender form. The less broad pronotum is much more regularly oval and the marginal fields of the tegmina are distinctly narrower in the present species.

Both the present species and *giganteus*, as far as we are able to determine from females, agree in the following characters:

Head with interocular width in males from slightly less than to a full one-fourth the interocellar width, in females from one-fourth to one-third the interocellar width. Head shining blackish, the ocelli and soft portion of clypeus buff. Ocelli with flattened surfaces slanting laterad, the inner margins slightly raised above the flattened plane of the space between the ocelli. Tegmina very ample, rounding broadly distad to distinct but not sharply rounded apex which in position is situated slightly nearer the costal margin. Dorsal surface of abdomen in both sexes with sixth segment strongly acute-angulate produced latero-caudad; seventh much narrower across abdomen and but slightly projecting beyond caudal margin of sixth, with small rounded latero-caudal projections; eighth still narrower across abdomen with caudal margin straight; supra-anal plate strongly quadrate produced, bilobate. Cerci moderately slender, slightly incurved, tapering distad to acute apex, with about seventeen short joints, (in females of *giganteus* twenty to twenty-two); polished and slightly convex above, very hairy and strongly convex below with narrow deep lateral marginal channels. Concealed male genitalia:—Mesad, from above a soft surrounding mantle, a moderately stout short tapering blunt chitinous projection extends caudad; the surrounding mantle having the free dorsal and distal margins fringed with small blunt chitinous projections, these longer and more like short blunt teeth of a comb on the sinistral margin. Dextrad of this organ, from a broad chitinous base, a stout subchitinous shaft is directed caudad curving regularly outward, the convex surface is subchitinous, the inner surface soft, the apex more chitinous and flattened, broadened and blunt. Male subgenital plate convex, asymmetrical, distal margin broadly convex from sinistral base to mesal portion of distal half, there rounding sharply into deep concave emargination at dextral base, within which the margin is much softer and subchitinous. Minute slender cylindrical styles present on this margin at the inner bases of the cerci, the sinistral five times as long as broad and situated in a small indentation of the external surface near the margin, the dextral eight times as long as broad and situated in a more decided indentation of the margin itself. Ventro-cephalic margins of cephalic femora supplied proximad with three or

four short stout widely spaced spines, succeeded distad by a close set row of short stout hairs, these terminated distad by a single short stout spine; ventro-caudal margin of cephalic femora and ventral margins of other femora supplied with a similar single distal spine. Median and caudal femora armed in addition with a single longer geniculate spine.

Measurements (in millimeters).

♀	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen	Width of marginal field	Length in width in pronotum[4]
Caparo, Trinidad	58 3	16.8	22.0	69.6	22.4	6.3	X 1.31
Caparo, Trinidad	56.6	15.6	20.7	63.8	21.3	5.6	X 1.33—
Caparo, Trinidad	57.0	15.0	20.0	64.3	21.0	6.2	X 1.33+
Gorgona, Panama	53.6	15.6	22.7	63.0	22.3	7.0	X 1.46—
St. Jean, French Guiana	58.8	15.7	22.2	70.7	25.2	7.6	X 1.41+
♂							
Guatemala	54.6	14.3	20 2	53.8	20.7	6.0	X 1.41+
San Carlos, Costa Rica	59.6	16.0	23.2	67.7	24.5	7.7	X 1.45
Costa Rica	58.7	16.9	24.6	70.8	24.8	7.0	X 1.45—
San Esteban, Venezuela	64.0	16.0	22.8	69.4	25.0	6.8	X 1.43—
San Esteban, Venezuela	60.0	14.9	20.7	64.7	22.9	6 3	X 1.49—
Maroni River, Fr. Guiana	59.0	16.6	23.7	68.4	26.2	7.0	X 1.43—

Coloration. In intensive examples (Costa Rica) exactly as described under *giganteus.* Through recessive stages first the distal suffusion of the tegmen disappears (Trinidad), then all markings except the blackish brown proximal fifth of the humeral trunk. In the condition of maximum recession (majority of Trinidad material) the pronotal margins are warm buff, the tegmina clear transparent warm buff with but small dashes of blackish brown at base of humeral trunk. Three recessive examples before us (Trinidad) have two dots of zinc orange mesad in the pronotal spot, while an intensive specimen (Costa Rica) has four of these dots. The pronotal spot is often in full contact with the caudal margin of the pronotum, usually it is distinctly narrowed there, while in a few specimens it fails to reach that margin by a narrow interval.

Specimens Examined: 23, 16 males, 7 females.

Olas de Moka, Solola, Guatemala, 3,000 feet, IX, 1908, 1 ♂, [U. S. N. M.].

Senahu, Alta Vera Paz, Guatemala, (P. Haase), 1 ♂, [U. S. N. M.].

Guatemala, 1 ♂, [Am. Mus. Nat. Hist.].

San Carlos, Costa Rica, (Schild-Burgdorf), 2 ♂, 2 ♀, [U. S. N. M. and A. N. S. P.].

Costa Rica, (M. A. Carriker, Jr.), 1 ♀, [Hebard Cln.].

Gorgona, Canal Zone, Panama, 1 ♂, [A. N. S. P.].

[4]Saussure gives for his material, the length contained in the pronotal width, in *giganteus* 1.48 to 1.50, in his *mexicana* (synonym of *colosseus*) 1.40 to 1.45.

Ancon, Canal Zone, Panama, 1 ♂, [U. S. N. M.].

San Esteban, Venezuela, X to XI, 1910, (M. A. Carriker, Jr.), 2 ♀, [A. N. S. P.].

Cerro Aripo, Trinidad, VIII, 1909, (M. A. Carriker, Jr.), 1 ♂, [A. N. S. P.].

Caparo, Trinidad, VI, 1913, (H. S. Parish), 1 ♂, [A. N. S. P.]; VIII, 1913, (H. S. Parish), 7 ♂, [Hebard Cln.].

St. Jean, French Guiana, (W. Schaus), 1 ♂, [U. S. N. M.].

Maroni River, French Guiana, (W. Schaus), 1 ♀, [U. S. N. M.].

Blaberus discoidalis Serville.

1839. *Blabera discoidalis* Serville, Hist. Nat. Ins., Orth., p. 76. [♀, San Domingo.]

1839. *Blabera atropos* Serville, (not *Blatta atropos* of Stoll, 1813), Hist. Nat. Ins., Orth., p. 77. [♂, ♀, San Domingo.]

1839. *Blabera varians* Serville, Hist. Nat. Ins., Orth., p. 78. (In part.) [♂, Cuba.]

1864. *B*[*labera*] *cubensis* Saussure, Rev. Mag. Zool., 2e Ser., XVI, p. 347 [Cuba.]

1865. *Bl*[*abera*] *atropos* Brunner (not *Blatta atropos* of Stoll, 1813), Nouv. Syst. Blatt., p. 375, pl. XII, figs. 55, A to G. (In part.) [♂, ♀; (probably) Jamaica; Venezuela, and Colombia; (probably not) Brazil.]

1868. *Blabera subspurcata* Walker, Cat. Blatt. Br. Mus., p. 4. (In part.) [♂; San Domingo; (probably not) Brazil.]

1894. *Blabera rufescens* Saussure and Zehntner, Biol. Cent.-Amer., Orth., I, p. 119, pl. V, fig. 22. [♀, Cuba.]

In 1839, Serville discussed three supposed species of the genus from the West Indies, describing two of these as new, but stating that all might be varieties of *discoidalis* (in which remark *B. dubia* was included, that species now standing as genotype of *Blaptica*). It is evident that all of his West Indian material, except the female of his *varians*, represents mere color variations of the same species.

In 1864, Saussure described *B. cubensis* briefly, later in the same year discussing the insect more fully, comparing it with his *mexicana* (= *B. colosseus*, see page 291), but evidently overlooking Serville's *discoidalis* and confusing that author's *atropos* and *varians* with *atropos* of Stoll. His species is clearly a synonym of *discoidalis* and later, with Zehntner, he

added another evident synonym, *rufescens*, to the present list, giving for the basis of that name only such characters as slight differences in the shape of the ocular margins and shape of the pronotum to separate it from *cubensis*, features attributable wholly to individual variation within the species.

We find Walker's *subspurcata* to be based primarily on material of the present species, though the Brazilian specimen included probably represents a different form. This name was placed by Kirby under *cubensis* in 1904.

The present insect is the smallest of the North American species of *Blaberus* and is a rather robust species. Decided variation is found in the pronotal form, while the extremes of intensive and recessive coloration are very dissimilar in general appearance.

The following features are of interest:

Head with interspace between eyes in males from one-half to three-quarters the interocellar width (normally three-quarters), in females over one-half to (normally) four-fifths the interocellar width. Head shining blackish, ocelli and soft portions of clypeus buff. Ocelli with flattened surface slanting laterad, the inner margin hardly raised above the very weakly concave surface of the space between the ocelli in males, not at all raised above the deplanate surface of this space in the females. Tegmina very ample but short, reaching well beyond the abdomen in males, very slightly beyond the apex of the supra-anal plate in females; margins distad broadly rounding to distinct but not sharply rounded apex, which in position is slightly nearer the costal margin. Dorsal surface of abdomen much as in *B. giganteus* but with apex of latero-caudal productions of sixth segment much shorter and blunt. Cerci shorter, less tapering and with apex more blunt than in *giganteus*, with about fifteen short joints. Limbs shorter but armament of the same as in *giganteus*.

The extremes in the series from Trinidad are given above. Decided pronotal variation is shown in the material before us, frequently the

Measurements (in millimeters).

♂	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen	Length in width of pronotum
Puerto Plata, San Domingo	42.1	11.9	16.8	40.2	16.3	X 1.41
Porto Rico	36.4	11.7	16.7	40.7	16.0	X 1.43—
St. Joseph, Trinidad	44.9	12.8	17.9	43.2	16.6	X 1.4
St. Joseph, Trinidad	36.8	11.6	16.7	40.1	16.4	X 1.44—
Panama	40.9	12.3	18.6	43.0	18.0	X 1.51
♀						
Puerto Plata, San Domingo	49.4	13.8	19.7	41.4	19.0	X 1.43
St. Joseph, Trinidad	51.0	13.6	19.6	40.8	17.8	X 1.44
St. Joseph, Trinidad	44.0	12.7	18.8	40.6	17.0	X 1.48
Caicara, Venezuela	43.8	12.8	18.0	38.4	15.3	X 1.41
Panama	45.1	12.4	18.3	41.8	17.0	X 1.47

two sides will be produced in slightly different degree or form.

Coloration. Pale portions of pronotum warm buff (recessive) to clay color (intensive). Pronotal spot with caudal margin nearly two millimeters distant from caudal margin of pronotum (maximum recessive), grading through every degree to a great roughly quadrate blotch in full contact with caudal margin of pronotum (maximum intensive). In the maximum recessive coloration the tegmina are transparent light ochraceous buff, with humeral trunk blackish brown for one-third the tegminal length; our series shows every degree of intensification to one in which the anal and narrow lateral portion of marginal and scapular fields are cinnamon buff, the humeral trunk blackish brown with this color spreading out beyond the anal fields, the remaining distal portions of the tegmina, exposed when at rest, deep chestnut brown. The portion of the dextral tegmen, concealed when at rest, has a faded and more buffy appearance. The wings are usually weakly suffused with brown, but in specimens of maximum intensive coloration this suffusion is rather decided and more pronounced in the anterior field. Even in the maximum recessive color condition the limbs remain shining very dark brown, the underparts much suffused with this color.

Specimens Examined: 28; 10 males and 18 females.

Puerto Plata, San Domingo, IV, 7 and 8, 1915, 1 ♀; VII, 6, 1915, 1 ♂, [both Am. Mus. Nat. Hist.].

Porto Rico, 1 ♀,[6] [A. N. S. P.].

Vieques Island, Porto Rico, II, 1899, (A. Busck), 3 ♀, [U. S. N. M.].

Kingston, Jamaica, VIII, 1, 1913, (W. Harris), 2 ♂, 6 ♀, [U. S. N. M.].

St. Joseph, Trinidad, XI, 9, to XII, 10, 1915, (R. A. Wood), 3 ♂, 5 ♀, [Hebard Cln.].

Diego Martin, Trinidad, VI, 21, 1915, (R. A. Wood), 2 ♂, [Hebard Cln.].

Caicara, Rio Orinoco, Venezuela, 1 ♀, [A. N. S. P.].

Porto Bello, Panama, (A. H. Jennings), 1 ♂, [U. S. N. M.].

Panama, (H. E. Wetherell), 1 ♂, 1 ♀, [A. N. S. P.].

EXPLANATION OF PLATE XV.

Dorsal view. (Natural size.)

Fig. 1. *Blaberus giganteus* (Linnaeus). Female. Cincinnati, Santa Marta, Colombia.

Fig. 2. *Blaberus colosseus* (Illiger). Female. San Esteban, Venezuela.

Fig. 3. *Blaberus colosseus* (Illiger). Male. San Esteban, Venezuela.

Fig. 4. *Blaberus colosseus* (Illiger). Male. Caparo, Trinidad.

Fig. 5. *Blaberus colosseus* (Illiger). Male. Caparo, Trinidad.

[6]Recorded by Rehn as the synonymous *B. rufescens* in 1903.

The Lines of Descent of the Lower Pterygotan Insects, with Notes on the Relationships of the other Forms.

By G. C. Crampton.*

(Continued from page 258)

The interrelations of the different groups making up the section Neuropteradelphia are extremely complicated, and can be worked out in detail only after studying more of the primitive and annectent forms than are at present accessible. Enough material is available, however, to indicate the following relationships.

The Raphidoides (*Aponeuroptera*) or Raphidian group is closely related to the Sialid group, but has tended to branch off along its own line of development. The Sialoides (*Meganeuroptera*) or Sialid group comprises such insects as *Sialis, Corydalis, Chauliodes,* etc., and is one of the most primitive of the Neuropteroid section, forming one of the main trunks upon which the other lines of descent converge. This group contains some of the largest of the Neuropteroid forms (hence the name *Meganeuroptera*).

The Chrysopoides (true *Neuroptera*) or Chrysopid group comprises such forms as the Chrysopidae, Hemerobiidae, Coniopterygidae, etc., and is rather closely related to the Sialid group, the two together constituting the most primitive lines of Neuropteroid insects.

The Myrmeleonoides (*Zygoneuroptera*) or Myrmeleonid group is related to both the Sialid and Chrysopid groups and has retained certain characters suggestive of a relationship to the Zygoptera, or Libellulid forms. This group contains such insects as the Myrmeleonidae, Ascalaphidae, *Nymphes,* etc., all of which are quite primitive forms, so that it is rather difficult to determine which of the three groups (Sialids, Chrysopids or Myrmeleonids) is the most primitive, although the Sialids are apparently as little modified as any.

The Mantispoides (*Dictyneuroptera*) or Mantispid group is related to the Chrysopid group, and also shows some affinities

* Contribution from the Entomological Laboratory of the Massachusetts Agricultural College, Amherst, Mass.

with the Panorpid group, which is also rather distantly related to the Chrysopid group. These insects (e. g., *Mantispa*) resemble Mantids in some respects, but the relationship between the two is not very close—although the Mantids are distantly related to them, as may be seen by comparing a specimen of *Mantoida luteola* with the members of this group.

The Nemopteroides (*Eunemoptera*) or Nemopterid group occupies a position intermediate between the Neuroptera (Chrysopid group) and the Panorpid group. Such forms as *Nemoptera* are extremely Panorpid-like in the structure of the head, etc., but have retained other Neuropteron characters, thus making them annectent between the Neuroptera and Mecoptera, or Panorpids.

All of the groups described above (i. e., the Raphidian, Sialid, Chrysopid, Myrmeleonid and Mantispid groups) might be considered as suborders of the "Neuroptera" (used in the broad sense), but they are for the most part as different from each other as they are from the Panorpids, and if the Panorpids are to be regarded as a distinct order (the Mecoptera of authors), then these different groups of Neuropteroid insects should also be regarded as distinct orders.

The Panorpoides (*Mecoptera*) or Panorpid group is composed of two distinct subdivisions represented by such forms as *Merope, Panorpa,* and *Bittacus.* The Meropoides (*Promecoptera*), or Meropid group, differs so much from the others (i. e,, the mouthparts are not drawn out into a beak; the terminal abdominal appendages, wing venation, etc., differ markedly from the other Panorpids) that it might possibly be considered as a distinct order, although I would regard it as a sub-order, until more is known of the other representatives of the Mecoptera. The *Bittacus* group is quite distinct from the *Panorpa* group, but the differences are apparently those between groups of a family rank, rather than between suborders. *Merope tuber* is one of the most interesting members of the Panorpid group, and exhibits certain characters (terminal abdominal appendages of the male, etc.) suggestive of the ancestral condition of the Diptera and other

higher forms. I have captured in North Carolina some insects related to the Meropid subdivision, which suggest affinities with the Hymenoptera, but this can be determined only after a more thorough comparative anatomical study of the groups in question. The Mecoptera are related to the Chrysopid-Mantispid group, and also to the Nemopterid group. They also approach the Trichopteron line of development, and have retained certain features suggestive of the ancestral Diptera, so that the more detailed study of these forms should be of considerable interest from the phylogenetic standpoint.

The Phryganoides (*Trichoptera*) or Phryganid group is related to the Panorpid group, and also to the Neuroptera. The Trichopteron line of descent likewise parallels that of the Lepidoptera very closely, and the group furnishes us with many clues as to what the ancestral condition of the Lepidopteron line of descent must have been like. The Diptera also resemble the Trichoptera in some respects, and the Homoptera resemble them rather remotely. The closest affinities of the Trichoptera, however, are with the Panorpid and Mantispid-Chrysopid group, and with the Lepidopteron group in particular.

The Psocoides (*Clinoptera*) or Psocid group is an extremely interesting one, and the question of its relationship is still a matter of dispute. As far as the winged forms are concerned, they are undoubtedly near the Neuroptera, and exhibit certain characters strongly suggestive of affinities with the Homoptera (which are themselves related to the Neuroptera). Some of the features retained by the Psocid group are strongly suggestive of affinities with the Blattid-Perlid group also, and they may possibly be considered as occupying a position somewhat intermediate between the Blattid-Perlid group and the Neuroptera, although the closest affinities of the winged forms are with the Neuroptera, and they are undoubtedly very near the group which gave rise to the lines of descent of the Homoptera. The Hymenoptera resemble them in certain respects, but I have not been able to determine the meaning of this as yet, unless the Hymenoptera are also to be regarded as occupying a position intermediate between the Blattid-Perlid group and the Neuropteron-Panorpid group.

The "Hemipteroid" insects, or those usually designated as the "Hemiptera," form a rather heterogeneous collection of insects, which arose from ancestors somewhat intermediate between the Neuroptera and the Psocid line of development. They should be divided into at least two orders (possibly more) known as the Hemiptera proper and the Homoptera. The principal subdivisions of these groups are as follows:

The four most primitive lines of descent of the Homopterous forms are those of the Fulgorids, Cicadids, Psyllids and Aphids. The Fulgoroides (*Neurohomoptera*) or Fulgorid group is an exceedingly primitive one, and is closely related to the Neuroptera, such Fulgoroid forms as *Pochazia* (Ricaniinae) having retained certain features strongly suggestive of a Neuropteron ancestry. The Fulgorid group is also related to the Trichoptera and Lepidoptera (and somewhat distantly to the Panorpids), but they are much more closely related to the Neuroptera.

The Cicadoides (*Euhomoptera*) or Cicadid group, is closely related to the Fulgorid group, and has also retained certain characters which show a relationship with the Ascalaphids and Chrysopid group. Together with the Fulgorid group, the Cicadoid forms are among the lowest of the Homoptera.

The Psylloides (*Mesohomoptera*) or Psyllid group is quite closely related to the Cicadid group, as far as I am able to judge from the material available. They are also apparently related to the Coccid group, but this can be determined only after a more thorough study of intermediate forms.

The Aphidoides (*Clinohomoptera*) or Aphid group is related to both the Fulgorid and Cicadid group as well as to the Psyllids, etc. Their line of descent apparently arose from forms intermediate between the Neuroptera and Clinoptera (Psocids), and they have retained many features suggestive of the Psocids (Clinoptera) in particular.

The Aleurodoides (*Coniohomoptera*) or Aleurodid group is closely related to the Fulgorid group. These insects have retained certain characters suggestive of affinities with the Coniopterygidae (Neuroptera), which is to be expected, since

the Aleurodids are related to the Fulgorids, which in turn are closely related to the Neuropteron group, of which the Coniopterygidae are members.

The Coccidoides (*Microhomoptera*) or Coccid group, is rather closely related to the Psyllid group, in its general features, and is also related to the Aphids. A further study of intermediate forms is necessary in order to determine its closest affinities.

The preceding groups of Homopteroid insects might be regarded as sub-orders of the order Homoptera. I would consider that the Fulgorid, Coccid and Aphid groups are sufficiently distinct to be regarded as orders, however, but this is largely a matter of personal opinion.

The *Hemiptera* proper (sometimes referred to as the Heteroptera) are as closely related to the Homoptera as to any other insects; but, aside from the similarity in structure of the mouth parts, they have much less in common than is ordinarily supposed, and the Hemiptera proper should undoubtedly be considered as an order distinct from the Homoptera. Four typical groups or sub-orders of the Hemiptera proper are the Notonectid (*Euhemiptera*) and the Capsid groups (*Mesohemiptera*), which are among the more primitive of the Hemiptera and the Pentatomid (*Metahemiptera*) and the Berytid groups (*Apohemiptera*), which are more highly specialized. There are other groups which might be regarded as sub-orders, but the above mentioned ones will serve to illustrate the principal subdivisions of the Hemiptera proper. The true Hemiptera are so highly specialized that they are of no great interest from the standpoint of the study of phylogeny; but the Homoptera give some valuable hints as to the relationships of certain of the higher forms.

The *Lepidoptera* arose from ancestors whose lines of development occupied a position intermediate between the Chrysopid-Myrmeleonid group, and the Phryganid-Panorpid group. The line of development of the Lepidoptera also approaches that of the Homoptera in many respects. Some of the main subdivisions of the Lepidoptera are as follows: The

Micropterygid group (*Tricholepidoptera*) is extremely primitive, and might possibly be regarded as a separate order, but it is preferable to give it the rank of a suborder. This group is closely related to the Neuroptera and also to the Trichoptera. The Tineid group (true *Microlepidoptera*) is closely related to the Micropterygid group, the two together constituting the more primitive lines of descent of the Lepidopterous insects. Of the higher groups, the Pyralid group (*Mesolepidoptera*) is somewhat intermediate between the lower forms and the Hesperiid group whose line of descent closely parallels that of the Papilionid group (*Eulepidoptera*).

The ancestors of the Diptera arose from forms occupying a position intermediate between the Meropid group and the Nemopterid group, which is closely related to the Neuroptera, so that the Dipteron line of descent, if traced further back, ultimately approaches that of the Neuropterous forms. The line of descent of the Diptera also approaches that of the Homopterous insects, but the relationship is not a very close one. Of the lower Dipterous forms, the Psychodid group and the Tipulid group (*Prodiptera*) have retained certain characters suggestive of the Neuroptera, Trichoptera and Meropid group. The Leptid group (*Mesodiptera*) is related to both the Tipulid group and the Muscid group (*Eudiptera*). The Hippoboscid group (*Metadiptera*) has become markedly different from the remainder of the Diptera, while the Nycteribiid group (*Apodiptera*) has become so greatly modified, that it might be considered as a distinct order. The Braulid group (*Paradiptera*) has departed sufficiently far from the main Dipteron stem to be considered as a distinct order, since these insects have lost the halteres in addition to the wings, eyes, ocelli, etc., and the tarsi and other parts have become profoundly modified, so that they would scarcely be recognized as Dipteroid forms, did we not know their mode of reproduction, etc. The Phorid group (*Siphonodiptera*) serves to connect the Diptera with the Siphonaptera (Pulicid group), although it has not departed markedly enough from the Dipteron stem to be considered as a separate order.

The *Siphonaptera,* or Pulicid group, forms a rather homogeneous order of insects, which has been considered as a suborder of the Diptera, by many investigators. They have become sufficiently modified from the Dipteron type, however, to be considered as representing a distinct order, although their affinities are clearly with the Diptera, especially with the Phorid group, which evidently resembles the ancestral group which gave rise to the Siphonaptera.

The Hymenopterous insects should be divided into two orders, the *Prohymenoptera* or Tenthredinid group, and the *Hymenoptera* proper. The lines of descent of the Hymenopteroid forms are rather difficult to trace, and until more material consisting of very primitive or annectent forms, is available, it will be very difficult to determine with any degree of certainty, or satisfaction, the closest affinities of these insects.

On page 347, of the Ent. News, Vol. 26, 1915, I made the following statement: "The Hymenoptera very probably arose from ancestors not very unlike those of the Isoptera and Gryllobla ttids . . . this point, however, can be decided only after a more extended study of the Hymenoptera, and an examination of intermediate forms not at present accessible." A further examination of the primitive Hymenopteroid insects (Lydidae, Xyelidae, etc.) has indicated that these forms bear a strong resemblance to the Psocids, and certain features in them suggest a relation to both the Meropid-Neuropteron line of descent and the Blattid-Perlid line (to which the Isoptera, etc., belong). The resemblance to the Meropid-Neuropteron line is especially noticeable when the lower Hymenopteroid forms are compared with certain Meropid insects, which I captured in North Carolina, but have been unable to identify. This resemblance to both the Blattid-Perlid group and to the Meropid-Neuropteron group is a rather puzzling feature, but may possibly be explained by the fact that the Psocids, to which the Hymenoptera are related, also occupy a position intermediate between the Blattid-Perlid group and the Neuroptera, so that the Hymenoptera might also be regarded as somewhat intermediate between the two groups in question, al-

though their closest affinities can be determined only after the examination of annectent forms not at present accessible.

The Hymenoptera are considered by some investigators, as quite near to the Coleoptera, but I am not ready to accept this view at present. The fact that both have a complete metamorphosis has no particular bearing on their relationships, since in the Coccid group alone, the males may have a complete metamorphosis, while the females have not; so that this is of no great importance from the standpoint of the determining of the relationships of the different groups.

The Coleopteron line appears to lead back to the Perlids and closely parallels that of the Embiids and Dermaptera, and unless it can be shown that the same is true of the Hymenoptera, the relationship between the Hymenoptera and Coleoptera must be considered as very distant. Whether the differences between the less modified Coleoptera and the Curculionid group (*Paracoleoptera*) are sufficiently great to be considered as of the value of an order, is largely a matter of personal opinion. I would regard the Curculionids as one of the suborders of the Coleoptera, however, while the Platypsyllid group (*Apocoleoptera*), on the other hand, has become sufficiently modified to merit the rank of a distinct order.

As far as the other higher, or more modified orders are concerned, it is practically impossible to determine their closer affinities until more material of an annectent nature is available. I would venture the opinion, however, that the Thysanoptera will be found to be related to the Psocid group, and that the Strepsiptera will be found to be related to one of the lines of descent leading from the Neuropterous forms, rather than to the Coleopteron line—as has been hinted at by Pierce (Monograph of the Strepsiptera)—but whether they will prove to be near the Heteroptera or to some other group remains to be seen, and any opinion unsubstantiated by a study of very primitive or annectent forms belongs to the realm of pure speculation.

As may be seen from the foregoing discussion, it is possible to divide all winged insects into five (or fewer) sections, on

the basis of the closeness of their lines of descent. These are as follows: 1. The section *Palaeopteradelphia,* or Palaeopteron (Blattid) brotherhood, comprising the Blattids (and possibly the Mantids also.) 2. The section *Plecopteradelphia,* or Plecopteron brotherhood, comprising the Plecoptera and those insects whose lines of descent parallel that of the Plecoptera (e. g., the Embiids, Forficulids, Grylloblattids, Coleoptera, Termites, Gryllids, Tettigonids, Locustids, Phasmids, Phylliids, etc.). 3. The section *Neuropteradelphia,* or Neuropteron brotherhood, comprising all of those forms descended from ancestors similar to those of the Neuroptera (e. g., the Neuropteroid insects, Homopteroid forms, Hemiptera, Lepidoptera, Diptera, etc.). 4. The *Zygopteradelphia,* or Zygopteron brotherhood, comprising a small aberrant group (Anisoptera, Zygoptera, etc.), which may possibly be included in one of the other sections. 5. The *Plectopteradelphia,* or Plectopteron brotherhood, comprising the very primitive though strongly aberrant Ephemerid group. These five sections represent five evolutionary groups, although some of them might possibly be included in certain of the other groups, thus reducing the number; but I think that each of the five is distinct enough to merit being regarded as a separate line of evolution.

The section *Plecopteradelphia* (Plecopteron brotherhood) and the section *Neuropteradelphia* (Neuropteron brotherhood) comprise the greater part of all winged insects, and are thus by far the most important of the evolutionary lines. Whether the *Plectopteradelphia* (Ephemerid brotherhood) and *Zygopteradelphia* are sufficiently distinct from each other and from the Plecopteron group, to be considered as separate sections is open to question; and the fact that the *Palaeopteradelphia* (Blattid brotherhood) is closely related to the Plecopteron group also raises the question of its being sufficiently distinct to be regarded as a separate section. It must be borne in mind, however, that all of the sections are ultimately closely related, and the Plecopteron group itself is closely related to the Neuropteron group, but both appear to represent definite foci about which numerous other forms cluster; and the other

sections seem almost as distinct as these two, so that temporarily, at least, I would regard all five sections as representing distinct limbs of the developmental tree, two of which exceed the others in size and importance.

Among the Apterygotan forms there are but three sections —which also represent the main evolutionary lines of development in these insects. These sections are the *Proturadelphia* (or Proturan brotherhood) comprising such insects as the Eosentomidae, Acerentomidae, Neelidae, Sminthuridae, Achorutidae, Entomobryidae, etc.; the *Rhabdurädelphia* (or Rhabduran brotherhood) comprising the Rhabdura, Dicellura, etc., and the *Thysanuradelphia* (or Thysanuran brotherhood) comprising such forms as the Lepismidae, Machilidae, etc., and about these three nuclei all of the wingless insects group themselves.

The Thysanuran line of development appears to approach as closely as any to that of the lower winged forms, but the retention of many of the characters found in certain wingless forms, by certain of the lower winged insects, makes it rather difficult to determine the exact relationships of the different lines of descent; and it is very probable that no one group of Apterygotan insects occupies the position of "mediary" between the wingless and winged forms, but the winged forms probably approach all of the Apterygotan groups to some extent, or arose from ancestors combining characters common to a number of Apterygotan groups, and therefore occupying a position somewhat intermediate between the groups in question.

The lines of development of the Crustacea (e. g., *Bathynella, Koonunga, Anaspides,* etc.) and "Myriopoda" (e. g., *Scolopendrella,* etc.) very closely parallel those of the lower insects, such as *Eosentomon, Anajapyx, Machilis,* etc., so that the Crustacea, "Myriopoda" and Insecta may be regarded as forming the three apices of a triangle, each apex of which is connected with the other two by mutual bonds of relationship. The lines of development of such Trilobites as *Triarthrus, Neolenus* and *Nathorstia* approach rather closely to the lines

of descent of the Crustacea, Insecta and "Myriopoda" (i. e., Diplopoda, Chilopoda and Symphyla) and are not far removed from the most primitive Crustacea, such as *Apus, Branchipus* and similar forms which approach the Annelida in many respects. The Merostomata, Arachnida, etc., on the other hand, have followed a course of development rather widely divergent from that of the Insecta, and are related to Insects only very distantly. The more detailed discussion of these Arthropodan lines of descent, however, is beyond the province of the present paper.

A New Catagramma from Brazil (Lep.).

By Henry Skinner.

Catagramma oberthüri n. sp.

♂. Expanse 58 mm. Primaries blue, apices and margin black, base of wing in discoidal cell orange, extending from the base into the wing 14 mm. and for half this distance on the costa.

Secondaries blue black on inner two-thirds of the wing, outer third blue.

The underside in general is like the other forms of the *excelsior* group, except that the orange band is the same as above.

Described from two males from the Rio Madeira, Brazil, 8 deg. 45 min. South, 63 deg. 54 min. West. Academy of Natural Sciences of Philadelphia.

This species is related to *ockendeni* Oberthür and is named in appreciation of the splendid work on the genus in *Études Lepidopterologie Comparée*, Part XI, by Mr. Charles Oberthür.

Photographs Received for the Album of the American Entomological Society.

During the year 1915 photographs for the Album were received and acknowledged from those whose names follow and the members of the Society wish again to thank the donors for their gifts which are much appreciated: R. A. Sell, William A. Riley, Walter Dannatt, George A. Chandler, J. F. Monell (from J. J. Davis), R. W. Braucher, Charles L. Heink, C. H. T. Townsend, E. D. Ball.

Notes on Leptoypha mutica Say (Hemip.).

By Edgar L. Dickerson and Harry B. Weiss.

(Plate XVI)

In Banks' Catalogue of the Nearctic Hemiptera-Heteroptera is found the following reference to this species, "New Harm. 26, 1832; Compl. Writ. i, 349, 1859 (*Tingis*),—U. S." In Smith's *List of the Insects of New Jersey,* it is recorded by Barber from Madison as rare. Mr. H. M. Parshley states that he has no records of it from the New England States and Mr. H. G. Barber says that he has come across it only rarely in material which he has examined from the Southern States. Taking everything into consideration, it is evident that the species is not at all common.

An additional locality can now be listed from New Jersey, namely, Hammonton, where for the past few summers it has been extremely abundant on *Chionanthus virginica* L. growing in a nursery. These plants originally came from Norma, New Jersey, some years ago, but the bugs were noted by the writers only recently. In Stone's *Report of the Plants of Southern New Jersey* (N. J. State Mus. Rept. 1910), *Chionanthus virginica* is listed as occurring "only in low woods along the lower part of the Maurice River and Cohansey Creek and up the tributaries of the former to Buena Vista." Hough, in his *Handbook of the Trees of Northern United States and Canada* gives the natural range of this plant as along both sides of the Allegheny Mountains from southern Pennsylvania to southern Texas and states that it rarely attains a size greater than twenty-five or thirty feet and eight or ten inches in diameter. It is known by various common names among which are fringe tree, old-man's-beard tree, snow-flower tree, sunflower tree and flowering ash. While spoken of as a tree, it is really grown in the nurseries and sold as a bush most frequently, and is listed by the nurseryman as white fringe.

At Hammonton, the insects were abundant enough to injure practically every leaf on all the fringe bushes in the nursery. The injury first appears as a slight, whitish discoloration on the upper surface along the mid-rib, due to the abstraction of sap by the insect on the under surface. These

whitish patches gradually enlarge until the leaf has a mottled appearance and in severe infestations, the entire leaf becomes yellowish brown and withers completely. The under sides of the leaves also become covered with the brownish excrement of the nymphs and adults. Where the plants were growing in the sun, most of the insects were found on the under sides of the leaves, but in shaded situations and where the foliage was dense, many nymphs were found on the upper surfaces. After the second stage, the nymphs seem to migrate somewhat and feed singly and in colonies on any portion of a leaf which is shaded. No particular portion of a plant seems to be preferred as entire bushes were found infested from top to bottom.

On July 7, 1914, a few adults and all stages of the nymphs were found. On August 15, 1915, adults and nymphs were very abundant, and on September 1, 1915, adults and last stage nymphs only were present. It is quite possible that there are two generations each season and that the adults hibernate.

Egg. Length, 0.36 mm.; greatest width, 0.22 mm. The somewhat flask-shaped, smooth, whitish eggs were found on the under surface of the leaf, inserted as a rule in the mid-rib, but sometimes in the leaf tissue adjoining the mid-rib. Usually they occurred in small clusters, being stuck sometimes vertically in the tissue and at other times at an angle. The necks of the eggs seemed to be bent slightly so as to bring the caps on a level with the leaf surface. Where many eggs were found in a mid-rib, a distortion was present, the rib extending out on one side and being thickened at that point. The tissue surrounding the eggs was somewhat hard and corky and each egg-cap was topped by a brownish scab-like crust evidently deposited by the parent insect.

Color Notes

1st stage nymph. Length 0.56 mm., greatest width 0.26 mm. (exclusive of tubercles.) Dorsal and ventral surfaces, light brownish red in general appearance. Abdomen posteriorly and medially tending toward brown; head, same brownish color. Antennae pale except at extreme bases. Coxa, trochanter and most of femur, brownish, remainder of legs, pale.

2nd stage nymph. Length 0.64 mm., greatest width 0.44 mm. (exclusive of tubercles). Ventral surface similar in color to that of the first stage; dorsal surface somewhat darker; antennae pale as in first stage except for the apical ends of the distal segments which are darker; head lighter medially; bases of legs darker than in first stage. Entire appearance of this stage is smoky brown with light ashen specks due to numerous secreting hairs from which hang clear drops of a somewhat sticky liquid.

3rd stage nymph. Length 0.92 mm., greatest width 0.62 mm. (exclusive of tubercles). Ventral surface darker and markings more pronounced except medially and laterally; dorsal surface brownish red; distal segment of antenna darker; legs darker; head lighter, eyes dark brown; ashen specked appearance more pronounced.

4th stage nymph. Length 1.28 mm., greatest width 0.86 mm. (exclusive of tubercles). Ventral surface slightly darker; legs, except tibiae, smoky brown; tibiae pale; antennae light brown except apex of penultimate and antepenultimate segments. Dorsal surface pale brownish red except medial parts of the abdomen, thorax and wing pads. Head pale brownish red. Specked, ashen appearance very pronounced.

5th stage nymph. Length 1.84 mm., greatest width 1.22 mm. (exclusive of tubercles). Similar to preceding stage except that the dark markings are more pronounced and the wing pads are dark at the anterior and posterior edges. Specked ashen appearance very pronounced.

Adult (from Vol. I, *Complete Writings of Thomas Say on the Entomology of North America,* edited by John L. Le Conte):

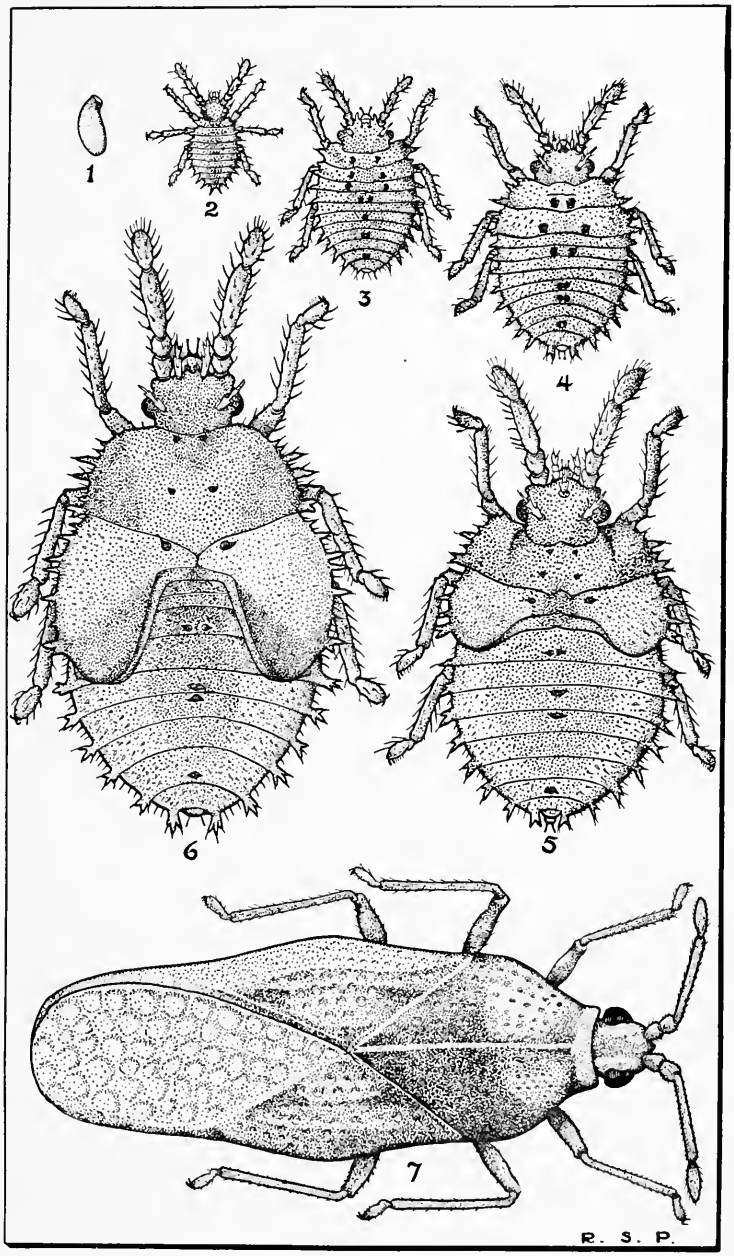
Tingis mutica—Thorax and scutel with a single line, hemelytra with a brown spot. Inhabits Indiana.

Body grayish brown, unarmed, not dilated on the margin; with much dilated punctures; antennae, second joint rather thicker than the first; thorax with a paler, slender, glabrous line and paler line each side; scutel with a paler line on the middle and a short one each side, not elevated; hemelytra like the thorax with dilated approximate punctures; on the middle an obvious darker, irregular spot or band; membrane reticulate with brown; beneath dusky, tibiae paler. Length to tip of hemelytra over one tenth of an inch.

Explanation of Plate XVI.

(R. S. Patterson del.)

Fig. 1, egg.
Fig. 2, first stage nymph.
Fig. 3, second stage nymph.
Fig. 4, third stage nymph.
Fig. 5, fourth stage nymph.
Fig. 6, fifth stage nymph.
Fig. 7, adult.



LEPTOYPHA MUTICA—DICKERSON AND WEISS.

A New Killing Bottle.

By Wm. Moore, Asst. Prof. of Entomology, University Farm, University of Minnesota.

In Bulletin No. 167 of the United States Department of Agriculture, mention is made of the feasibility of using paradichlorobenzene as a substitute for potassium cyanide in killing bottles. Being interested in the benzene derivatives and having a number on hand, killing bottles made of various derivatives of benzene were tried out. They all proved of value, but paradichlorobenzene being a solid gave the best results.

By placing a few pieces of paradichlorobenzene in the bottom of the desired bottle and heating to 55 deg. C. either over a flame or by dipping in hot water the paradichlorobenzene is melted. The bottle, without being corked, is then carefully placed in a cool place or in cold water until the paradichlorobenzene has solidified. Crystals are often found on the sides if the cooling is rapid, but these can easily be removed with a cloth.

The advantages of a paradichlorobenzene killing bottle over potassium cyanide are: First, the ease with which it can be made; second, the fact that paradichlorobenzene will not absorb water and thus spoil the bottle and specimens; third, the paradichlorobenzene bottle is full strength as soon as made and remains full strength as long as there is any of the material in the bottle; fourth, the bottle can be easily remade by putting in fresh paradichlorobenzene and melting,—fifth, paradichlorobenzene is not very poisonous to higher animals and great care does not have to be taken to clean up all the small pieces if a bottle is broken. This is of particular value where the bottles are used by students.

The disadvantage is the fact that if the bottle becomes warm and is then cooled that crystals are apt to be formed on the sides of the bottle or even on the specimens. Those on the bottle can easily be removed by a cloth, while the crystals on the specimens will soon evaporate without injury to the specimen when it is removed to the air.

A strong cyanide bottle freshly prepared with potassium cyanide and plaster of paris was used in comparison with a paradichlorobenzene bottle. In the cyanide bottle a honey bee was rendered inactive in three-quarters of a minute, a house fly one-half minute, a cockroach (*P. germanica*) one minute, a carabid two minutes and *Trombidium* sp. two minutes. In the paradichlorobenzene bottle the honey bee required four minutes, house fly two and one-half minutes, a cockroach (*P. germanica*) ten minutes, a carabid ten minutes and a *Trombidium* sp. five minutes. This time was for the cessation of all violent motions since slight movements of the legs or antennae were noticed for a much longer period of time. Probably the greatest value of the paradichlorobenzene bottle will be for students' use, because of its non-poisonous nature, but they should be warned that large insects such as beetles should not be collected in the same bottle, as delicate flies and moths, as the slow action of paradichlorobenzene would allow the larger insects time to injure the delicate specimens.

Paradichlorobenzene may be used as a substitute for naphthalene in insect boxes. A hot pin can be run into a lump of paradichlorobenzene as easily as into a moth ball and the box will be better protected than with naphthalene, as paradichlorobenzene will even kill the pests already present in the box.

An Efficacious Endoparasite of Chrysomphalus dictyospermi Morg. (Hym., Hom.).

For some years past the Reale Stazione di Entomologia Agraria in Florence has been seeking a natural means of combating this scale insect. A valuable check on the ravages of the coccid has been sent from Madeira by Prof. C. P. Lounsbury and has been described as *Prospaltella lounsburyi* by A. Berlese and G. Paoli (*Redia*, xi, 305-307, Feb. 24, 1916). This Chalcid fly attacks not only the adult *Chrysomphalus* but also the male and female larvae. The parasitized female larvae are of a more intense yellow color and have a thicker cuticle than the normal individuals, while on the other hand the adult females are almost transparent and colorless and their cuticle is particularly fragile. The percentage of parasitized females in the material examined was estimated at 60 per cent. for the larvae and 40 per cent. for the adults. *P. lounsburyi* is 470 microns in length.

On Certain Acanthagrions, Including Three New Species (Odonata).

By E. B. Williamson, Bluffton, Indiana.

(Plate XVII)

This paper is a brief account of material collected in Guatemala, British Guiana and Trinidad by B. J. Rainey, L. A. Williamson and myself. At Tumatumari, British Guiana, we were aided by Mr. A. F. Porter and Mr. J. M. Geddes; and in Trinidad we enjoyed the frequent companionship of Mr. F. W. Urich and Mr. P. L. Guppy.

Pruinescence. It is a matter of common observation that in many agrionines pruinescence appears first on the under parts of the thorax. Pruinescence in certain calopterygines is known to be displayed by the male and it is possible that pruinescence in agrionines may serve a similar purpose. In *Acanthagrion* there are between the first coxae, and probably also between the second coxae, bright shining black areas which, in the case of the first coxae at least, are not covered with pruinescence. These black areas in their white field might be displayed by the male fluttering over the female. However the female is about as definitely marked as the male and the theory of sexual display seems rather improbable unless the female uses the same parts to advertise her sexual maturity. I have not examined species in other genera to see how common this type of ventral coloration is. It may also be noticed in this connection that the lower posterior angle of the thorax is tipped with black and there is a more or less definite dark longitudinal mid-ventral line on the first abdominal segment. These various marks produce a definite and uniform ventral color pattern, the most plausible value of which would seem to have to do with the relation of the sexes.

The Penis. In his study of the penis of Zygoptera Mr. Kennedy has given systematic odonatology a new and valuable tool. Specimens from Trinidad appeared, when judged by conventional characters, to be scarcely distinct from *gracile.* However, there were enough differences to excite suspicion, and when specimens were given to Mr. Kennedy for study,

to our great surprise, he found that the penis of these Trinidad specimens was entirely distinct from that of *gracile*. It is therefore very appropriate that this Trinidad species, the positive recognition of which has been possible only through Mr. Kennedy's work, should be named *Acanthagrion kennedii*.

The mesepisternal fossae. In Plate XVII, figures 10, 11, 12 and 13, I have figured a portion of the right dorsum of the thorax of four females. In these four species there is, on either side of the middorsal carina, and immediately adjacent thereto, and at varying heights on the thorax, a small more or less semicircular depression which, in these species at least, functions as a socket for the reception of half of the posterior dorsal termination of the tenth segment of the male. These depressions have the middorsal carina between them variously modified. As shown by the figures, and as might be expected, the fossae are placed higher on the mesepisterna in *gracile* than in *kennedii* and still higher in *ascendens*. The name, mesepisternal fossae, given to these pits or depressions, has been suggested by Dr. Calvert.

Acanthagrion kennedii n. sp. (Plate XVII, figs. 5, 6, 8, 11).

Abdomen ♂ 24-27, average 25.5, ♀ 24-25; hind wing ♂, 15.5-17.5, average 16.6, ♀ 17-18.

♂.—Genae, labrum and rhinarium green, the rhinarium usually duller than the labrum, and the labrum with an impressed posterior median spot and posterior lateral margins dark brown or black. Nasus black, the extreme posterior lateral corner green. Frons in front with a large quadrangular, slightly oblique bar on either side, varying in color from green to obscure green, yellowish or brownish, and varying also in size, in rare cases reduced and so obscured as to be scarcely evident. Head above black; postocular spots greenish blue rounded, with very little variation in size, about equal to a circle enclosing the ocelli. Rear of head above level of foramen black; below pale, dull or yellowish or greenish tinged.

Front lobe of prothorax pale or yellowish, with a black posterior spot on either side and with the anterior border more or less black; middle lobe black with a variably-sized yellow spot on either side near the lateral margin, this spot never large, reduced to a mere point in many cases, and sometimes wanting; hind lobe black, a small yellowish spot at either extreme end, this spot almost directly posterior to the spot on the middle lobe when the latter is present. Propleuron largely yellowish or greenish, black above.

Dorsum of thorax black, a pale yellow or yellowish blue antehumeral stripe, expanded above at the antealar sinus, then gradually constricted to about one-half the maximum width above, then gradually widening till, at its extreme lower end at the end of the sclerite, it is about three times its width at the narrowest place above; the stripe slightly variable in width in different individuals. A black humeral stripe, wider than one-half the dorsal black, occupying much of the mesepimeron and extended across the mesinfraepisternum, leaving only the lower posterior border of the latter pale; this humeral stripe above notched with pale on its posterior border, and joined along the wing base with a more or less distinct short black spur on the first lateral suture; sometimes this short spur is joined to the humeral suture also across the pale notch in the latter, in which case a pale isolated spot is enclosed. Remainder of sides of thorax pale yellowish or greenish, a black spot above on the second lateral suture which is usually produced as a narrow, sometimes indistinct, stripe on the metepisternum along the second lateral suture, in its maximum development scarcely reaching the level of the mesostigma. A more or less distinct broad greenish or bluish band across the metepimeron parallel and adjacent to the second lateral suture, the posterior triangular area thus marked off being more heavily pigmented and more distinctly yellow than the area anterior to it. Beneath flesh-colored.

Abdomen above black, 1 with apical integument blue; black on 2 more or less narrowed subbasally, at the extreme base expanded laterally as a mere line, widened subapically over an extensive rounded area, in general about as wide as the pale sides and as the black on 1; 3-7 with narrow basal pale rings or spots; 7 apically blue beyond the row of spines in every case and in many cases an equal area basal to the spines also blue; 8-9 blue; 10 black. Sides of 1 and 2 with lower two-thirds greenish, posterior border of 1 black; base of 3 greenish, fading out posteriorly into yellowish which reaches about mid-height, expanded basally to form the basal ring, and constricted apically by the expanded dorsal black which, at the extreme apex, reaches the lower edge; 4-7 similar but yellowish, with little or no bluish or greenish, at the base of each, and with the paler lateral area progressively narrowed by the widened dorsal black which reaches a maximum on 7; 8-9 blue; 10 black, beneath yellowish brown. Appendages black, inferiors yellowish brown at base.

Legs yellowish brown, femora black on the superior surface, increasing apically where the black surrounds the femur, more extensive and intense in some individuals than in others but in all darkest on the first femora and palest on the last; first tibiae, and second more or less, black-lined on anterior face, the line tending to break into a series of connected spots; tarsi varying from brown, with apices of joints dark, to largely dark; tooth on tarsal claw similar to *gracile*.

Wings hyaline to slightly brown tinged; stigma black, shorter than I have seen in *gracile*.

♀.—Labrum yellowish brown, darker at base, shading out insensibly to the pale lower border. Genae, rhinarium and frons in front olive, the two latter the darker, the frons sometimes dark reddish brown. Nasus black, one specimen with an obscure spot on either side. Frons in front with the pale areas, as compared with the male, generally greatly more extended with the result that in some cases the black is reduced to a longitudinal median stripe, wider above and below. Head above as in the male with the postocular spots more bluish; in some cases there is on either side a small round brown spot just behind and external to the antenna, and indistinct areas of the same color in front of the median ocellus.

Prothorax similar to male, but pale color bluish.

Thoracic pattern similar to male, but pale blue replacing the yellowish colors of the latter, except in the posterior triangular area of the metepimeron which is more or less distinctly yellowish. Metepisternum from the wings to slightly below the level of the stigma is a darker blue than the color which bounds it on both sides and below (in the male the corresponding area is more or less slightly more green than the surrounding areas).

Abdominal segments 1-7 similar to male; 8 black (pale basally on either side in one case), apex pale beyond the spines (and in one case for a distance anterior to the spines equal to about one-half the part posterior to the spines); 9 with apical half or two-thirds blue, this blue encroaching on the black in a large quadrangular median spot which reaches the base of the segment or is separated therefrom by a narrow transverse line of black; 10 blue. Seen from the side similar to the male but with blue or bluish replacing green; 8 in one specimen with a blue basal spot as described in dorsal view, in others black, the narrow inferior yellowish margin slightly widened basally; 9 with the blue appearing as a large distal superior triangular spot, the base of the triangle on the apical border of the segment, extreme lower margin of segment yellowish; 10 blue, lower half paler and duller. Appendages black. Vulvar spine large, black tipped.

Legs as in male, but black greatly reduced especially on parts distal to the femora.

Wings as in male, but stigma light brown.

Trinidad, 1912: Cunapo River, Feb. 27, 10 ♂, 1 ♀; Arima, March 4, 15 ♂, 1 ♀; Cumuto, March 6, 8 and 10, 88 ♂, 8 ♀; *types* a ♂ and ♀, Cumuto, Trinidad, March 10, 1912, in the writer's collection. Named for Mr. Clarence Hamilton Kennedy in recognition of his work on Zygoptera penes which has made the recognition of this species possible.

Males of this species were sent to Dr. Calvert and Dr. Ris. Dr. Ris writes, "It is almost exactly similar to a few Acanthagrions taken by myself in Bahia in 1890; I have considered them nearly typical *gracile*." Dr. Calvert says, "It is nearer *gracile minarum* than no. 2 (*indefensum*) is. I am inclined to so consider it; almost the only objection is the presence of black stripe on second lateral thoracic suture." In view of these opinions any comment on the difficulty of recognizing this species is superfluous.

In Calvert's key to the males of *Acanthagrion* of the *gracile* group (Od. Neotrop. Reg., Ann. Carnegie Mus., Vol. VI, pp. 161-2) *kennedii* will run out to *gracile* or *g. minarum*. *Minarum* was described by de Selys from material from Minas Geraes. It is possible it may prove to be specifically distinct from *gracile*, but there is no reason to think it is the same as the species here described from Trinidad. *Vidua* de Selys, from Venezuela, might possibly be expected in Trinidad, but it is not represented in the material before me unless *ascendens* should turn out to be a synonym, which I think is improbable.

Compared with material from Guatemala determined by Calvert as *gracile*,* males of *kennedii* differ in the blue color of the head, thorax and basal abdominal segments of *gracile* being replaced by green and yellowish, thus approaching *ascendens*. A comparison of the descriptions will show that black is more extensive on the head and thorax of *kennedii* than of *gracile*. In posterior views of the male appendages, the superior appendages of *gracile* are seen to be longer (higher) with the superior rounded angle reaching well above the constriction in the dorsal elevation of segment 10; in *kennedii* the appendages reach this constriction but do not extend above

[*Since this paper was written, a study of the penes of specimens in the Cornell and Harvard collections has brought to light two more species included under the name *gracile*. As both are from Brazil it may be that one or the other of these will be found to agree with the type of *gracile* in the Selys collection. Neither of these Brazilian species are described or figured in Mr. Williamson's article or in my own in this number of the NEWS.—C. H. KENNEDY.]

it. Venational differences may be noted in the tabulation which closes this paper, especially the more apical position of the arculus and of vein A and the larger number of post-nodals in *kennedii.*

Like *ascendens* (see *posteà* under that species) the female of *kennedii* runs out to C, under B, under A. As might be expected the mesepisternal fossae of *kennedii,* corresponding to the shorter (lower) appendages and the less elevated tenth segment of the male, are placed lower on the sclerites than in *gracile.* It is possible the form of the mesostigmal lamina may be of value in separating the two species. As in the male, the female of *kennedii* has much more black than the female of *gracile;* for example *gracile* has the nasus largely pale and the dorsum of the head more extensively pale-marked, and the dark markings on both thorax and legs are reduced in extent as compared with *kennedii;* in *gracile* in some cases abdominal segment 8 in side view is largely pale, the black occupying the upper third of the segment for about two-thirds its length from the base; in those cases where the black is more extensive and reaches the apex of the segment the inferior yellowish border is fully twice as wide as it is ever found in *kennedii;* segment 9 is similarly conspicuously paler in *gracile* and even in the darkest examples the superior apical blue area posteriorly blends insensibly below into the pale inferior margin which is much wider than in *kennedii* where the posterior triangular blue spot is definitely separated by dark from the narrow inferior pale margin.

Fortunately we took a large number of this difficult species, and this material will be so distributed as to give students generally an opportunity to know the species from specimens as well as from my description. It is to be hoped for the sake of convenience that definite characters, in addition to those of the penis, may be detected. Much of this material was collected at the small swamp at Cumuto where we took three species of *Metaleptobasis,* a new *Telagrion,* and many other things (see *Notes on Neotropical Dragonflies,* Proc. U. S. Nat. Mus., Vol. 48, 1915, p. 601).

Acanthagrion indefensum n. sp. (Plate XVII, figs. 3, 4, 7).

Abdomen ♂ 23; hind wing ♂ 15-15.5.

♂.—Similar to *kennedii* and *gracile* but smaller; like *kennedii* as described except as noted below; one specimen with a large blue spot on either side between the apex of the second joint of the antenna and the eye, and a small obscure yellowish spot on either side just inside the first joint of the antenna, the blue postocular spots in this specimen much larger than in the other specimen where they are about the size of the spots in *kennedii*, and in both specimens the postocular spots are irregular lobate in outline as contrasted with the entire outline of *kennedii*. Rear of head above, about foramen, and below adjoining mouth parts, black, thus differing from both *gracile* and *kennedii* which are pale below.

Prothorax black, thus darker than in *kennedii*; front lobe with a median bright blue spot. Propleuron below dull or leaden blue.

Thoracic pattern similar to *kennedii* but clear blue replacing the yellow or yellowish-tinged parts of *kennedii*, in which character *indefensum* is like *gracile*. The black stripe along the second lateral thoracic suture is more definite and more intensely black than it ever attains in *gracile* and as it very rarely attains in *kennedii*.

Abdominal segment 1 variable; in one specimen the dorsal black, which is about as wide as in *kennedii*, fails to reach the apical integument by a distance equal to the length of this integument, that is, the black is a quadrate basal spot; in the other the black is narrowed apically, but reaches the blue integument, and there is a median blue spot which is contiguous posteriorly with the integument. Sides of 1 and 2 blue, instead of green or greenish, thus again resembling *gracile*. Remainder of abdomen like *kennedii* with apical integument only of 7 blue.

Legs much darker than in *gracile* or *kennedii*; first femora entirely black except the base on the inner surface; on the second femora the pale basal color on the inner surface not quite reaching the middle of the femora; the third femora still paler, with a pale line on the anterior dorsal surface, this pale line broader basally and disappearing before the apex where the femur is completely circled with black, the inner surface otherwise pale; first tibiae with anterior dorsal surface black; second and third tibiae black at base and apex; tarsi black, claws dark amber, darker than in related species, toothed as in *gracile*.

Wings hyaline; stigma black, similar in shape to *kennedii*.

Wismar, British Guiana, Feb. 16, 1912, two males in my collection.

One of the specimens was sent to Dr. Calvert who writes, "Most like *A. gracile minarum* of anything I know but ab-

dominal segment 10 not so elevated, superior appendages not so high, and an additional black stripe on the second lateral thoracic suture." Of the four related species of the *gracile* group considered in this paper, *indefensum* has the lowest tenth abdominal segment, and the superior apical apex is strikingly rounded as compared with the others. It will be interesting to know the female of *indefensum* and to note what modifications of the middorsal thoracic carina between the mesepisternal fossae have taken place. May it not be expected that here the carina will be indented rather than elevated as it is in *ascendens?* In spite of its close resemblance to *gracile*, I believe that this species offers no such difficulties as *kennedii*, since the appendages are strikingly different from its closer allies. These differences, however, are concerned with parts of inferior appendages which have received little attention. In many genera of Agrionines the inner posterior surface of the inferiors are variously modified, the most common form being a dorsally directed, acutely tipped, tubercle. These parts are concealed in lateral views, and are inconspicuous and usually neglected in dorsal views. In *kennedii* and *gracile* the inner face of each inferior appendage is produced in a great flattened, inward curved, obtuse tubercle; in *indefensum* this is reduced to a small inconspicuous prominence; the appearance in posterior view of the apex of the abdomen of *indefensum*, as compared with *gracile* and *kennedii*, has suggested the specific name (see figs. 7, 8 and 9, Plate XVII).

On February 16, my father and I collected near the canal and government sawmill at Christianburg about a mile below Wismar. A short distance above the sawmill a dressing room for bathers is located. We collected in brush on the right bank of the canal below this dressing room, and along a small stream on the left side of the canal, parallel to and only a short distance from it, in the brush. My notes fail to show just where the two specimens of *indefensum* were collected.

Acanthagrion adustum n. sp. (Plate XVII, figs. 1, 2, 10).

Abdomen ♂ 21-22.5, average 21.95, ♀ 21-22; hind wing ♂ 14-15, average 14.75, ♀ 16.

♂.—Genae light orange. Labrum light orange to dark orange or obscure reddish brown, narrowly black at base and on posterior lateral borders with a basal median black impressed spot. Rhinarium slightly darker than labrum. Nasus rarely entirely black, usually a median transverse orange bar, sometimes this larger with margins orange, except at base, thus reducing the black to a submarginal black ring. Frons in front light orange to obscure reddish brown, naso-frontal suture black, wider in the median line which is produced posteriorly in a more or less distinct narrow longitudinal black line which joins a distinct short transverse crescent-shaped black area of varying width lying in front of the median ocellus, and between the antennae from which it is separated by about its own length. Color of head above very variable in the extent of black; in the palest there is a short oblique black line on either side of the median ocellus and a median triangular black spot back of it; starting posterior to the lateral ocellus a suture-like line runs outward and forward to the eye which it meets on a level between the antenna and the median ocellus; anterior to this line all is slightly dull reddish orange with the restricted black markings above described, and posterior to this line the dorsum is solid black except for the large isolated postocular orange spots, and a narrow orange edging on the occiput. In darker specimens the ocelli are surrounded by black with a small orange spot in front of each lateral ocellus; from the black spot about the median ocellus a short bar runs outward and forward on either side toward, but not reaching, the antenna; the inner face of the second joint of the antenna is black, and posterior to this joint a short rounded bar runs toward, but does not meet, the eye; posteriorly from this bar, on a line with the antenna, there is a more or less distinct black connection with the large posterior black area. In the maximum development of black this becomes a wide black bar; the bar from the median ocellus reaches the antenna; midway it sends off an anterior branch which runs forward and inward to spread out and fuse with the black anterior to the median ocellus and the median transverse black bar on the frons; this above described anterior branch also near its middle throws off an anterior branch which runs outward and forward to the angle of the frons, then outward and backward across the first joint of the antenna to the inner face of the second joint. The orange or reddish brown postocular spots vary in size from as small as the area within the ocelli to fully twice this diameter when the lateral and posterior margining black is narrow, but in every case the spots are completely surrounded by black. Rear of head black, yellow margined against the eyes.

Prothorax with front lobe orange, more or less black posteriorly on either side; middle lobe black with a geminate median orange spot

of varying size and, on either side, an orange spot of varying size, in some cases large and conspicuous, and in some cases entirely wanting; the difference between extreme cases, as in the case of the head markings, is striking; hind lobe largely orange or this reduced to the extreme posterior edge and divided in the median line by black. Propleuron black above, yellow below, less variable than the median lobe.

Thorax above orange or reddish brown; on either side a straight black stripe, about two-fifths the width of the mesepisternum, separated by a pale median stripe starting at the antealar sinus and widening uniformly below, variable, scarcely more than a line in some cases and, in others, at about its mid length, almost half the width of the adjacent black stripes. A posthumeral stripe, slightly wider than the black stripe on the mesepisternum, entirely black in the brightest colored specimens, in others fading out along its posterior border, the black above and below being most persistent with the intermediate black reduced to the anterior line at some points; this posthumeral stripe continued across the mesinfraepisternum which is yellow in about its lower half. A black spot on the second lateral suture above, continued below in most cases as a black or brownish stripe lying on the anterior side of the suture, this stripe varying in width from the merest line to about one-half the width of the dorsal black stripe, and, in its extreme length, almost or quite reaching the metastigma. Metepisternum pale yellow and dull orange or orange brown in irregular pattern, in some cases the darker color is almost exclusively present, in others it is confined to the median and posterior portions of the sclerite. Metepimeron with a wide stripe of pale yellow parallel to the second lateral suture, the posterior triangular area dull orange. Metinfraepisternum pale dull yellow, narrowly black above. Beneath posterior to coxae dark colored or black, early becoming pruinose, orange brown adjoining the abdomen.

Abdomen above black, 1 and 2 usually with purplish reflections, the others with greenish reflections; apical integument of 1 pale blue; 3-8 with small basal, pale blue or green spots or rings; on 8 these spots are small, bright blue, and widely separated by the median black, not always present or, at least, not evident, in dried material; apical fourth to three-fifths of 8 and all of 9 bright blue, the blue on 8 indenting the black in the middorsal line in a more or less triangular area, the apex directed anteriorly; 10 black. Sides of abdomen pale, in the brightest-colored specimens bluish or greenish yellow on 1 and 2, and the base of 3, then yellow on 3-7, 8-10 bright blue; apical edge of 1-6 narrowly dark or black ringed; pale sides of 2-7 continuous with the basal rings or spots, apically on each segment the dorsal black widens and, with the apical black ring, separates the pale area

of one segment from the succeeding segment; seen from the side the blue and black of 8 are about of equal width, the black descending possibly a little more than half way, and there is a very narrow apical black ring; on 10 the dorsal black is extended narrowly on the sides of the segment at the base, reducing the blue to a large apical spot, beneath dull yellowish brown. Superior appendages black, sometimes brown on their posterior face, the apical inner angle with a minute acute spine; inferiors dark brown or black, pale at base and below.

Legs brown, coxae black-spotted in front at the base; femora dark on the superior face, increasing apically where the black surrounds the femur, the first femora the darkest, the last the palest, and varying in individuals; when reduced tending to break up basally (where it first disappears) into spots; tibiae with their anterior dorsal face black-lined, darkest on first tibiae, least developed on the last; tarsi black; tooth on tarsal claw as in *gracile*, possibly very slightly less developed.

Wings hyaline; stigma orange or reddish brown, conspicuous in color to the unaided eye.

♀.—Similar to the male, slightly duller and darker and with the black markings reduced. Genae lighter, light yellowish brown. Apparently as variable as the male in the color pattern of the head and thorax; the posthumeral black stripe noticeably more reduced than in the male, the upper and lower ends distinct but the intervening space represented by the merest black line or an indefinite row of disconnected obscure dark markings. On the metepimeron the distinction of pale yellow and dull orange is not so well marked.

Abdomen above black with greenish reflections, most marked on the proximal segments and completely disappearing on the distal segments; 3-6 with narrow basal rings or spots, slightly duller than in the male and with the pattern less definite; 7 with basal ring scarcely evident, and no trace on 8 of the basal blue spots often present in the male; extreme apex 7-9 blue; 10 blue except a small narrow triangular median black spot, the base of the triangle on the base of the segment. Sides similar to male; 8 with the entire lower edge narrowly yellowish; 9 apically at midheight with a large indefinite blue or yellowish area; 10 with the black on dorsum produced laterally narrowly along base, the sides bright blue, yellowish below; the restricted dorsal black results in 10 being much paler in the female than in the male, in contrast with 8 and 9 which are much darker in the female than in the male; appendages black. Vulvar spine large, black tipped.

Legs as in male. Wings hyaline; stigma pale brownish yellow.

Wismar, British Guiana, January 30, Feb. 15 and 16, 1912, 20 ♂, 2 ♀; *types* ♂, ♀, Feb. 15, in the writer's collection.

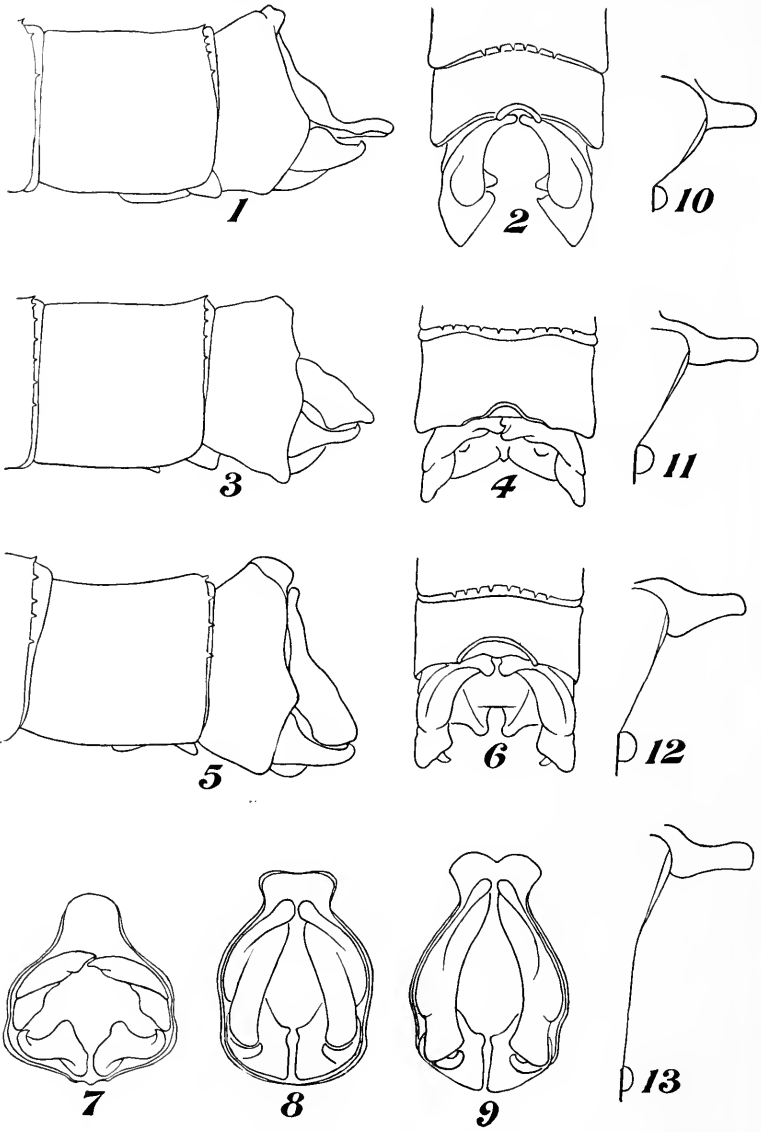
The specific name is suggested by the prevailing pale colors of the head and thorax giving the insect a brownish or sunburned appearance.

Males of this species were sent to Dr. Calvert and Dr. Ris. Dr. Calvert writes, "I do not know it." Dr. Ris says, "It is unknown to me and I cannot identify it with any of the described species; note its long feet and comparatively long spines." In Calvert's key to male *Acanthagrion* of the *gracile* group (Odonata Neotropical Region, Ann. Carnegie Museum), *adustum* might run out to C, p. 161, or CC, p. 162; if the latter, it is separated at once from *truncatum* by the form of appendages, the basal black of abdominal segment 8 of *adustum,* and many other characters, noting especially the yellow colors of *adustum.* If run out to C, p. 161, it would go in the key to HH, under which two varieties of *gracile* are distinguished; *adustum* is separated at once from these two by having the basal two-fifths to three-fourths of segment 8 black (blue in others) and by the yellow coloration of head and thorax of *adustum.* In de Selys' arrangement (Le Grand Genre Agrion, 1876), *adustum* properly belongs in his *première section,* though, so far as the origin of A with reference to the cubitoanal crossvein goes, some of the wings are as described in his *seconde section,* a section, however, recognizable by other characters; *adustum* belongs to the *gracile* group, under de Selys' *première section,* running out to *temporale,* from which species it is separated at once by the postocular spots not continuous with the rear pale color of the head (as in *temporale*) and by the extensive black on segment 8 in *adustum* (blue in *temporale*).

In Calvert's key to female *Acanthagrion* (loc. cit., p. 162), *adustum* might run out to B or BB; in either case it may be recognized by having abdominal segment 9 black, 10 largely blue, pale colors of head and thorax largely yellow or yellowish, not blue.

This species flew with *Enallagma-* or *Ischnura*-like flight in the vegetation bordering the canal along its left bank just above the sawmill at Christianburg, a mile below Wismar.

(To be continued)



ACANTHAGRION ADUSTUM, 1, 2, 10; A. INDEFENSUM, 3, 4, 7; A. KENNEDII, 5, 6, 8, 11; A. "GRACILE," 9, 12; A. ASCENDENS, 13.—WILLIAMSON

EXPLANATION OF PLATE XVII.

Figs. 1, 2 and 10. *Acanthagrion adustum,* type ♂ and ♀, Wismar, British Guiana, Feb. 15, 1912. 1 and 2, appendages of ♂; 10, portion of right dorsum of thorax of ♀, showing the mesepisternal fossa and mesostigmal lamina.

Figs. 3, 4 and 7, appendages of ♂ of *Acanthagrion indefensum,* type, Wismar, British Guiana, Feb. 16, 1912; 7 posterior view.

Figs. 5, 6, 8 and 11. *Acanthagrion kennedii,* type ♂ and ♀, Cumuto, Trinidad, March 10, 1912. 5, 6 and 8 ♂, 8 posterior view; 11 ♀, same as 10.

Figs. 9 and 12. *Acanthagrion "gracile."* 9, posterior view of ♂, Morales, Guatemala, May 27, 1909; 12, same as 10, ♀, Gualan, Guatemala, June 10, 1909.

Fig. 13. *Acanthagrion ascendens.* Same as 10, ♀, Georgetown, British Guiana, January 27, 1912.

Notes on the Penes of Zygoptera (Odonata).

No. 1. Species Limits in the Genus Acanthagrion.

By CLARENCE HAMILTON KENNEDY, Cornell University.

(Plate XVIII)

In the fall of 1913, when I was working with the Argias and Ischnuras of Washington and Oregon[1] I discovered that the penis, hitherto overlooked by systematists who had studied the Zygoptera, was in some cases an excellent generic character and in other cases even a good specific differential. In the Fall of 1914, when I was working over my collection of California Odonata and found it expedient to describe two new genera,[2] I went into a careful study of the penis in these and related genera, which convinced me that the penis had characters worth studying and made me desirous of carrying the study further. This opportunity came in the Fall of 1915, when I had the privilege of spending several weeks studying with Mr. E. B. Williamson in his private collection and laboratory at Bluffton, Indiana. At this time I drew two

[1]Notes on The Life History and Ecology of the Dragonflies (Odonata) of Washington and Oregon, C. H. Kennedy. Proc. U. S. Nat. Mus., Vol. 49, pp. 259-345, 1915.

[2]Notes on The Life History and Ecology of The Dragonflies (Odonata) of Central California and Nevada. (In press.)

views each of the penis in over three hundred species of Zygoptera. Since my arrival at Cornell I have had the privilege of spending altogether two weeks studying the species of Zygoptera in the collections of the Academy of Natural Sciences of Philadelphia, and of Dr. P. P. Calvert through his courtesy. To date I have drawn the penes of over five hundred species of Zygoptera, having made altogether over one thousand figures, and am hoping to continue the work until the subject is completed, as a monograph.[3]

I wish here to thank Mr. Williamson and Dr. Calvert and Dr. Skinner of the Philadelphia Academy, who have so generously opened their collections to me, as it is only through such interest and generous assistance that this study has been made possible.

When this work was begun, I felt some assurance that the penis would be, not only a good generic, but also a good specific character. More extended study however has shown that only a monographic study of the penes in the entire group of Zygoptera will reveal just how far these organs can be trusted to show true relationships between species and groups, for it has already become evident that the value is very different in different groups.

The accompanying text figure is a diagram showing what seems to me to be the zygopterous penis stripped of its special modifications, in other words what might be its most generalized form. I have no evidence that this is also its most primitive form, as in those genera usually considered most primitive the penis may be most fantastic in the complex modifications of these simple parts, so that it appears that there has been a tendency to a reduction in its complexity from the more primitive forms to those more recent. However there are undoubted exceptions to this. The zygopterous penis

[3]On Jan. 1, 1916, Dr. Needham received a copy of Dr. Erich Schmidt's interesting paper on this same subject of penes (Vergleichende Morphologie des 2. und 3. Abdominal-segments bei männlichen Libellen. Zool. Jahrbüchern. Bd. 39, Heft, 1, 1915.) It was the first intimation I had had that some one else was working on the same subject. Dr. Schmidt has dealt with seventy species of Zygoptera.

which is an appendange of the ventral side of abdominal segment two consists usually of three segments and two, usually unchitinized folds. Segment 1 is the basal or proximal, slender, heavily chitinized shaft. Segment 2 is the moderately chitinized median segment, while segment 3 is the apical or distal segment which folds forward on the median segment and is usually unchitinized. The median segment ordinarily carries across its ventral surface a fleshy ridge or fold, the inner fold, and across its posterior end the terminal fold. This latter is probably erectile in many species. Either or both fleshy folds may be lacking and in the Legion Lestes segment 3 is much reduced. The differences between penes are usually in the shape of the distal or third segment.

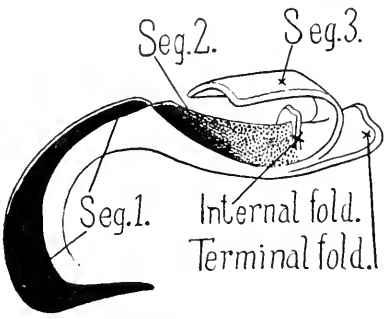


Diagram showing the parts usually found in the zygopterous penis.

I have introduced this present series of papers with this one on *Acanthagrion* to have it appear in conjunction with a paper on some species of the same genus by Mr. Williamson.

The study of the penes in this group at once cleared up the hitherto obscure relations of the various forms which had variously been termed varieties and subspecies. Those that have been studied are, as far as the penis is concerned, good species. Mr. Williamson and I were both much surprised when we found the great structural differences existing in the penes of the so-called "subspecies" (*ablutum, ascendens, minarum*[4]), of *gracile*. The penes of the thirteen species of *Acanthagrion* I have been able to examine vary more among themselves in form than those of any similar group of closely related species of Zygoptera. If I had seen the penes only, I

[4]The *minarum* referred to by Mr. Kennedy is the species described by me (*anteá*, p. 314) as *kennedii*. It was determined independently by Dr. Calvert and myself as *minarum*, but is probably not the *minarum* of de Selys.—E. B. Williamson.

would have unhesitatingly believed that they represented at least four genera.[5]

The only single character which runs through the entire series is the absence of the internal soft fold. Probably the spines along the shaft are also a character of the entire group but they are so delicate that they have to be looked for specially, and in *laterale* and *adustum* I did not notice their absence until the drawings were assembled in the plate. Another character which runs through the entire group, but which is not so obvious, because it appears in a different form in each species, is one or more outgrowths (septa, lobes, spines, hooks, etc.) which appear along the median line of the dorsal or internal surface of the distal lobe. Outgrowths along this line, though they do occur in a few other genera, are rare. The singular paired outgrowths of the lateral edges of the distal segment, as they are developed in *temporale, apicale, gracile, ablutum, ascendens, kennedii, cuyabae,* and *truncatum,* are unusual, though they also appear in other genera. The strangest and least comprehensible development in the entire series is that of the pair of heavily chitinized hooks on the apex of the distal segment in *apicale* (Plate XVIII, fig. 3). A strong chitinization at this point is all but unique among the more than five hundred species of Zygoptera examined. The terminal soft fold varies in development in this series but I should hesitate to say that it was entirely absent in those species in which it is not figured, as it is at times gossamer-like and if the specimen is the least dry clings so closely to the terminal segment that the most careful dissection may fail to loosen it. However I can state that it is as a rule poorly developed except in *cheliferum,* (Pl. XVIII, fig. 26).

The following brief notes are to amplify the characters shown in the figures on Plate XVIII.

Acanthagrion ablutum Calvert, figs. 10-11. The edges of segment 3, twisted at its base and turned in, form a pair of "shelves" between which is an ill-defined median septum.

[5]Prof. O. A. Johannsen has just called my attention to a condition similar to this in certain genera of Mycetophilidae. In some genera in this family the hypopygium in the male varies between species so much that the parts cannot be homologized.

Acanthagrion adustum Williamson, figs. 20-21. A thin septum-like, median, internal hook pointing distad on segment 3.

Acanthagrion apicale Selys., figs. 3-4. Segment 3 with a pair of heavy, chitinized, terminal hooks between which is a median globular swelling.

Acanthagrion ascendens Calvert, figs. 12-13. A median internal apical hook on segment 3.

Acanthagrion cheliferum Selys., figs. 26-27. An internal median swelling on segment 3. A thin, chitinized median hook on segment 2. Terminal fold well developed. The ridges in fig. 27 may have been due to the drying of the preparation.

Acanthagrion cuyabae Calvert, figs. 16-17. A median internal enlargement between the two lateral lobes of segment 3.

Acanthagrion "gracile" Rambur, figs. 8-9. Peculiar in that the tip of segment 3 is divided horizontally into three septa.

Acanthagrion indefensum Williamson, figs. 22-23. A delicate median, internal, barbed hook on segment 3.

Acanthagrion interruptum Selys., figs. 5-7. A median internal hook on segment 3. See fig. 7.

Acanthagrion kennedii Williamson, figs. 14-15. A thin septum along the median, internal line of segment 3.

Acanthagrion laterale Selys., figs. 18-19. The most simple of the series having merely an internal, median swelling to indicate its relationships.

Acanthagrion temporale Selys., figs. 1-2. A thin septum as in *kennedii*.

Acanthagrion truncatum Selys., figs. 24-25. A median internal hook formed by the turning in of the edges of segment 3.

In conclusion, certain venational characters divide this genus, as it has been understood in the past, but the penis, because of its evident great variety of forms, is of little assistance in defining groups among this series of species. However the study of the penis has shown very definitely that we are dealing with structurally, well defined species rather than with subspecies and varieties based, as hitherto, largely on color.

In addition I might say that I shall treat in another paper of a series of species in which a condition exists just opposite to this which occurs in *Acanthagrion*. In this other series what are apparently generically distinct species have almost identical penes.

EXPLANATION OF PLATE XVIII.

Drawings of the penes of the species of *Acanthagrion*, being lateral and ventral views of the last two segments.

Figs. 1-2, *Acanthagrion temporale*, Chapada, Matto Grosso, Brazil, det. P. P. Calvert.

Figs. 3-4, *Acanthagrion apicale*, Tumatumari, British Guiana, Feb. 10, 1912, det. E. B. Williamson.

Figs. 5-7, *Acanthagrion interruptum*, Concepcion, Chili, Jan., 1905, det. P. P. Calvert. Fig. 7 shows the median internal hook.

Figs. 8-9, *Acanthagrion "gracile,"* Gualan, Guatemala, June 14, 1905, det. E. B. Williamson.

Figs. 10-11, *Acanthagrion ablutum*, Coroico, Yungas, Bolivia, May 10, 1899, det. P. P. Calvert.

Figs. 12-13, *Acanthagrion ascendens*, Cunapo River, Trinidad, Feb. 27, 1912, det. E. B. Williamson.

Figs. 14-15, *Acanthagrion kennedii*, Cunapo River, Trinidad, Feb. 27, 1912, det. E. B. Williamson.

Figs. 16-17, *Acanthagrion cuyabae*, Cuyaba, Brazil, det. P. P. Calvert.

Figs. 18-19, *Acanthagrion laterale*, Bogotá, Columbia, Lindig, 1863, det. P. P. Calvert.

Figs. 20-21, *Acanthagrion adustum*, Wismar, Brit. Guiana, Feb. 15, 1912, collected by E. B. Williamson.

Figs. 22-23, *Acanthagrion indefensum*, Wismar, British Guiana, Feb. 16, 1912, collected by E. B. Williamson.

Figs. 24-25, *Acanthagrion truncatum*, Chapada, Matto Grosso, Brazil, det. P. P. Calvert.

Figs. 26-27, *Acanthagrion cheliferum*, Rio Grande do Sul, Brazil, H. von. Ihering, det. P. P. Calvert.

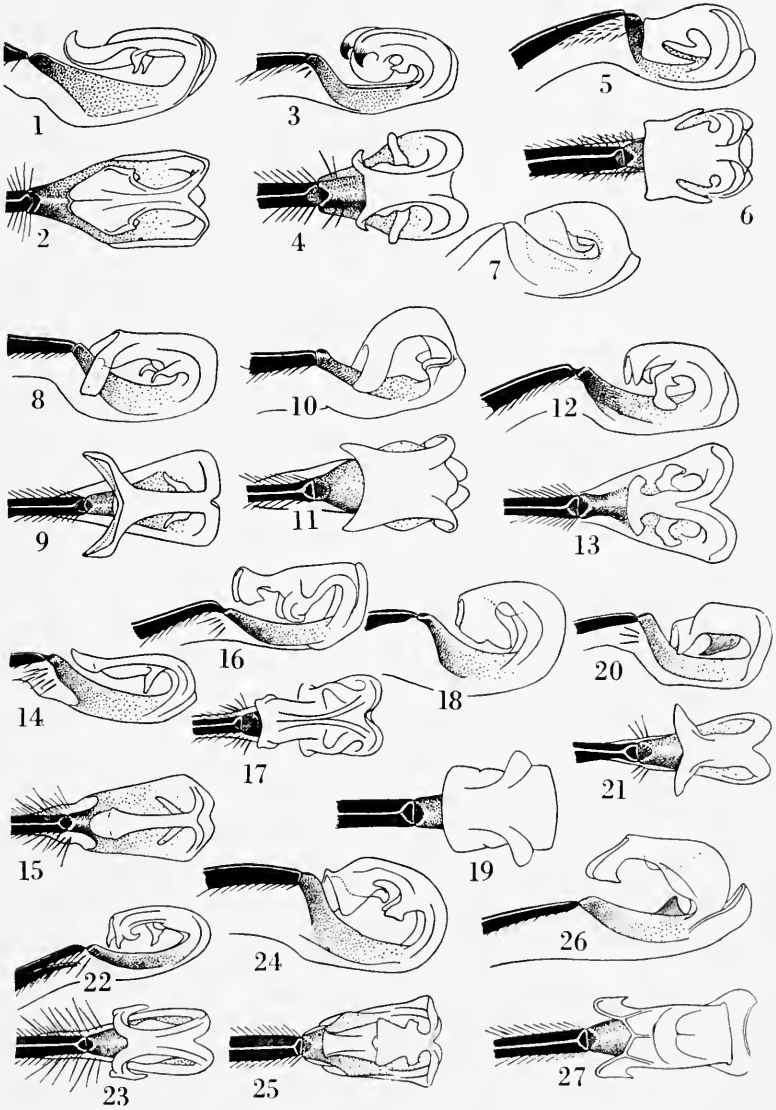
An American Species of the Ichneumonid Genus Heterocola Förster (Hym.).

By CHARLES T. BRUES, Bussey Institution, Harvard University.

In 1890 Ashmead[1] erected the genus *Dolichopselephus* for a species of Porizontine Ophioninae with greatly elongated maxillary palpi. *Dolichopselephus* has recently been regarded by Szépligeti[2] as a synonym of *Heterocola* Förster, a genus represented by three European species. The characters given by him for *Heterocola* however, do not agree with those given by Ashmead for *Dolichopselephus* in several respects and it is evident that Szépligeti has been led by the peculiarly modified maxillary palpi to consider the two genera inseparable. They may be easily distinguished as follows:

Antennae with not over 20 joints; metathoracic spiracle lying very close to the pleural carina.....*Heterocola.*
Antennae consisting of 30 joints; metathoracic spiracle not lying next to the pleural carina .....*Dolichopselephus.*

[1] Bull. Colorado Biol. Assoc., No. 1. p. 23.
[2] Gen. Insec., Fasc. 34. p. 56 (1905).



PENES OF ACANTHAGRION.—KENNEDY.

I find in my collection a specimen from Forest Hills, Massachusetts, which is evidently a true *Heterocola* and establishes the occurrence of this genus in the Eastern United States. It is described below.

Heterocola americana sp. nov.

♀. Length 2.8 mm. Black, with the abdomen beyond the middle of the petiole ferruginous; scape below, mandibles, lower portion of clypeus, mouth-parts, tegulae and legs, including coxae, honey yellow, apical joint of palpi black; ovipositor concolorous with the abdomen, its sheaths piceous; wings tinged with brown, stigma and veins dark brown.

Head subopaque, very finely shagreened, more shining on the temples and distinctly so on the cheeks. Antennae 20-jointed, inserted midway between the vertex and base of clypeus; scape short, only half longer and no thicker than the pedicel; flagellum narrow at base, the first joint as long as the scape, but only half as thick; second joint two-thirds as long as the first, third and following thicker, those toward the middle a little longer than wide; clypeus shining, coarsely punctate. Mandibles long, nearly twice as long as the malar space and equalling the width of the eye; labrum elongated, pointed, as long as the eye and extending considerably beyond the anterior coxae; maxillary palpi with four subequal joints, reaching, when extended, almost to the middle coxae.

Mesonotum and scutellum opaque, shagreened, separated by a deep punctate groove which is terminated at the sides by a sharp carina that extends back over the basal angles of the very convex scutellum. Metathorax short, obliquely truncate, with a short basal median carina followed by a large area which includes the whole of the posterior slope of the metathorax; posterior lateral and pleural areas large, distinct; spiracle minute, circular, close to the anterior end of the pleural carina; surface of metathorax finely rugulose; pleurae shagreened.

Abdomen widest at the third segment, acutely narrowed apically; petiole slender, scarcely widened to beyond the middle, then suddenly wider, more gradually so near the apex, its spiracles just behind the middle; body of abdomen moderately compressed toward apex, its surface smooth and shining; ovipositor as long as the abdomen without the petiole.

Legs moderately slender. Wings with the transverse cubitus short, almost punctiform, recurrent nervure received just beyond it; third discoidal cell completely closed.

A single female from Forest Hills, Boston, Massachusetts, taken during September, 1913.

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., JULY, 1916.

The Need of Carefulness in Identification.

One of the common complaints of the time in entomological, nay zoological circles is the difficulty of obtaining the aid of specialists to identify material. Every specialist becomes flooded, even overwhelmed, with the quantity of animals, of insects, which he is desired to determine. Delays of months or of years ensue and he who wishes his collections examined by competent authority must often send them to the one who will report on them the soonest, rather than to the one whose knowledge and carefulness are greatest. The conscientious specialist himself is obliged to decline to add to the tasks which the eager collector or museum officer presses upon him.

Under all the conditions, it is inevitable that some, not really fitted to identify species, take up the work without a full realization of all the safeguards to identification that honest work demands. It is not enough to compare specimens with others already tagged, it may be erroneously. Constant recourse must be had to original descriptions and to other published sources of exact information. Comparison of specimens is, indeed, important, for thereby the confounding of two or more forms under one name is discovered. The ultimate appeal is, of course, the comparison with types, but few of us have access to these courts of last resort.

The constant checking up of new material, as well as that previously determined (including types where possible), *with the literature* is the obvious duty of everyone who undertakes to pass definitely on the systematic status of speciments of natural history.

A Correction for Parnassius smintheus (Lep.).

I chanced to see a recent issue of ENTOMOLOGICAL NEWS last night, and noticed under your article on *Parnassius* that I am quoted (Vol. xxvii, page 213) as recording *smintheus* from southeast of Calgary. This should be southwest. The correction is rather important as everywhere southeast of Calgary is open prairie; there the species is not in the least likely to occur.—F. H. WOLLEY DOD.

A Remarkable Abdominal Structure in Certain Moths (Lepid.).

In *Papilio*, III, 41, 1883, R. H. Stretch published an article entitled "Anal Appendages of *Leucarctia acraea*" and figured the appendages. In ENTOMOLOGICAL NEWS, XXVI, 166, 1915, F. W. Russell, M.D., published a paper entitled "A Remarkable Abdominal Structure in Certain Moths." This also was illustrated. Both observers described this curious organ in *acraea*. The species is a common one and the insect evidently only protrudes the organ on special occasions, otherwise it would be more commonly observed. At the time Dr. Russell made his observation he was not aware that the organ had been previously known and described.*—HENRY SKINNER.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

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

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new species are all grouped at the end of each Order of which they treat. Unless mentioned in the title, the number of the new species occurring north of Mexico are given at end of title, within brackets.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

1—Proceedings, Academy of Natural Sciences of Philadelphia. **4**—The Canadian Entomologist. **9**—The Entomologist, London. **11**—Annals and Magazine of Natural History, London. **16**—Bulletin, Societe Nationale d'Acclimatation de France, Paris. **50**—Proceedings, U. S. National Museum. **51**—Novitates Zoologicae, Tring, England. **60**—Anales, Museo Nacional de Buenos Aires. **79**—La Nature, Paris. **86**—Annales, Societe Entomologique de France, Paris. **161**—Proceedings, Biological Society of Washington. **177**—Quarterly Journal of Microscopical Science, London. **184**—Journal of Experimental Zoology, Philadelphia. **206**—The Scottish Naturalist, Edinburgh. **259**—Publications, Carnegie Institution of Washington. **272**—Memorias, Real Academia de Ciencias y Artes de Barcelona. **285**—Nature Study Review, Ithaca, N. Y. **291**—Proceedings, Staten Island Association of Arts and Sciences. **447**—Journal of Agricultural Research, Washington.

* See also *Papilio*, III, 84, 1883.

475—Bulletin, Societe Vaudoise des Sciences Naturelles. 490—The Journal of Parasitology, Urbana, Illinois. 524—Tecl nical Bulletins, Entomology, University of California, Berkeley. 529—Journal of Zoological Research, London. 530—Memoires, Societe des Sciences Naturelles de Neuchatel.

GENERAL SUBJECT. Hegner, R. W.—Gall insects and insect galls, **285,** xii, 201-12. Pictet, A.—A propos des tropismes. Recherches experimentales sur le comportement des insectes vis-a-vis des facteurs de l'ambiance, **475,** 1, 423-548. Young, R. T.—Some experiments on protective coloration, **184,** xx, 457-508.

PHYSIOLOGY AND EMBRYOLOGY. Morgan & Bridges—Sex-linked inheritance in Drosophila, **259,** No. 237, : pp.

MEDICAL. Britton, W. E.—The house fly as a disease carrier and how controlled. 12 pp. (Connecticut State Board of Health, 1916.) Coupin, H.—Le danger des moustiques pendant la guerre, **79,** 1916, 295-9.

ARACHNIDA, ETC. Herms, W. B.—The pajaroello tick (Ornithodorus coriaceus), **490,** ii, 139-44.

Brolemann, H. W.—Essai de classification des Poly< **86,** 1915, 523-610. Carl, J.—Die Diplopoden von Columb: beitragen zur morphologie der Stemmaloniliden, **530,** Kraepelin, K.—Beitrag zur kenntnis der skorpione und p Columbiens, **530,** v, 15-28. Ribaut, H.—Contribution a l' Chilopodes de Colombie, **530,** v, 67-95. Strand, E.—Spi familien Sparassidae, Lycosidae, Sicariidae und Phole Kolumbien, **530,** v, 810-20.

NEUROPTERA, ETC. Brethes, J.—Descripcion de un nuevo y una nueva especie de Tisanoptero de la Rep. Arg **60,** xxvii, 89-92. Hood, J. D.—Descriptions of new Thysa [8 new], **161,** xxix, 109-124. Longinos Navas, R. P.—Neuro nuevos o poco conocidas (Ser. vi-vii), **272,** xii, 119-36; 219-

ORTHOPTERA. Foucher, G.—Etudes biologiques sur ques Orthopteres, **16,** 1916, 116-22.

Brethes, J.—Un nouvel O. de la Republic Argentine, **60,** 333-34. Rehn & Hebard—Studies in the Dermaptera and Or tera of the costal plain and Piedmont region in the soutl e. U. S. [9 new], **1,** lxviii, 87-314.

HEMIPTERA. Gibson, E. H.—Some 1915 notes on a few mon Jassoidea in the central Mississippi valley states, **4,** 1916, 1-9.

Imms, A. D.—Observations on the insect parasites of some Coccidae, **177,** lxi, 217-74.

Baker & Davidson—Woolly pear aphis (Eriosoma pyricola n. sp.), **447,** vi, 351-60. **Van Duzee, E. P.**—Notes on some Hemiptera taken near Lake Tahoe, California [13 new], **524,** i, 229-49.

LEPIDOPTERA. Bailey, J.—School room experiences with the cecropia moth, **285,** xii, 226-29. **Davis, W. T.**—Notes on the Microlepidoptera of Staten Island, II, **291,** v, 94-7. **Whittle, F. G.**—L. from the Argentine and Canada, **9,** 1916, 106-8. **Wolley Dod, F. H.**—The Heath collection of L., **4,** 1916, 161-67 (cont.).

Giacomelli, E.—Algunas novedades de lepidopterologia argentina, **60,** xxv[illegible]356-364. **Rothschild & Jordan**—Corrections of and additions to our "Revision of the Sphingidae," **51,** xxiii, 115-23. **Schaus, W.**—A generic revision of the American moths of the subfamily Hypeninae with descriptions of new genera and sps., **50,** I, 259-399.

DIPTERA. Ashworth, J. H.—A note on the hibernation of flies, **206,** 1916, 81-4. **Grimshaw, P. H.**—The study of D., **206,** 1916, 85-8. **P[illegible]n, B. M.**—The changes of the blowfly larva's photosens[illegible] with age, **184,** xx, 585-97.

[illegible]PTERA. **Barbey, A.**—Biologie du Cerambyx heros, [illegible]6. **Davis, W. T.**—A beneficial beetle (Carabus nemo[illegible]ntly found on Staten Island, **291,** v, 92-3. **Harris &** [illegible] Cicindelinae of N. Am. as arranged by Dr. Walther [illegible]enera Insectorum (distributed by Am. Mus. N. Hist., [illegible]p. **Payne, O. G. M.**—On the life-history and structure [illegible]orus lituratus, **529,** i, 4-32. **Simanton, F. L.**—Hyperaspis [illegible] predatory enemy of the terrapin scale, **447,** vi, 197-203.

[illegible]NOPTERA. **Brethes, J.**—A proposito de la nota del [illegible]F. Lahille sobre Prospaltella berlesei; Hymenopteres [illegible]s de l'Amerique meridionale, **60,** xxvii, 353-58; 401-30. [illegible] **A.**—A few observations on the apple maggot parasite—[illegible]res rhagoletis, **4,** 1916, 168. **Lahille, F.**—Nota sobre Pro[illegible]berlesei, **60,** xxvii, 111-26. **Packard, C. M.**—Life histories [illegible]ods of rearing hessian-fly parasites, **447,** vi, 367-81.

Cr[illegible]ey, W. C.—Ants from British Guiana, **11,** xvii, 366-78. **Fore[illegible]A.**—Quelques fourmis de Colombie, **530,** v, 9-14. **Girault, A. A[illegible]** A new Phanurus from the U. S., with notes on allied species, [illegible] 1916, 149-50. **Santschi, F.**—Descriptions de fourmis nouvelle[illegible]Afrique et d'Amerique—Fourmis de l'Argentine, **86,** 1915, 509-[illegible]

THE LIFE OF INLAND WATERS. An elementary text book of fresh-water biology for American students. By JAMES G. NEEDHAM, Professor, and J. T. LLOYD, Instructor, in Limnology in Cornell University. 1916. The Comstock Publishing Company, Ithaca, New York. 9¼ x 6½ inches, 438 pp., 242 figs., 19 initials and tail pieces. Price $3.00.

This book has developed in connection with the course in general limnology at Cornell University, begun in 1906. Its scope is naturally much wider than that of entomology, but insects figure largely in its pages. After an historical introduction (Chap. I, pp. 13-24), the nature and types of aquatic environment are described (Chaps. II, III, pp. 25-99). Under Chapter IV, Aquatic Organisms, pages 100-158 are concerned with plants and pages 158-241 with animals; of the latter section, the insects occupy pages 195-230, with 37 figures. Owing to limitations of space, smaller taxonomic groups than families are not considered. Perhaps the most interesting part of the book is Chapter V, Adjustment to Conditions of Aquatic Life (pp. 242-292), such as flotation, improvement of form, avoidance of silt; withstanding the wash of moving waters, etc., etc. Aquatic Societies, both limnetic and littoral, are discussed in Chapter VI (pp. 293-375), which vies with its predecessor in attractiveness. Finally, Inland Water Culture is treated in Chapter VII (pp. 377-412). There is a bibliography under author's names arranged alphabetically (pp. 413-419) and an index (pp. 421-438).

As mentioned above, the insects are formally treated in Chapter IV, but many other references to them occur in subsequent pages. The reader will not find in this volume any keys to the identification of aquatic organisms but the numerous figures and the text will enable him to become acquainted with the names, habits and environmental relations of many plants and animals associated with any group of water beings in which his interest chiefly lies. "It is the ecologic side of the subject rather than the systematic or morphologic, that we have emphasized," say the authors, and every entomologist looking into this book will be the better for such a consideration of aquatic life as he will find here.

The text is pleasingly written, the type is clear and large, the illustrations useful or beautiful. We must, however, utter a protest against a fault too common with our American books. This volume is too heavy; it weighs 38 ounces, a quality which has already discouraged us from carrying it with us to while away an enforced wait when reading was almost the only resource. The common practice of printing half-tones in the midst of the text, with the use of coated paper throughout, is the responsible cause.—P. P. C. (*Adv.*)

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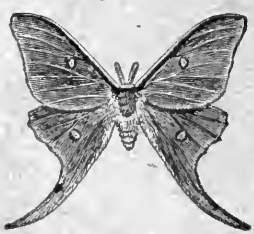

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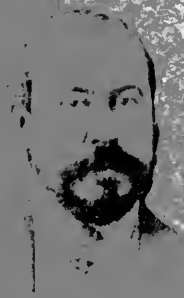

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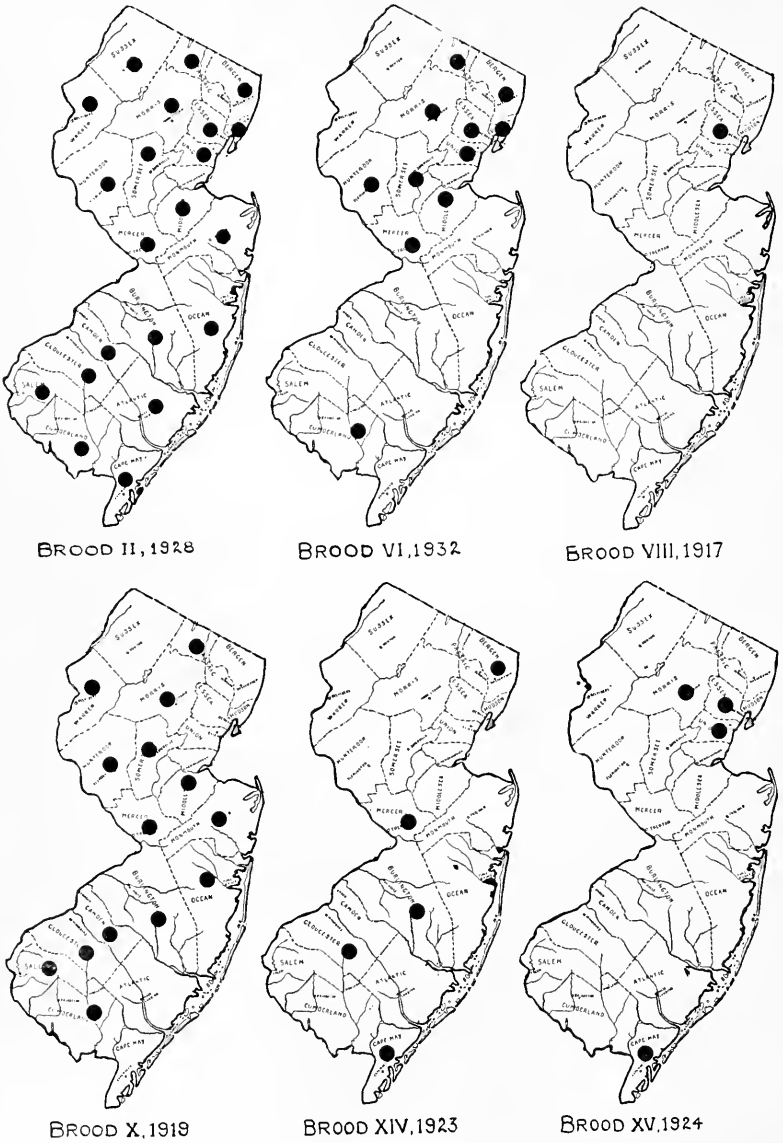

DISTRIBUTION OF THE PERIODICAL CICADA IN NEW JERSEY—WEISS.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XXVII. OCTOBER, 1916. No. 8.

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The Distribution of the Periodical Cicada in New Jersey (Hem., Hom.).

By HARRY B. WEISS, New Brunswick, N. J.

(Plate XIX.)

The present information concerning the distribution of the several broods of *Tibicen septendecim* in New Jersey has been obtained from Bull. 71, U. S. Bur. Ent., by C. L. Marlatt and the reports of the entomologist of the N. J. Agric. Exp. Sta., from 1889 to 1915. Since the 1902 report of the entomologist of the N. J. Agric. Exp. Sta. by J. B. Smith, in which there appears a map showing the distribution of broods II, VI, X and XIV, no attempt has been made to bring all of the New Jersey records together in one paper or to map the distribution of each brood separately.

From Marlatt's numbering and distribution of the broods in the United States, it appears that six are present in New Jersey, these being II, VI, VIII, X, XIV and XV. Broods

II and X are the most important in point of numbers and are the best recorded. Brood VI is rather unimportant in spite of its somewhat extended distribution and brood VIII with a single record in New Jersey represents only scattered individuals. Brood XIV appears to be so considerably reduced in numbers that it amounts to almost nothing in New Jersey and the same can be said of brood XV, which, according to Marlatt, consists of retarded eastern colonies of brood XIV. Broods XIV and XV may never be reported from New Jersey in the future.

On the accompanying maps, the distribution is by counties only, these records having been obtained from Marlatt's Bull. 71 and the New Jersey reports. A more detailed distribution will be found below. In a few cases, some of the marked counties failed of confirmation in recent years. This may mean that the cicada was absent or that no reports of its occurrence were received. It was thought best however to record all counties where the insects appeared, even though some indicate old records, so that persons interested will know just where to look for them when due and so that accurate information can be obtained in the future as to whether the insects have been actually eliminated or simply overlooked. By consulting the following detailed account the exact locality can be ascertained.

DETAILED DISTRIBUTION.

BROOD II, 1877—*Union, Essex, Morris, Monmouth* Counties in large numbers; *Warren* Co., Hainesburg; *Sussex* Co., Monroe Corner.

1894—*Bergen* Co., throughout, especially from Tenafly, Carlstadt, River Vale, Mahwah. *Passaic* Co., Paterson, Greenwood Lake district. *Sussex* Co., Huntsburg and Papakating. *Morris* Co., Boonton and eastern districts. *Essex* Co., everywhere. *Hudson* Co., everywhere except flats and marshy portions. *Union* Co., everywhere. *Somerset* Co., in a few localities. *Warren* Co., Rocksburg. *Hunterdon* Co., northwestern corner. *Mercer* Co., along road to Hightstown. *Middlesex* Co., irregularly distributed, more plentiful north of Raritan River, becoming less toward south and west; along Raritan River from Perth Amboy to Bound Brook; Jamesburg. *Monmouth* Co., slight in eastern part. *Ocean* Co., in small patches; Toms River, Cassville. *Burlington* Co., in small patches; Pemberton. *Camden* Co., Pensauken, Clementon; along Camden and Atlantic and Reading Railroads

toward Atlantic County line. *Gloucester* Co., Franklinville and north of this at several places; along line of Cape May Railroad. *Salem* Co., Friesburg. *Atlantic* Co., irregular throughout; Hammonton to coast along Atlantic City Railroad. *Cumberland* Co., irregular throughout; between Bridgeton and Millville; along railroad from Vineland to Cape May County line. *Cape May* Co., throughout in large numbers, except on lowlands; plentiful at Woodbine.

1911—*Bergen* Co., from Fort Lee northward to New York State line; along top of Palisades and on both slopes; none in Hackensack valley and in low marsh areas; Rutherford, Ramsey, Westwood, Tenafly, Carlstadt, River Vale, Mahwah, Englewood, Alpine. *Passaic* Co., Paterson, Totowa, Little Falls; along line of S. & W. Railroad they extended to Morris County line; in Lake Macopin region; Hackensack. *Sussex* Co., Sparta, Newton, Huntsburg, Papakating. *Warren* Co., Washington, Hamburg, Port Murray. *Morris* Co., along line of D. L. & W. Railroad to Lake Hopatcong: Morristown, Morris Plains; from Newfoundland and Charlottesburg to Sparta along line of S. & W. Railroad; Newark watershed, Chatham, Denville, Dover to Wharton, Mendham, Millington, Mt. Tabor; north and south of Dover; Pleasant Hill in patches; Mt. Olive. *Essex* Co., infested everywhere. *Hudson* Co., Snake Hill; very little Cicada ground now remains in this county. *Somerset* Co., Washington Valley back of Pluckamin and along road to Basking Ridge; in spots from Bound Brook to Bernardsville; Somerville, Raritan. *Hunterdon* Co., High Bridge, throughout hills southeast toward Lebanon; Fairmount, Lambertville, Stockton, Ravenlock. *Union* Co., Roselle, Fanwood, Summit, Elizabeth, Springfield, Rahway; county generally covered in much reduced extent. *Middlesex* Co., New Brunswick, College Farm; from Stelton to Union County line; along north bank of Raritan River from Bound Brook to county line; Rahway to Perth Amboy; Metuchen to Perth Amboy along north bank of Raritan River; Old Bridge, Milltown, South Amboy. *Mercer* Co., between Hightstown and Yardville; Princeton. *Monmouth* Co., Matawan, Cliffwood. *Ocean* Co., around Lakewood, South Lakewood; west of Lakewood, Ridgeway. *Burlington* Co., no records. *Camden* Co., Clementon; along line of Atlantic City Railroad to Atlantic County line; Almonesson, Blue Anchor, Florence to Williamstown Junction, and along this branch to Gloucester County; Haddonfield. *Gloucester* Co., Woodbury, Malaga; along line from Williamstown to Glassboro. *Atlantic* Co., irregularly throughout on gravelly knolls or areas. *Cumberland* Co., Husted, Bridgeton; Bridgeton to Rosenhayn along Central Railroad; Vineland, along trolley line between Malaga and Newfield; Millville, irregular throughout county. *Salem* Co., between Elmer and Palatine only. *Cape May* Co., all wooded areas of peninsula in gravelly lands; Woodbine, Ocean View, Tuckahoe, Den-

nisville, Sea Isle Junction, Wildwood Junction, Seaville, Swain, South Seaville.

Brood VI, 1881—*Essex* Co., Caldwell in small numbers.

1898—*Middlesex* Co., Piscatawaytown. *Passaic* Co., Charlottesburg. *Morris* Co., Hanover. *Cumberland* Co., Vineland.

1915—*Union* Co., Cranford. *Essex* Co., Upper Montclair. *Passaic* Co., Oak Ridge. *Mercer* Co., Princeton.

Brood VIII, 1900—No records in Smith's reports. *Essex* Co., (Marlatt).

Brood X, 1885—*Burlington, Camden, Mercer, Middlesex, Monmouth, Morris, Passaic, Somerset, Hunterdon* Counties.

1902—*Warren* Co., southwestern corner; well covered south of Central Railroad of New Jersey and along Delaware River. *Hunterdon* Co., southern half. *Mercer* Co., pretty well distributed, except in extreme south. *Somerset* Co., not heavily visited, except at Rocky Hill; Middlebush, Martinsville, Franklin Park, Bound Brook, Raritan, Somerville, Neshanic, Three Bridges, Harlingen, Kingston. *Middlesex* Co., Piscatawaytown. *Monmouth* Co., highlands of Navesink, Locust Point. *Ocean* Co., New Egypt, Collier's Mill, Prospertown; between Jacobstown and Ellisdale (Burlington Co.). *Burlington* Co., Ellisdale, Indian Mills. *Camden* Co., Delaware Township. *Salem* Co., Salem, Yorktown, Woodstown. *Gloucester* Co., Swedesboro and between Swedesboro and Harrisonville. *Cumberland* Co., Shiloh; no records from Hudson, Essex, Bergen, Union, Passaic, Sussex, Cape May, Morris and Atlantic Counties.

Brood XIV, 1889—*Bergen* Co., Englewood. *Mercer* Co., Princeton. *Burlington* Co., Palmyra. *Gloucester* Co., Red Bank.

1906—No reports of occurrence except in Bergen County by Marlatt.

Brood XV, 1890—*Essex* Co. *Cape May* Co., Anglesea.

1907—*Cape May* Co. *Union* Co., Plainfield to Westfield. *Morris* Co., Newfoundland.

New Species of Corixidae (Heteroptera).

By J. F. Abbott, St. Louis, Missouri.

From time to time collections of "water-boatmen" have come in to me for determination, which have contained undescribed species. I have put these aside until such time as they might be included in a general survey of the group upon which I have been at work. But as it is the wish of those whose material I have examined, to include the names of such species in lists which they have in preparation, it seems desirable that formal descriptions of them should be published at once in order to avoid the publication of manuscript names.

1. **Arctocorisa lucida** n. sp.

Tegminal markings (typically) coalescent into solid black. Sutures marked with yellow. Head yellow. Embolium and outer portion of corium, sordid to smoky, but without markings, as if the black were condensed into the inner angle of the corium and etched away from the outer margin. Membrane smoky but without markings (or with very obscure markings). Pronotum unicolorous (in paratypes, with occasionally indications of 7-8 very narrow scratched lines). Male fovea ovate, extending to the middle of the eyes. Pala short, ligulate; 20 pegs.

The species resembles *A. kennicottii* Uhler in size and facies, but differs in the markings of the corium and the smaller number of palar pegs.

Holotype, a male from Cheshire, Connecticut, May 6, 1911 [B. H. Walden].

Allotype, a female, same data.

Paratypes from Kingston, Rhode Island, New Haven and Hamden, Connecticut, Forest Hills, Massachusetts.

2. **Arctocorisa ornata** n. sp.

Sides parallel. Head wider than pronotum. Color tawny yellow with umber markings. Surface very rastrate. Pronotum with 4-5 indefinite lines. Sutures pale. Lineations of both clavus and corium coalescent into longitudinal seriations. Membrane with a central vitta from which radiate vermiculate markings. Frontal fovea large and conspicuous, elongate ovate. Pala cultrate; pegs in a single curving, interrupted row, 18 plus 18 equal 36, in number. Length, 9 mm.; width in middle of body 2½ mm.

Holotype, a male from Ithaca, New York, August 21 [Kirkaldy coll.].

Allotype, a female from Orono, Maine, April 20, 1912 [Coll. Me. Exp. Sta.].

Paratypes from Orono and Amherst, Massachusetts, and Cheshire, Connecticut.

3. **Arctocorisa decorata** n. sp.

Yellow, with dark brown markings. Surface rastrate. Pronotal lineations, 8. Lines of clavus broad, somewhat forked; those of corium tending to coalesce into indefinite longitudinal lineations. Membrane covered with vermiculate markings, suture defined by a yellow line. Male fovea small and shallow, barely exceeding the eye. Pala falcate; pegs 37, the distal 12-14 about three times as long as the proximal. Length, 9 mm.; width, 3 mm.

Holotype, a male from Amherst, Massachusetts, August 26, 1904 [Coll. H. M. Parshley].

Allotype, a female, same data.

4. **Arctocorisa dubia** n. sp.

Surface shining, finely rastrate; chestnut brown. Pronotal lineations 8, rather broad, straight and unbroken. Lineations of clavus, corium and membrane uniformly coalescent to form a dark background with narrow flecks of lighter color. Posterior angle of corium conspicuously bordered by a V-shaped yellow band. Male fovea very shallow, not reaching middle of the eyes. Pala oblong-cultrate; pegs 27, crowded distally as in *A. interrupta, nitida,* etc. Length, 8½ mm.; width, 3 mm.

Holotype, a male from Peru, Massachusetts, August 27, 1904 [Coll. H. M. Parshley].

5. **Arctocorisa parshleyi** n. sp.

Near *alternata* Say. Lineations similar to *alternata* but color umber on a cream to ochroleucous background, approaching the typical coloration of *calva.* Width of male pala 3-7, the length (1-3 in *alternata*); pegs 29-30 (38-40 in *alternata*), along the upper margin (in *alternata*, the row starts from the middle of the base) Strigil square, small, 6 striae. Length, 6½ mm.; Width, 1¾ mm.

Holotype, a male from Providence, Rhode Island, June 18 [Davis coll.].

Allotype, a female, same data.

Paratypes from Ithaca, New York, Mercer and Orono, Maine.

6. **Arctocorisa seriata** n. sp.

Near *scabra* Abbott. Pronotum and clavus very rastrate. Coloration dark brown. Pronotal lineations 5. Those of clavus entire for the most part. Those of corium and membrane much broken and indefinitely seriate. Head yellow. Fovea deep, extending past middle of the eye. Pala very short, cultrate, about twice as long as high, with 17 pegs in an angulated row. Length, 4¾ mm.; width, 1¾ mm.

Holotype, a male from Peru, Massachusetts, August 27, 1904 [H. M. Parshley].

Allotype, a female, same data.

Paratypes from Cheshire, Hamden, and New Haven, Connecticut; Pownal, West and Orono, Maine; Kingston, Rhode Island, and Durham, New Hampshire.

7. **Arctocorisa modesta** n. sp.

Tawny yellow with brown markings; pronotum clavus and anterior half of corium strongly rastrate. Fovea elliptical, reaching middle of eye. Pala cultrate, slightly produced at base and somewhat incurved; pegs 33 in number in a single row, the distal ones slightly elongated. Pronotum subtriangular with 9 unbroken brown lines. Clavus narrowly margined with yellow, the brown lines broken, forked and confluent. Corial lineations inosculate, tending to coalesce in a vitta toward the inner margin; those of the membrane coalescing in a central fleck. Strigil minute. Length, 5 mm.; width, 1½ mm.

Holotype, a male from Piney Branch, District of Columbia, May [D. E. Clemmons].

Allotype, a female, same data.

Paratypes from Washington, District of Columbia; Plummer's Island and Great Falls, Maryland, and Charles Bridge, Virginia.

New Species of Crane-Flies from the West Indies (Tipulidae, Dip.).

By Charles P. Alexander, Ithaca, New York.

The material upon which this paper is based is largely the property of the American Museum of Natural History and I am indebted to the curator, Dr. F. E. Lutz, for the loan of the same.

Subfamily Limnobinae, Tribe *Eriopterini.*

Gonomyia (Leiponeura) helophila, sp. n. (Text figs. 1, 3.)

Male.—Length, 4.6-5.2 mm.; wing, 5-5.3 mm. Female.—Length, 4.8-5.3 mm.; wing, 5.4-5.7 mm.

Rostrum and palpi dark brownish black. Antennae with the scape dark brownish black below, yellow above; the flagellum light yellowish brown, the terminal segments blackish; flagellum with an abundant pale pubescence and very elongate hairs. Head yellow with a vertical brownish mark.

Pronotum with the scutum yellowish white, broadly grayish brown on the dorso-median area; scutellum light yellow. Mesonotal praescutum light gray with four light brown stripes; middle stripes elongate becoming confluent behind and prolonged caudad on the mid-dorsal line of the scutum; tuberculate pits far up on the cephalic margin of

* Contribution from the Entomological Laboratory of Cornell University.

the sclerite, rather closely approximated, black; pseudo-sutural foveae elongate-oval, reddish; extreme lateral margins of the praescutum whitish; scutum gray with the lobes brown; scutellum light gray, more yellowish on the caudal margin. Pleura with the dorso-pleural area light yellow extending from the pronotum to the wing-root; remainder of the pleura dark brown with two white stripes, the ventral stripe broad, clear-cut, beginning on the fore coxa extending to above the hind coxa; dorsal stripe suffused with dusky, not clear-cut, sometimes obliterated; the brown vitta separating these two white stripes well-defined. Halteres light brownish yellow passing into grayish brown on the knob which is obscurely tipped with dull yellow.

Legs with the fore coxae brown and white; middle coxae with the basal half brown, the terminal half light yellow; hind coxae light yellow; trochanters light yellow; fore femora dark brownish black; middle femora yellow, tipped with dark brown; hind femora brownish yellow, slightly darkened toward the apex; fore and middle tibiae white, the extreme base and slightly broader apex of each dark brown; hind tibiae white, the extreme base and apex light brown; fore and middle tarsi dark brownish black; hind tarsi dark brown, the basal half of the first segment whitish.

Wings with the costal margin, *Sc* and *R* china-white; remaining veins dark brown; wings subhyaline; stigma distinct, oval, brown; a vitreous spot before and beyond the stigmal spot. Venation as in fig. 1; *Sc* very short, ending far before the base of the sector, this distance about equal to from one to two times the length of the sector; *Rs* short, only a little longer than the deflection of *R*4 + 5; cell *1st M2* open, except in abnormal specimens where it may be closed.

Abdominal segments brown, the caudal margins broadly dull light yellow. Hypopygium as in fig. 3; dorsal appendage of the ninth pleurite fleshy without chitinized hooks or teeth of any kind, but with numerous bristles; middle appendage a very slender, somewhat sinuous hook with the apex blackened; ventral appendage prominent, the apex flattened, smooth, chitinized, the ventral angle produced into a slender finger-like lobe, the apex of which is blackened; the dorsal angle similarly produced but the lobe shorter and broader; ventral margin of the appendage with two prominent teeth whose inner margins are minutely denticulate, the tips blackened.

Habitat: Neotropical region.

Holotype: ♂, Lima, Peru; August 4, 1914; altitude 500 feet (Parish.)

Allotpye: ♀, topotypic; August 19, 1914.

Paratypes: 18 ♂ ♀, topotypic; August 4-24, 1914; 3 ♀ ♀, Bartica, British Guiana, December 31, 1912; February 4, 1913;

Mallali, March 11, 1913 (Parish); ♂, Roseau, Dominica, British West Indies, June 22, 1911 (Lutz.)

The Guiana material, represented only by females, was determined as *G.* (*L.*) *alexanderi* Johnson in my paper on British Guiana Tipulidae (Trans. Am. Ent. Soc., vol. 40, p. 242, 1914); the Peruvian specimens were determined as probably representing a new species closely allied to *alexanderi* (Trans. Am. Ent. Soc., vol. 42, p. 17, 1916.)

The two species, *G. alexanderi* Johnson (Nearctic) and *G. helophila* sp. n. (Neotropical) are closely allied and may be separated most readily by the structure of the male genitalia, these differences being expressed as follows:

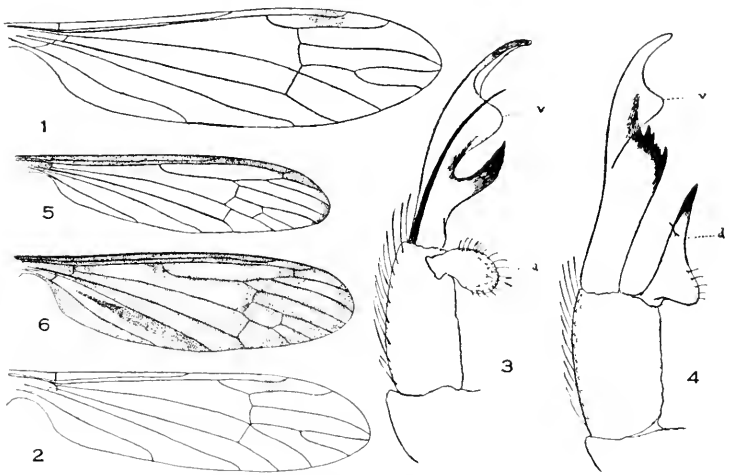

Fig. 1.—Wing of *Gonomyia* (*Leiponeura*) *helophila* sp. n.
Fig. 2.—Wing of *G.* (*L.*) *alexanderi* Johnson.
Fig. 3.—Pleurite and appendages of the male hypogygium of *G.* (*L.*) *helophila*; d, dorsal appendage; v, ventral appendage. Dorsal aspect.
Fig. 4.—The same for *G.* (*L.*) *alexanderi*.
Fig. 5.—Wing of *Eriocera aelherea* sp. n.
Fig. 6.—Wing of *Erioeera domingensis* sp. n.

Dorsal pleural appendage triangular, the caudal angle a prominent spine that is heavily chitinized apically; middle pleural appendage apparently lacking; ventral pleural appendage with a broad flattened blade. the inner caudal margin with about five or six acute, chitinized, appressed teeth of which the innermost is the largest (see figs. 2, 4). **alexanderi** Johnson

Dorsal pleural appendage a fleshy lobe bearing many hairs; middle pleural appendage a slender acute spine; ventral pleural appendage with the apex flattened, smooth, chitinized, bi-lobed; the ventral margin of the appendage with two prominent teeth whose margins are minutely denticulate (see figs. 1, 3). **helophila,** sp. n.

Tribe *Hexatomini.*

Eriocera aetherea, sp. n. (Text fig. 5.)

Male.—Length, 11 mm.; wing, 9.3 mm.

Rostrum and palpi dark brown. Antennae with the scape black, the flagellum broken. Head brownish gray.

Thoracic dorsum clear reddish orange without darker markings, the scutellum and postnotum with a very indistinct bluish cast. Pleura yellowish red. Halteres black, the base of the stem brownish. Legs with the coxae and trochanters reddish; femora black, more yellowish basally, this area narrowest on the fore legs, broader on the middle legs, the hind legs broken; tibiae and tarsi black. Wings hyaline, the costal area dark brown, this color continued around the wing as a narrow apex extending through cell R_5 of the wings; veins slender. Venation as in fig. 5.

Abdomen orange-red, including the hypopygium.

Habitat: Santo Domingo.

Holotype: ♂, San Lorenzo, Santo Domingo; June 27-29, 1915. (No. F 3785, Am. Mus. Nat. Hist.)

Eriocera domingensis, sp. n. (Text fig. 6.)

Male.—Length, 14 mm.; wing, 11 mm.

Rostrum short, reddish brown; palpi brown. Antennae short, first, third and fourth segments black; second segment subglobular, brown; flagellum beyond the second segment brownish yellow, darker toward the tip of the organ; each of the first two segments of the flagellum a little longer and stouter than the third. Head lead-gray, along the inner margin of the eye with numerous short black hairs.

Thoracic dorsum dull reddish, the mesonotal stripes just indicated, brownish red; remainder of the dorsum slightly suffused with brown. Pleura yellowish red, shiny, the mesepisternum with a large black area that is continued up to the wing-root and cephalad along the lateral edge of the praescutum; a narrow black line running from above the middle coxa across the mesepimeron to behind the wing-root. Halteres short, black, only the base of the stem a little paler.

Legs with the coxae dull reddish yellow, the outer faces suffused with black; trochanters dull yellow; femora of the fore legs dull yellow, the tip broadly dark brown, a very broad median area brownish; middle and hind femora black with an indistinct dull yellow subapical band; tibiae and tarsi black, the claws of the latter concolorous.

Wings light yellow, heavily suffused with brown, including the costal area, broad seams to all the veins and cross-veins restricting the ground-color to the central portions of the cells; apex of the wings broadly seamed with brown. Venation as in fig. 6; forks of *Rs* and *R2* + 3 acute; the deflection of *R4* + 5 longer than *r-m; r-m* and the deflection of *M1* + 2 in a line.

Abdominal tergites bright orange-red, the first segment black at the base; hypopygium black; sternites yellow, trivittate with black, the median stripe interrupted, heaviest on the basal sternites.

Habitat: Santo Domingo.

Holotype: ♂, Sanchez, Santo Domingo; May 28-31, 1915. (No. F 3682, Am. Mus. Nat. Hist.)

This group of the genus will probably be found to include many species when the crane-fly fauna of the Antilles is better known. It seems to be a case comparable to that found in this same genus in Ceylon where there are in the neighborhood of a dozen species forming a peculiar group or section. There are now four species of *Eriocera* known from the West Indies and they may be separated by the following key:

1. Wings hyaline with the costal margin brown, this color running to beyond the wing-apex; (body-coloration light orange-red). (Santo Domingo). **aetherea,** sp. n.

Wings hyaline or yellowish with brown markings on the wing-disk. 2

2. Wings with three bands, the first at the wing-root, the second at the origin of the radial sector extending across the wing and connecting with the basal band in the anal cells; wing-apex largely dark, the cells *R3*, *R5*, *M1* and *M3* grayish hyaline in their middle portions; thorax yellowish with a grayish blue bloom especially on the pleura and coxa; abdomen with blackish bands on the anterior margins of the segments, the incisures yellowish. (Porto Rico.) **trifasciata** Röder.

Wings not trifasciate; thorax orange without grayish blue bloom; abdomen without blackish cross-bands. 3

3 Wings with an interrupted brown pattern that is ocelliform at the base of the sector; thorax orange, unmarked; legs with the coxae orange; femora yellow tipped with dark brown; claws yellow. (Porto Rico). **ocellifera** Alexander.

Wings light yellow, heavily suffused with brown, this consisting of very broad seams to all the veins; thorax orange with black spots on the pleura; legs with the coxae largely blackish; femora dark brown with a dull yellow subterminal annulus; claws black. (Santo Domingo). **domingensis,** sp. n.

A New Genus of Tetrastichini (Chalcidoid Hymenoptera).

By A. A. GIRAULT, Glenndale, Maryland.

The following genus is based on a common species in the eastern United States, namely *Euderus columbianus* Ashmead, a species very little known because of its obscure and inaccurate description.

GALEOPSOMYIA new genus.

Female: Form as in *Secodella*. Antennae inserted in the middle of the face, 11-jointed with three large ring-joints, the club 3-jointed. Scutellum with a marginal groove on each side and a median groove. Marginal vein long, the postmarginal absent, the stigmal moderately long, not a fourth the length of the marginal. Caudal tibial spur stout, single. Abdomen stout, conical, twice the length of the thorax, a little stylate at apex. Propodeum with distinct median and lateral carinae. Scutum simple, the scutellum with the three grooves as described. Mandible bidentate.

The genotype has the apex of the femora and distal third of the last two pairs of tibiae yellowish white and its color is dark metallic green or purple. Pedicel over twice longer than wide at apex, subequal to funicle 1; funicles 2-3 subequal, each somewhat shorter than 1, twice longer than wide; club 3 with a distinct terminal nipple, smaller than 1 which is a little longer than wide. Whole body densely scaly. Segments 5 and 6 of abdomen longest, 8 as long, conical.

The large size, densely scaly, stout and conical abdomen, bidentate mandibles and median groove of the scutellum should make this form easy of recognition. I have taken specimens in meadows at Glenndale, Maryland, as late as September 30.

Annual Meeting of the Ontario Society.

The Entomological Society of Ontario will hold its 53rd Annual Meeting at its headquarters in the Ontario Agricultural College, Guelph, Ontario, on Thursday and Friday, November 2nd and 3rd. There will be a goodly gathering of our Canadian members from all over the Dominion and some visitors from the United States.—CHARLES J. S. BETHUNE.

On Certain Acanthagrions, Including Three New Species (Odonata).

By E. B. Williamson, Bluffton, Indiana.

(Continued from page 324.)

Acanthagrion apicale Selys.

Abdomen: ♂, 28-30; average, 29; hind wing ♂, 19-20; average, 19.8 mm.

♂. Face in front orange, the genae paler, yellow. Labrum with median posterior impressed spot, extreme posterior edge and posterior lateral border, black or dark brown. Black on nasus variable, in palest specimens a small quadrangular black spot near the anterior border on either side; in the next darkest stage there is also a rounded median spot near the anterior border between the two quadrangular spots, this median spot connected or not with the black posterior to it on the suture; in still darker stages these three spots are more or less connected and the exterior ends of the quadrangular spots fuse with the black on the nasofrontal suture. Naso-frontal suture black, widest in the median line. The frons in front is usually slightly darker than the labrum, and rarely is obscured and much darker; in about half the specimens the black of the frons above joins the black of the naso-frontal suture in the median line. Head above black, usually with a small orange spot on either side of the median ocellus, and more rarely with a similar spot between the apex of the second joint of the antenna and the eye; postocular spots orange, orange red, or rarely yellow, about the size of an area enclosing the three ocelli, or slightly larger. Rear of head above and surrounding the foramen, black; below pale, slightly yellowish-tinged or not.

Anterior of lobe of prothorax with a large, median orange or yellow spot which nearly reaches the anterior border, reaches the posterior border, and is wider than long, in some cases reaching the lateral margins where it is more or less obscure; remainder of prothorax black. Propleuron largely brown, black above, the adjoining brown orange-tinged.

Thorax above black with an orange or orange red antehumeral stripe, slightly wider below and as wide as, or a little wider than half the black mid-dorsal stripe, which latter stripe is about equal in width to the black humeral stripe, which extends broadly across the mesinfracpisternum, leaving only the lower corner of the latter brown. A short black spur on the first lateral suture above, broadly joined above with the humeral stripe, and narrowly joined with a broad stripe about half as wide as the humeral, just in front of and parallel to the second lateral suture, this stripe narrowed above, where it overlaps the suture, and continued narrowly along the wing margin nearly across the metepimeron; below it does not quite reach the metastigma. Mese-

pimeron and metepisternum, where not black, orange or yellowish brown, duller below. Metepimeron pale bluish in a broad band parallel and adjacent to the second lateral suture, the posterior triangular area and above adjoining the wing bases to a variable extent, pigmented yellow. Beneath pale, yellowish- or greenish-tinged.

Abdomen black above; 1 with black on either side with two shallow rounded indentations in the apical half and with the extreme border black to the ventral edge; 2 with a single, similar, but deeper and more conspicuous, subapical indentation in the black which, just basal to this indentation, is wider and rounded; sides of these two segments green or greenish; 3-7 with narrow, interrupted basal rings, green on 3 and usually distinctly green or yellowish on 4 and 5, but often obscure, blue or bluish on 6 and 7 and usually not discernible in dried material; apical dorsal fourth to more than one half (usually about one-half) of 7 blue (thus differing strikingly from the descriptions of de Selys and Calvert, where 7 is described as black), this blue area wide for its entire length but narrower basally, widening apically, but not reaching the ventral edge, which is black; apical integument of 7-9, seen from the side, with a shining black spot below midheight; 8 otherwise blue, the extreme lower edge dull pale yellowish brown or with the lower edge with some traces of black which, in extreme cases, fuse to form an inferior longitudinal stripe, most developed posteriorly and fusing with the apical black spot in the integument, very rarely extending the full length of the segment; 9 similar to 8; 10 black, beneath reddish or yellowish brown. Superior appendages black, apically and posteriorly brown; inferiors dark brown or black, very restricted yellowish brown at base as seen in lateral view.

Legs dark, pale colors yellowish or greenish brown; both anterior and posterior faces of superior surface of femora black except at extreme base, more or less running out into spots basally, especially on last femora; anterior superior face of first tibiae black, other tibiae with minute lines or spots or unmarked; tarsi black, more or less pale at base of joints; tarsal claws amber, black-tipped, toothed like *"gracile."*

Wings very slightly tinged to yellowish brown-tinged, stigma dull red or reddish brown (same shade but slightly darker than in *adustum.*)

This species has been determined independently by Dr. Calvert and myself as *apicale.* Because of some differences from earlier material described by de Selys and by Calvert, I have thought it advisable to give the above description of the British Guiana specimens.

Tumatumari, British Guiana, February 7, 10 and 12, 1912, 15 males, 3 collected by A. F. Porter. Along Tiger Creek, especially on the right bank near Washerwoman Falls, are more or less extensive pools left by gold diggers. These pools are grown up with vegetation, and are very suggestive of old brick yard pools or deserted gravel pits in Indiana. However, some of these placer mining pools are very small, being only a few feet long and 2 or 3 feet wide. On the right bank of the creek below Washerwoman Falls the pools are more extensive and are immediately adjacent. Here we found both *Perithemis lais* and *thais*. *Apicale* was found about these placer pools and nowhere else. It is the handsomest *Acanthagrion* I know, and is an unusually conspicuous and alert agrionine.

Acanthagrion ascendens Calvert (Plate XVII, fig. 13).

Abdomen: ♂, 27-29; average, 28; ♀, 26.5; hind wing ♂, 17-19; average, 18; ♀, 18.5 mm.

♂. Genae, labrum and rhinarium green or olive, labrum marked as described for *kennedii*. Nasus black, yellow and green in varying proportions; the green is confined to the lateral borders, the black may form a broad crescent inside this, the horns resting at either side on the posterior edge of the nasus, the curve reaching the anterior border of the nasus in the median line, from which median part a longitudinal median black line projects backward, dividing the enclosed yellow into two spots of varying size; the horns of the crescent, in its minimum development, may not reach the posterior border of the nasus, and the longitudinal median black line may be incomplete in which case the enclosed yellow is constricted, not divided, in the median line; in the maximum development of black the green lateral borders remain, but the yellow is reduced to a small spot on either side just anterior to the posterior border, or the black may occupy even this area; in extreme cases of minimum black the black crescent consists of only three spots, one median and one on either side, the median spot with or without a posteriorly directed prolongation. Frons in front with a yellowish or greenish bar on either side as described for *kennedii;* the obliquity of these bars results in a low broad triangle of black on the lower edge of the frons, the apex of the triangle produced dorsally in the median line in a bar of black of varying width to the dorsal black of the head; usually the pale quadrangular bars are confined to the frons in front but in their maximum development (minimum black) they are extended over the frons above and, in a broad mass of

color, reach over and cover the anterior surface of the first joint of the antennae; in such a case their quadrangular shape is of course entirely lost. Corresponding to the variation in nasus and frons in front, there is decided variation in the marking of the head above; in the darkest individuals the entire head above is black, with yellow postocular spots slightly larger than a circle enclosing the ocelli; in the palest coloration the yellow markings are as follows: The pale color of the frons in front encroaches on the frons above; back of the antenna and on either side of it are two spots, the inner one of which is connected posteriorly with a spot or stripe which ends opposite and close to the lateral ocellus; there is a 3-pronged spot in front of and between the lateral ocelli, and a crescent-shaped spot in front of the median ocellus; and the occipital crest is narrowly yellow; the two spots back of the antenna may fuse with each other and with the stripe to the lateral ocellus; and the pale crescent in front of the median ocellus may fuse on either side in front with the pale color of the frons; in such a condition the head above is, of course, largely yellowish or reddish brown, depending on age and it may be described in terms of the black markings as follows: A more or less regularly elliptical median black spot on frons above; an irregular stripe starts from two points, the median ocellus and the lateral ocellus, and runs forward and outward to the edge of the frons, then turns at a right angle and runs backward and outward through the antenna to the eye; some black about the ocelli; and postocular spots black-bordered. In young males the postocular spots and any markings on the occipital crest are pale blue, the markings of the face are slaty, but the pale markings on the dorsal surface of the head are distinctly yellowish. Rear of head as in *kennedii*.

Prothorax and thorax similar to *kennedii* but with the yellow brighter and clearer on fully colored specimens. The spot on the median lobe of the prothorax is often larger; the posterior lobe may be largely or entirely pale-bordered behind, and in some cases there is a median geminate yellow spot on the median lobe. In fully colored males the antehumeral stripe is clear yellow or orange, pale blue in young specimens; the humeral black stripe is slightly less developed than in *kennedii* and is sometimes reduced on the mesinfraepisternum to an obscure line; superiorly it is narrowed from both sides, the posterior side not giving the impression of being notched as usually in *kennedii*, and the black spur or line on the first lateral suture above is weak and linear and without any tendency to fuse with the humeral stripe to enclose a pale spot. In the same way the spot above on the second lateral suture is reduced and usually no trace exists of a line parallel to the suture on the metepisternum; rarely there is a short obscure line. The sides of the thorax are much yellower than in

kennedii, except in younger individuals which are as blue as *"gracile."* Posterior triangular portion of the metepimeron heavily pigmented yellow except in younger individuals where it is blue, similar to adjacent areas. In Trinidad specimens of *ascendens* the humeral stripe is often less intense black than the dorsal stripe, tending to a reddish tinge; rarely the humeral stripe is entirely dark reddish brown, the margins, especially the posterior, not sharply defined and with black confined to the extreme upper end and a trace, if any, near the mesinfraepisternum. Such differences are not due solely to age; a pruinose male from St. Ann River, Trinidad, is the palest individual I have seen; in this specimen, head, prothorax, thorax, abdomen and legs all have the black reduced, not as readily noticed in the case of the abdomen; the legs are especially pale, the last legs with only a trace of color near the apex of the femora, the first femora with a little more than the apical half of the anterior dorsal surface dark, and the middle legs intermediate in color.

Abdomen similar to *kennedii,* but the dorsal black on 1 is narrower than on 2, and greatly constricted subapically to a varying extent, rarely reduced to a line, but usually this apical black is a stripe about one-third as wide as the basal black area anterior to it. Segment 7 black to apex with integument brown, or apex with a large semicircular blue spot which, in the midline, reaches anterior to the apical row of spines a distance equal to three to five times the length of the integument posterior to the row of spines. In brightly colored specimens the pale colors on the first six segments are all yellow or yellowish, blue first appearing on the basal ring of 7, which segment, like the preceding segments, has the sides below yellow; in duller specimens the basal rings on 4-6 are obscurely colored. Sides similar to *kennedii,* with blue more extensive on 1 (see description above of dorsal view); segments 8 and 9 blue, unmarked except for a shining black spot in the apical integument just below midheight, conspicuous only by reason of the clear blue surrounding it, or the entire lower border of 8 and 9 may be black, except the base of 8, this black broadest on 9 and, on both segments, produced dorsally in the apical integument to join the shining black spot described above; between these two extremes all intermediate stages exist; 10 black, dull orange or reddish brown beneath, in one Georgetown specimen a small round median blue spot on the side. Superior appendages black or dark brown; inferior appendages dull orange or reddish brown, darker at apex.

Legs light brown or cream-colored, paler than in *kennedii* and with more restricted dark markings; the first femora the darkest, the last the palest, dark markings confined to the dorsal surface of the femora, darkest apically, and greatly reduced or almost wanting on the last femora, some of the Trinidad specimens the palest of the series.

Wings slightly brownish-tinged or hyaline; stigma brown to dark brown or black.

♀: The female of *ascendens* has not hitherto been described; unfortunately the single specimen I took is teneral. Yellow appears only on the dorsum of the head and nasus, the postocular spots and the pale markings of the thorax and basal abdominal segments being light clear blue, just as in "*gracile*." The pattern of the dorsum of the head is pale, but the black is not reduced to the extreme degree found in some males; probably the pattern will be found to be as variable in the female as it has been shown above to be in the male.

The antehumeral blue stripe is wide; the humeral stripe is reddish brown, diffuse at the edges, black at the superior extremity, and darker below, near and on the mesinfraepisternum. There is no trace of the black spot on the second lateral suture or a dark line or stripe on the metepisternum along this suture. The metepimeron is bluish-tinged above and along the second lateral suture but fades rapidly into the cream color of the coxae and under parts.

Abdominal segments 1 and 2 patterned as in the male, the pale color light blue; 3-7 with basal rings less conspicuous than in the male; 7 with the apical integument only blue, but this will probably be found to vary in this sex as in the male; 8 with the apical third or fourth blue; 9 blue with a larger quadrangular dark spot on either side, this spot produced posteriorly at its two posterior corners, these points reaching about the middle of the segment; 10 blue; appendages brown.

Legs pale, as described for the pale males.

Wings hyaline, stigma light brown (teneral).

Georgetown, British Guiana, January 25, 26, 27 and 28, 1912, 15 ♂, 1 ♀; Paramaribo, Dutch Guiana, Feb. 23, 1912, 1 ♂; Trinidad, localities as follows, all in 1912,—Cunapo River, Feb. 27, 11 ♂; St. Joseph River, Feb. 28, March 10, 2 ♂; St. Ann River, March 1, 1 ♂; Arima, March 4, 2 ♂; Maracas River, March 5, 2 ♂; Cumuto, March 6, 1 ♂; Baracon, Chaquanas, March 7, 1 ♂.

Ascendens has hitherto been known from a single male from Cachoeira, Brazil. A male from Georgetown was sent to Dr. Calvert who confirms the identification. *Ascendens* is one of the *gracile* group in which the fully colored male (and probably older females) has departed from the ancestral blue coloration of the thorax and basal abdominal segments and has taken on green and yellow colors. The wide distribution of the species as shown by the present collection should make the

discovery of the species in some of de Selys' material not surprising. The species is a pond or sluggish stream inhabitant.

In Calvert's key to females of *Acanthagrion* (Ann. Carnegie Museum, vi, Odonata Neotropical Region, p. 162), *ascendens* runs out to C, under B, under A, in which also will fall *A. kennedii* described below. The female of *ascendens* may be recognized at once by having the mesepisternal fossae at about the midheight of the mesepisterna, the carina between the fossae, as seen in lateral view, elevated into a small semicircular prominence. In *"gracile"* and *kennedii* the fossae are placed much lower, the carina not elevated but bevelled off anterior to the fossae.

Acanthagrion "gracile" Rambur (Plate XVII, figs. 9, 12).

In view of Mr. Kennedy's work on *Acanthagrion* penes,* and because of the specific distinctness of forms otherwise scarcely separable, the true status of *gracile* and the many varieties discussed by de Selys is a matter for future determination. The following notes refer to the common Central American form determined by Calvert as *gracile* (Biol. Centr. Amer. Neurop., pp. 115, 382).

♂ : In the darkest specimens the dorsum of the head is entirely black excepting the blue postocular spots and a more or less definite blue trace on the occipital crest; in the palest, the pale color on the anterior side of the first joint of the antenna is produced inward and upward to make a rounded connected spot on the frons above on either side; back of and just outside this is a spot opposite the apical end of the second joint of the antenna, and another spot between the apex of this second joint and the eye; between the median ocellus and the second joint of the antenna is another spot lying close to the ocellus..

On the middle lobe of the prothorax the blue spot on either side varies considerably in size. The black spot on the second lateral suture above is often inconspicuous, though always present so far as the present collection goes, but never produced as a line beyond the depression in which it lies.

In the extent of black on abdominal segment 1 there is considerable variation, and but little variation on 2; the black on 1 is basally about as wide as the black generally on 2, but on 1 the blue on either side encroaches subapically on the black in a triangular dorsal projection, which may fail, in varying degrees, to reach the mid-dorsal line or which may broadly meet its fellow of the opposite side, in which case

*See this volume of the NEWS, pages 325-330.

the black is reduced to a quadrate basal spot and a very narrow subapical transverse ring. The black on 2 has a similar subapical narrowing, but in this segment there seems to be but little variation, and the black is reduced only to about its width throughout the segment basal to the dilatation just basal to the subapical narrowing. The blue on the apex of 7 is variable especially on the sides; on the dorsum it varies in length but never equals the diameter of the segment; on the sides the black may reach the apex of the segment (in which case the blue is a dorsal spot) or, more generally, the black is reduced and laterally the blue occupies a greater length than dorsally, varying greatly in extent.

Wings usually hyaline, sometimes slightly tinged and in one case deeply tinged yellowish brown.

♀: Varies more in pattern of dorsum of head than does the male; the markings are yellowish above (except the postocular spots) as in the male, but in the darkest female the pattern is as described for the palest male, with the addition of a small spot in front of each lateral ocellus; in the palest female the head above is yellow, marked with black as follows: A trilobed spot in front of the median ocellus; an edging around all ocelli; a more or less indistinct irregular bar from this black edging past the apex of the second joint of the antenna to the eye; a definite border around the blue postocular spots; intermediates between the darkest and palest exist.

The humeral black stripe is more or less rusty-edged, and in one specimen it is reduced and is entirely rusty red except the extreme upper end, which remains black.

Apparently the same variation in black on abdominal segment 1 as described for the male may be expected in the female. Apex of 8 black to the transverse row of spines in only one specimen, in the others with some blue, not very variable, the integument blue in all cases. Width of dorsal blue basally on 9 not very variable but the length of the basal black on the sides more variable.

Guatemala, localities as follows, all in 1909: Puerto Barrios, May 25 and 30, 3 ♂; Morales, May 27, 2 ♂; Los Amates, June 21, 2 ♂; Gualan, June 12, 13, 16 and 18, 6 ♂, 2 ♀; Agua Caliente (on Ferrocarril del Norte), 20 ♂, 2 ♀. A common widely distributed species, in life suggesting *Enallagma exsulans*.

Acanthagrion cuyabae Calvert.

Georgetown, January 27, 1912, a single teneral male in poor condition. Dr. Calvert who examined the specimen writes of it, "In appendages, blue color and pale mid-dorsal thoracic carina more like *cuyabae fimeuse* than *cuyabae*, but differing

from both in the pale reddish line bisecting lengthwise the black humeral stripe; different from *fimense* in size and in black on abdominal segment 2 not narrowing anteriorly. Perhaps it is the Guianan race of *cuyabae*." In the condition of the specimen nothing more definite can be stated.

VENATIONAL CHARACTERS OF SIX SPECIES OF ACANTHAGRION, EXPRESSED IN PERCENTAGES.	apicale	ascendens	gracile	kennedii	indefensum	adustum
M_2 front wing arising at fourth postnodal						5
" " " " midway between fourth and fifth postnodals		5	20	5		5
" " " " just proximal to fifth postnodal	40	80	80	75	50	80
" " " " at fifth postnodal	40	15		10	50	
" " " " midway between fifth and sixth postnodals	10					10
" " " " just proximal to sixth postnodal	10			10		
M_2 hind wing arising just proximal to fourth postnodal	60	75	90	75		100
" " " " at fourth postnodal	40	15	10	15	100	
" " " " just distal to fourth postnodal		10				
" " " " just proximal to fifth postnodal				10		
M_{1a} front wing arising at seventh postnodal		5	20			10
eighth "	60	90	80	50	100	90
ninth "	40	5		45		
tenth "				5		
M_{1a} hind wing arising at seventh postnodal	50	40	70	20	100	100
" " " " eighth "	50	60	30	70		
" " " " ninth "				10		
Proximal side quadrangle front wing=about $\frac{1}{4}$ posterior side			30	80		
" " " " " $\frac{2}{7}$ "		100	60	20	25	
" " " " " $\frac{1}{3}$ "	100		10		75	100
Anterior side quadangle front wing=about $\frac{1}{4}$-$\frac{1}{3}$ proximal side						10
" " " " " $\frac{2}{3}$ "					50	40
" " " " slightly shorter than proximal side	50	5	20		25	30
" " " " about equalling proximal side	20	5			25	10
" " " " slightly longer than proximal side	30	60	50	45		10
" " " " " $1\frac{1}{3}$ proximal side		25		50		
" " " " " $1\frac{1}{2}$ "			20	5		
" " " " " $1\frac{3}{4}$ "		5	10			
Anterior side of quadrangle hind wing=$1\frac{1}{4}$-$1\frac{1}{3}$ proximal side					50	40
" " " " $1\frac{1}{2}$ "	20	5			25	
" " " " $1\frac{3}{4}$ "	60	15	20			40
" " " " about twice proximal side	20	55	40	40	25	20
" " " " slightly more than twice proximal side		25	40	45		
" " " " about $2\frac{1}{2}$ proximal side				15		
Arculus front wing at or scarcely distal to second antenodal	90	70	100	30	100	85
" " slightly distal to second antenodal	10	30		45		15
" " distal less than length of upper limb of arculus				20		
" " distal about the length of upper limb of arculus				5		

VENATIONAL CHARACTERS OF SIX SPECIES OF ACANTHAGRION, EXPRESSED IN PERCENTAGES.

	apicale	ascendens	gracile	kennedii	indefensum	adustum
Arculus hind wing at or scarcely distal to second antenodal	70	45	90	30	50	75
" " slightly distal to second antenodal	30	45		50	50	20
" " distal less than length of upper limb of arculus		10	10	20		5
A front wing arising slightly basal to C-A crossvein					50	30
" " " at C-A crossvein.	30		20	5	50	50
" " " slightly distal to C-A crossvein	70	35	50	5		20
" " " distal to C-A crossvein less than length of the latter		65	30	10		
" " " distal to C-A crossvein at least length of the latter				80		
A hind wing arising distinctly basal to C-A crossvein						15
" " " slightly basal to C-A crossvein					25	30
" " " at C-A crossvein	30		40		50	55
" " " slightly distal to C-A crossvein	70	50	60	5	25	
" " " distal to C-A crossvein less than length of the latter		50		25		
" " " distal to C-A crossvein at least length of the latter				70		
Stigma front wing with costal side shorter than either proximal or distal side						20
" " " " about equal proximal side	40	15			50	20
" " " " longer than either proximal or distal side	60	85	100	100	50	60
Stigma hind wing with costal side shorter than either proximal or distal side						20
" " " " about equal proximal side	30	30			50	60
" " " " longer than either proximal or distal side	70	70	100	100	50	20
Stigma front wing covering much less than 1 cell				10	50	100
" " " less than 1 cell	90	90	90	90	50	
" " " 1 cell	10	10	10			
Stigma hind wing covering about ½ cell						20
" " " much less than 1 cell			20	20	100	80
" " " less than 1 cell	90	55	80	75		
" " " 1 cell	10	45		5		
Postnodals front wing 8						10
" " 9						85
" " 10		35	90		50	5
" " 11		55	10	30	50	
" " 12	50	10		55		
" " 13	30			15		
" " 14	20					
Postnodals hind wing 7						45
" " 8		5	70			55
" " 9		45	30	40	100	
" " 10	50	50		45		
" " 11	40			15		
" " 12	10					

The foregoing tabulation is based on the wings of the following number of specimens of each species: *apicale*, 5 males; *ascendens*, 10 males; "*gracile*," 5 males; *kennedii*, 10 males; *indefensum*, 2 males; *adustum*, 10 males.

The Identity of Eriosoma querci Fitch (Aphididae, Hom.).*

By A. C. Baker, Bureau of Entomology, Washington, D. C.

The species of *Anoecia* upon *Cornus* in America has for many years been considered to be *corni* Fab., of Europe. While working over the species in 1909, the writer was convinced that the American form is distinct from the European. At that time he had no European specimens and was unable, therefore, to prove or disprove his suspicions excepting by literature. Since that time he has studied specimens from several localities in France, Germany, Belgium, Russia, the Madeira Islands and Japan. All of this material and a careful study of the European literature and the forms met with in this country have proven that the American form is quite a distinct species. It, however, winters upon plants of the same genus as does the European *corni* and migrates in summer to grass roots as does the European species. The Japanese form seems to agree with the European.

It will be seen by the accompanying figures that the fall migrants of the two species are quite different. The third segment of the antennae of *corni* is armed with twelve to nineteen sensoria and these are narrow, not subcircular, in shape. The average number in all the forms examined by the writer is between twelve and thirteen. Segments IV and V have from four to six similarly shaped sensoria. The fall migrant of the American species on the other hand has usually six or seven sensoria and these are oval or almost circular in shape, very different from the narrow elongate sensoria met with on *corni* antennae. Segments IV and V have two or three sensoria and these are oval or subcircular. The spring migrant of the American species shows two or perhaps three sensoria upon Segment III. These vary greatly in size. Sometimes they will be minute and sometimes there will be one large one and one small one. Again in other specimens some will be absent altogether. This also holds true of the sensoria upon Segment IV. The early summer alate of *corni* has about six or seven

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sensoria upon Segment III, and these are oval or sometimes almost subcircular like those upon Segment III of the American fall migrant.

Another thing which should be mentioned is the absence of

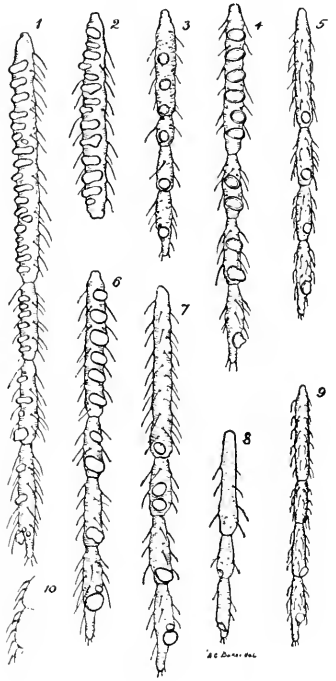

Fig. 1.—Antenna of Fall Migrant of *Anoecia corni* Fab.

Fig. 2.—Segment III of antenna of another specimen.

Fig. 3.—Antenna of Spring Migrant of *Anoecia querci* Fitch.

Fig. 4.—Antenna of Fall Migrant of *Anoecia querci* Fitch.

Fig. 5.—Antenna of Summer Aptera of *Anoecia querci* Fitch.

Fig. 6.—Antenna of Summer Alate of *Anoecia corni* Fab.

Fig. 7.—Antenna of Summer Aptera of *Anoecia corni* Fab.

Fig. 8.—Antenna of Stem mother of *Anoecia querci* Fitch.

Fig. 9.—Antenna of Summer Alate of *Anoecia querci* Fitch.

Fig. 10.—Margin of abdomen of Summer Aptera of *Anoecia querci* Fitch showing hairs.

the large quadrate patch on the abdomen of the spring migrant of the American form. In his description of the spring migrant of *corni* Koch (1857) does not mention this marking and his figure does not show it. The writer supposes, therefore, that it is absent from the spring migrant of *corni* also.

The writer has never seen European spring migrants and is therefore unable to give the number of sensoria. Judging from the American species and from the early summer form of *corni* he would suppose that it possessed about six or seven somewhat oval sensoria upon Segment III and in this way differs from the American form which possesses few sensoria.

Measurements of different forms of *corni* are here given for comparison with the descriptions of the American species also herewith included.

Fall Migrant.—
Segments of antenna: III, 0.464 to 0.512 mm.; IV, 0.16 to 0.176 mm.; V, 0.16 to 0.176 mm.; VI (0.144 to 0.176 mm. + 0.064 mm.)

Spring Aptera from Roots.—
Segments of antenna: III, 0.32 mm.; IV, 0.128 mm.; V, 0.128 mm.; VI (0.128 + 0.048 mm.).

Fall Apterous from Roots.—
Segments of antenna: III, 0.32 to 0.352 mm.; IV, 0.128 mm.; V, 0.128 mm.; VI (0.128 + 0.064 mm.).

Spring Alate from Roots.—
Segments of antennae: III, 0.32 mm.; IV, 0.128 mm.; V, 0.128 mm.; VI (0.128 + 0.048 mm.).

Since the American form proves to be distinct from *corni,* the correct name to apply to the species must be ascertained.

Two species were described by Walsh (1862). These two, *cornicola* and *fungicola,* are undoubtedly the same species as that common upon *Cornus.*

Fitch (1858) described *Eriosoma querci* from oak in Illinois, the description of which agrees fairly well with our *Anoecia* upon *Cornus.* His notes upon the species give the following collection numbers 7946-9 and 7950-1. Of these numbers 7948 was mounted from the Fitch collection by Mr. Theo. Pergande and deposited in the National Museum collection. The writer, in studying the Fitch collection, located also the numbers 7949, 7950 and 7951. These specimens were pinned and carried Fitch's labels. On mounting in balsam, all of the four specimens proved to agree with the species so common upon *Cornus. Anoecia querci* (Fitch), therefore, must be the name to apply to this species.

Cowen (1895) referred to *querci* Fitch a species found by him upon oak in Colorado. Later Davis (1911) gave a more complete description and figures of this same species and placed it in *Phyllaphis.* Davidson (1910) also recorded the insect from California. Gillette (1914) renamed Cowen's species *quercifoliae* and separated it from the eastern one. Specimens collected by the writer in Virginia prove that the insect referred to by Davis if not by Davidson is a very dis-

tinct species which may now be known as **Phyllaphis quercicola** n. n. It is, however, not a typical *Phyllaphis*.

While working at the Deciduous Fruit Insect Laboratory at Vienna, Virginia, the writer had the opportunity to observe the migrations of *querci* to and from *Cornus* shrubs. It is on the basis of these observations that the present paper showing the distinctness of *querci* has been written. The migration of the species from *Cornus* to grass roots was first pointed out by Osborn (1889) who placed *panicola* Thos. (1879) as a synonym of *corni* Fab. He took Oestlund (1887) as his authority for using the name *corni*, and therefore included *venusta* Pass. as a synonym of his summer form. Osborn was entirely right as far as his observations on the migration were concerned, although his presentation of the case has not been altogether followed by American writers. Recently Dr. Patch (1916) has pointed out this fact and made reference to the records (Mordwilko, 1907) of the migration of *corni* in Europe, which species she considered the same as the American. The writer believes that this retention of *panicola* Thos. is due to a lack of a sufficient knowledge of the variation of our *Cornus* species. As will be seen by the following descriptions and figures, the spring and fall migrants differ very much in antennal characters, and spring migrants vary greatly among themselves in regard to the sensoria of the antennae. The summer forms show other differences, the most important of which is the presence of prominent long curved hairs on the body. These, however, are present to some extent in the spring forms also. In some cases no sensoria are present on the third segment of the summer alate form and this might lead to its being considered a distinct species. A study of the different summer specimens has convinced the writer that *panicola* must become a synonym of *querci*. It might possibly be considered that the forms showing the prominent curved hairs are a distinct species and that the summer forms of *querci* though living upon grass roots would not show them. Since they are, however, indicated upon the spring forms there seems little doubt in the writer's mind that one species only is represented.

Thomas (l. c.) also described a species which he named *Rhizobius eleusinis*. In the Bureau collection there are specimens of this species reared by Mr. Pergande from the roots of *Eleusine indica* Gaertn. and determined by him as *eleusinis* Thos. These seem to agree in all important details with summer specimens of *querci* Fitch. The apterous forms agree well with the description given by Thomas. It seems evident then that *eleusinis* is a synonym of *querci*.

Wilson (1911) has recently described a species of *Anoecia* under the name of *oenotherae*. The principal differences between his species and *querci* are said to be the small sensoria on the antennal segments. These and the color are given as characters. As has been mentioned, the sensoria upon the spring and summer forms of *querci* vary greatly, sometimes being small and circular, sometimes large, sometimes absent altogether with the exception of the permanent ones.. The color also shows considerable variation in the main body color, though the black lateral patches are usually about the same.

The writer is inclined, therefore to believe that *oenotherae* is only another of the root-feeding forms of *querci*, which in the particular case was feeding upon *Oenothera*. That the forms do not migrate in the regular way can hardly be taken as evidence of a distinct species. The writer has summer forms of *corni* taken on wheat roots in April and it was evident that two generations at least had already lived there. In the same way, summer specimens of *querci* can be found very late in the year upon the roots of various plants, much later than the usual migration period. The proportion of the segments seems, however, to be different in the measurements given by Wilson.

Anoecia querci (Fitch)
Eriosoma querci Fitch
Rhizobius eleusinis Thos.
Schizoneura panicola Thos.
Anoecia corni, American authors.
?*Anoecia oenotherae* Wilson.

In the vicinity of Vienna, Virginia, the eggs of *Anoecia querci* hatch about the middle of April. By the end of the

month the stem mothers are mature and are producing the second generation practically all of which becomes alate. The spring migrants are in the pupal instar by about May 6. In another three or four days the migration commences and lasts until the fore part of June, a few insects becoming alate at a time. Alate forms as well as apterous are produced during the summer upon the roots of various grasses. Toward the last of September the return migration commences and extends almost to the end of October. The sexes are deposited as the alate forms arrive so that we have fresh migrants and nearly mature sexes upon the leaves at the same time. A few straggling migrants are on the trees even after the eggs are being laid. The eggs are not placed thickly upon the twigs and are many fewer than would be expected from the number of sexes present.

It may be mentioned that the writer was unable to rear this species on the flowering dogwood, but was able to get it to feed only upon the narrow-leaved dogwood which borders the streams.

Stem Mother.—Morphological characters:—Antennae composed of either six or five segments with the following measurements: I, 0.064 mm.; II, 0.064 mm.; III, 0.176 mm.; IV, 0.064 mm.; V, (0.08 + 0.032 mm.), or I, 0.064 mm.; II, 0.064 mm.; III, 0.112 mm.; IV, 0.048 mm.; V, 0.064 mm.; VI, (0.08 + 0.032 mm.). Segments armed with a few stout hairs. Eyes very small; labium short extending about to the second pair of coxae; body elongate oval, with scattered hairs, length, 1.76 mm.

Color Characters:—General color deep reddish brown, sometimes purplish or almost black. Antennae dusky; abdomen with broad transverse bands of black.

Spring Migrant.—Morphological characters:—Antennal segments as follows: I, 0.064 mm.; II, 0.064 mm.; III, 0.208 to 0.24 mm.; IV, 0.08 to 0.09 mm.; V, 0.096 to 0.112 mm.; VI, (0.08 to 0.096 + 0.048 mm.). Segments III to VI, covered with numerous imbrications composed of rows of minute points and armed with long hairs. Segment III, with 2 to 4 subcircular sensoria varying from fairly large to very minute in size. Segments IV and V with usually one sensorium each and segment VI, with one large and several small sensoria at the base of the unguis. Labium moderately long, reaching to or past the bases of the hind coxae. Length from vertex to tip of cauda about 1.7 mm.

Color Characters:—Head and thorax black; eyes deep reddish brown; antennae, legs and distal extremity of rostrum black or dusky; abdomen greenish orange or brownish green, with the cauda, anal and genital plates and a row of patches on either side of the abdomen dusky to black. No large black spot is present in the middle of the abdomen.

Summer Apterous:—Morphological characters:—Antennal segments as follows: I, 0.08 mm.; II, 0.08 mm.; III, 0.128 mm.; IV, 0.064 mm.; V, 0.08 mm.; VI (0.096 + 0.048 mm.). Segments with no sensoria excepting the usual ones, but with very many prominent hairs thickly covering all the segments. Labium extending about to the hind coxae; length from vertex to tip of cauda about 1.6 mm. Entire body covered with rather long somewhat curved hairs. Some specimens are considerably larger than the specimens measured.

Color Characters:—General color milky or pale yellowish and covered with a fine white powder. Abdomen with rows of small blackish markings along the sides and several broken dusky bands in the region of the cornicles. Antennae dusky.

Summer Alate:—Morphological characters:—Antennal segments as follows: I, 0.064 mm.; II, 0.064 mm.; III, 0.224 mm.; IV, 0.096 mm.; V, 0.112 mm.; VI, (0.08 + 0.033 mm.). Segment III, sometimes armed with two or three minute circular sensoria very much like the smaller sensoria upon the corresponding segment of the spring migrant; other sensoria normal. All segments armed with the prominent curved hairs similar to those of the apterous form. In some cases there are no sensoria present on segment III. Labium extending about to the hind coxae. Total length from vertex to cauda about 1.6 mm.; entire body covered with prominent curved hairs.

Color Characters:—Head, antennae and thorax black; abdomen whitish or pale yellowish with blackish transverse bands between the cornicles and with a large quadrate patch on dorsum. Lateral spots of the same color are present on the margins of the abdomen.

Fall Migrant.—This form and the sexes have been described by Weed (1888). Only the measurements of this form will, therefore, be given here.

Antennal Segments: I, 0.064 mm.; II, 0.032 mm.; III, 0.208 mm.; IV, 0.112 mm.; V, 0.128 mm.; VI (0.128 + 0.048 mm.). Segment III is armed with 6 to 7 subcircular sensoria; segments IV and V with usually 2 each and segment VI, with the usual large one and the small accessory ones. This form has the large quadrate patch upon the abdomen similar to that of *cerni* Fab.

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Anoplura from Sea-Lions of the Pacific Ocean.

By G. F. Ferris, Stanford University, California.

The Anopluran parasites of the seals and their allies constitute a small family, the *Echinophthiriidae*, containing less than ten species, all of which are adapted by a thick coating of spines, or spines and scales, to the aquatic life of their hosts. Opportunities for the examination of these marine mammals are not common and consequently new records are of much interest. The present paper records one Anopluran species previously described and another that appears to be new, both taken from sea-lions of the Pacific coast.

Echinophthirius fluctus n. sp.

Two mature males, a mature female and many immature

specimens taken from a stuffed skin of a sea-lion pup in the collection of the Department of Zoology of Stanford University. The skin bears no data, but the host is almost certainly the Stellar sea-lion, *Eumetopias jubata*, the range of which extends from California to Alaska.

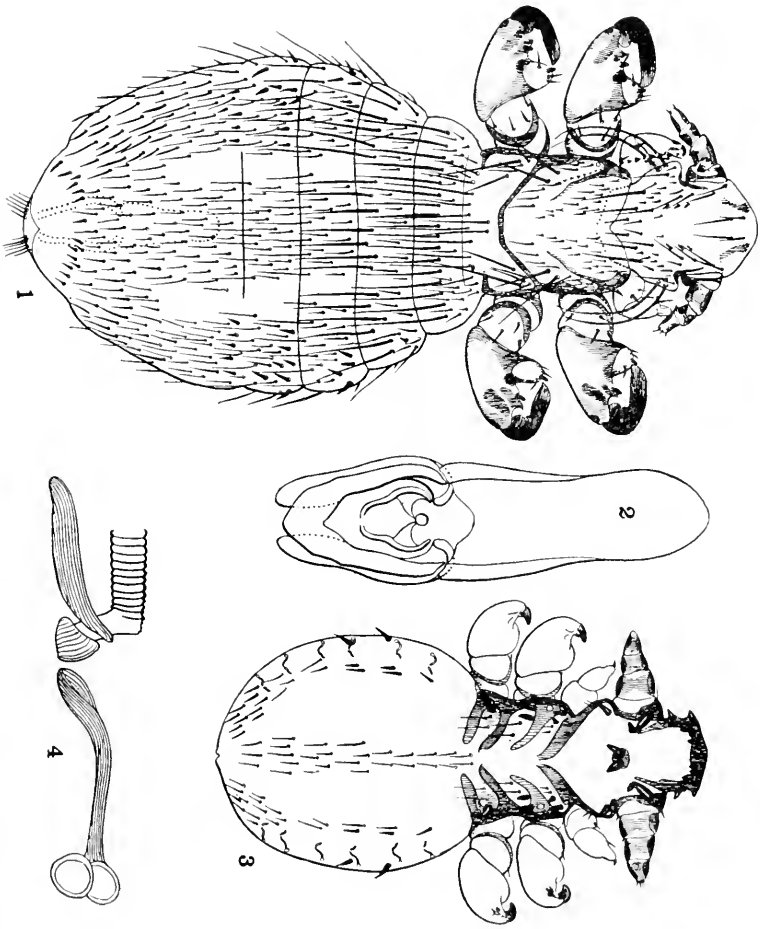

Fig. 1.—*Echinophthirius fluctus* n. sp.; female.
Fig. 2.—*Echinophthirius fluctus* n. sp.; genitalia of male.
Fig. 3.—*Echinophthirius fluctus* n. sp.; 1st (?) stage of larva.
Fig. 4.—*Echinophthirius fluctus* n. sp.; occluding apparatus of spiracle.

Through the kindness of Mr. James Waterston, of the Imperial Bureau of Entomology of Great Britain, it has been possible to compare the new species with specimens of *Echinophthirius horridus* (Olfers) (= *E. phocae* Lucas) taken from *Phoca vitulina*, a common seal of the Atlantic. The new species is very distinct, differing not only in its notably smaller size but in many structural characters as well. The extremely long spines on the temples, the slenderness of all the spines as contrasted with the short, blunt spines of *E. horridus* and the extremely small, sharp claws of the anterior legs serve to distinguish the new species immediately. It is in fact so different that it will probably eventually be placed in another genus.

Types, a mature male and a mature female, in the Stanford University collection. A paratype, a mature male, in the possession of Mr. James Waterston of the Imperial Bureau of Entomology of Great Britain.

♀. Length (cleared specimen), 2.4 mm. Body weakly chitinized throughout.

Head slightly more than half as wide as long, the anterior margin quite convex, the temples very prominent and sharp, the temporal margins converging rapidly to form the prolonged occiput. Antennae four-segmented, entirely destitute of spines except for very small spines at the distal end of each segment. The chaetotaxy of the head is entirely too complicated to describe in detail and only the more prominent details can be noted. Each temporal margin bears a pair of long stout spines which extend back to the middle of the thorax. The remaining spines are small and slender except for a transverse row, both dorsally and ventrally, near the posterior margin, which are much larger and stouter.

Thorax slightly longer than the head and but little wider, the lateral margins straight and nearly parallel. Along each lateral margin is a narrow chitinized area, which enlarges at the anterior lateral angles. From this enlargement a narrow bar extends diagonally a short distance toward the meson. A narrow, backwardly bent, transverse bar marks the dividing line between the meso- and metathorax. Mesothorax beset with numerous small, slender spines and with two or three conspicuously larger spines at each posterior lateral angle. Metathorax with a cluster of three or four small spines and two or three larger ones at each posterior lateral angle. Ventrally the thorax is beset with numerous small spines.

Anterior legs very small and with small, slender claw. Middle and posterior legs very large and stout, with large, heavy claw.

Abdomen elongated oval, widest near the middle, very weakly chitinized and thickly beset with slender spines, which are so arranged that a narrow, bare area is left on each side, about half way between the meson and the lateral margin. All the spines very slender and irregularly arranged except for a more or less regular, transverse row near the posterior margin of each of the first three segments which are conspicuously larger and stouter than the others. Chaetotaxy of the ventral side very similar. Gonopods practically obsolete, their positions marked by tufts of spines, and behind each gonopod is a thick cluster of spines.

♂. Length (cleared specimen), 2.2 mm. Very similar to the female, except for a noticeable reduction of the number of spines. Genitalia quite conspicuous, the basal plate short and rather broad, the parameres about half as long as the basal plate, rather weakly chitinized, slightly expanded posteriorly. There are no chitinous supporting structures as in *E. horridus*.

Immature stages. There are apparently three immature stages, differing from each other only in the increasing number of spines on the abdomen in each successive stage, but all differing very markedly from the mature form. In several instances the developing structures of one stage are visible within the body of the preceding stage and the sequence can thus readily be made out. Aside from the reduced number of spines all these stages differ from the adult in the extremely heavy chitinization of the skeletal elements of the head and thorax, the presence of numerous short, heavy, almost wart-like spines on head and thorax, the prolongation of the forehead and the small, weak claws. Figure 3, which is of the youngest stage found, obviates the necessity of an extended description.

Tracheal system. There are present seven pairs of spiracles, one pair on the mesothorax and six pairs on the abdomen. The segmentation of the abdomen is so faintly indicated that it is impossible to determine upon which segments the spiracles are borne (apparently they are on the third to eighth) and also, owing to the conditions under which the specimens were preserved it is difficult to speak with certainty of the distribution of the tracheal trunks. The occluding apparatus of the spiracles, however, presents some points of considerable interest.

All the spiracles, including the mesothoracic pair, are very small, so very small indeed that it is difficult to distinguish the openings. All are closed by the same type of apparatus. This consists of three chitinized pieces, a very small triangular piece that seems to border one side of the spiracle and that lies between the curved tips of two elon-

gated pieces. Apparently by some combination of muscles these long pieces can be brought to bear upon the small triangular piece, thus closing the spiracle. The arrangement of the parts is indicated in Fig. 4.

Antarctophthirius microchir (Troues. & Neum.).

A number of specimens, males, females and immature, from the California sea-lion, *Zalophus californianus,* obtained through the kindness of Mr. P. J. Fair, of the California Academy of Sciences. The species has previously been recorded from *Phocarctos hookeri*, another member of the Otariidae (Auckland Island). The description and beautiful figure given by Enderlein in the report of the Deutsche Südpolar Expedition (Vol. 10, pp. 511-512, ff. 176, 177, 183, 184) permit a definite determination of the species to be made. The California specimens differ hardly at all from those from the Antarctic.

Butterflies as Food for Squirrels. (Lep.).

The latter part of May, 1916, was noticeable in the vicinity of Los Angeles, California, for the great numbers of *Melitaea chalcedon.* On the 27th I was resting by the roadside among the willows at the upper end of Griffith Park. Great numbers of *chalcedon* were flitting up and down the road and settling on certain moist, sandy spots. Suddenly a gray ground squirrel ran out on one of these spots and apparently caught a butterfly, then sat up on its hind legs and worked over it. I tried several times to get closer, but succeeded only in scaring away the squirrel. Each time, however, it returned and went through the same performance. Finally I walked up and examined the spot, where to my astonishment I found quantities of *chalcedon* wings. To satisfy myself I counted roughly up to a hundred wings or enough for twenty-five complete butterflies. The squirrel evidently took the opportunity to obtain a meal while the butterflies were easily caught and gathered plentifully on the moist ground.—J. R. Haskin.

Vincetoxicum japonicum as a Mosquito Catcher (Dip.).

While it is generally known that some species of female mosquitoes feed to a certain extent upon the nectar of flowers, very little has been said of the herbaceous perennial, *Vincetoxicum japonicum* and its mosquito-catching ability. It is known commonly as the mosquito plant and its small white flowers which appear in June, secrete and trap by means of a sticky nectar, various small flower-visiting flies and mosquitoes. During the past season, I have found females of *Culex pipiens* and *Aedes subcantans* firmly held fast by the flowers. It would appear from this that females of these two species occasionally feed on nectar. In addition to flies and mosquitoes different species of *Geometridae* were noted, swinging helplessly, each with the tip of its proboscis fastened in the flower. Bees have no trouble in securing the nectar and getting safely away with it as they are evidently too able-bodied to be held fast.—Harry B. Weiss, New Brunswick, New Jersey.

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., OCTOBER, 1916.

A New Department in the News.

We all wish to improve our methods of doing things, so that we may obtain results previously out of our reach, or that we may save time for more important things. We ourselves do not always contrive such improvements, and although someone else often devises the very thing we need, we remain unaware of his success. It has been suggested that mutual help may come by the institution of a department of "Questions and Answers" in the NEWS, whereby we shall aid each other in our problems. We shall therefore make a beginning with a question which has been submitted to us and we invite those interested to send in replies which, if brief, we shall be glad to print in the earliest possible issue of the NEWS. Other questions are also welcomed, although the Editors must, of course, reserve the right not to publish questions or answers which seem to them objectionable or inappropriate. Those sending in either questions or answers will please indicate whether they wish their names, or merely one or more initials, to appear in connection with their contributions, but all such must be accompanied by the full name and address of the writer for the information of the Editors.

I wish to ask the opinion of entomologists as to the practical use to them of a transparent mount which I have devised that will enable both sides of an insect's wings to be examined, that can be handled with perfect freedom without breakage and that can be filed like a card index in standard cabinets, giving a reference collection right at the desk and doing away with the danger of breakage incident to using specimens from the main collection.—C.

New State Officials.

Professor J. G. Sanders has recently resigned as State Entomologist of Wisconsin to become Economic Zoologist of Pennsylvania. His work at Harrisburg began September 16, 1916.

Dr. S. B. Fracker has been appointed Acting State Entomologist of Wisconsin by the Commissioner of Agriculture, and will have charge of the work of the State Entomologist's office until a successor to Professor Sanders is appointed.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

Location of Pupae of Megathymus cofaqui (Lep.).

While collecting pupae and larvae of *Megathymus yuccae* I observed in one clump of *Yucca aloefolia* where I was collecting, several pouches of what I thought were *Meg. yuccae* but I noticed they were nearly all a light colored yellow instead of black, as is common, and were located on the sides and prostrate stems of the plant—some were even on partially rotten stalks—instead of in the top of the leafy cap as is usual with *yuccae*. My first impression was that they were the pouches of new larvae and was very much surprised to find on examining them that the majority contained pupae. The pupae were much smaller and slightly different in appearance from *yuccae*. I took home a few of these pupae and some of the larvae. The larvae I kept in their sections of the food plant with the ends put in an inch or so of water, which I changed twice a week. When the pupae emerged I noticed immediately that they were different from *yuccae*, although the latter varies considerably, and after several examinations Mr. Jacob Doll pronounced them to be *M. cofaqui*. So far I have succeeded in obtaining four males and four females and I have one or two pupae and two larvae yet to hear from. The females vary quite a little but the males not so much. Mr. R. E. Ludwig, of this place, has also obtained one male *cofaqui* from a number of pupae that he supposed were *yuccae*. He states that he did not notice any difference in the pouch or position on the stem so it may be that my observations relate to some purely local condition. These pupae and larvae were obtained in the early part of March and I still have two that are in the larval state although the others have pupated and imagos emerged from the pupae. —J. G. Bonniwell, St. Petersburg, Florida.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

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

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new species are all grouped at the end of each Order of which they treat. Unless mentioned in the title, the number of the new species occurring north of Mexico are given at end of title, within brackets.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

4—The Canadian Entomologist. **5**—Psyche. **8**—The Entomologist's Monthly Magazine, London. **9**—The Entomologist, London. **11**—Annals and Magazine of Natural History, London. **16**—Bulletin, Societe Nationale d'Acclimatation de France, Paris. **18**—

Ottawa Naturalist. **36**—Transactions, Entomological Society of London. **37**—Le Naturaliste Canadien, Quebec. **46**—Tijdschrift voor Entomologie. **50**—Proceedings, U. S. National Museum. **56**—Mittheilungen, Schweizerischen entomologischen Gesellschaft, Schaffhausen. **68**—Science, New York. **79**—La Nature, Paris. **86**—Annales, Societe Entomologique de France, Paris. **87**—Bulletin, Societe Entomologique de France, Paris. **128**—Proceedings, Linnean Society of New South Wales, Sidney. **131**—Proceedings, South London Entomological and Natural History Society. **143**—Ohio Journal of Science, Columbus, Ohio. **153**—Bulletin, American Museum of Natural History, New York. **179**—Journal of Economic Entomology. **180**—Annals, Entomological Society of America. **184**—Journal of Experimental Zoology, Philadelphia. **189**—Journal of Entomology and Zoology, Claremont, Calif. **198**—Biological Bulletin, Marine Biological Laboratory, Woods Hole, Mass. **200**—Bulletin Scientifique de la France et de la Belgique, Paris. **229**—Trabajos, Laboratorio de Investigaciones Biologicas de la Universidad de Madrid. **240**—Maine Agricultural Experiment Station, Orono. **278**—Annales, Societe Zoologique Suisse et du Museum d'Histoire de Geneve, Revue Suisse de Zoologie. **290**—Biological Series, Michigan Geological and Biological Survey, Lansing. **322**—Journal of Morphology, Philadelphia. **324**—Journal of Animal Behavior, Cambridge. **350**—Bulletin from the Laboratory of Natural History of the State University of Iowa, Iowa City. **389**—Archivos du Museu Nacional do Rio de Janeiro. **394**—Parasitology, Cambridge, England. **407**—Journal of Genetics, Cambridge, England. **411**—Bulletin, The Brooklyn Entomological Society. **420**—Insecutor Inscitiae Menstruus: A monthly journal of entomology, Washington. **447**—Journal of Agricultural Research, Washington. **480**—The Annals of Applied Biology. **509**—Revue Generale des Sciences pures et Appliquees, Paris. **519**—The Scientific Monthly, Lancaster, Pa. **524**—Technical Bulletins, Entomology, University of California, Berkeley. **529**—Journal of Zoological Research, London. **531**—Boletin, Direccion de Estudios Biologicos, Mexico. **532**—Proceedings, National Academy of Sciences of the United States of America, Washington. **533**—Memoirs, American Entomological Society. **534**—Proceedings, California Academy of Sciences, San Francisco. **535**—Annual Report, State Entomologist of Indiana.

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Dixey, F. A.—Seasonal dimorphism, **131,** 1915, 1-14. **Dow, R. P.**—Plaster-casting insect burrows, **5,** 1916, 69-74. The testimony of the tombs, **411,** xi, 25-33. **Felt, E. P.**—American insect galls. **18,** xxx, 37-39. **Herrera, M.**—La inteligencia y el instinto de los insectos, **531,** i, 389-98. **Janet, C.**—Constitution metamerique de l'insecte, **56,** xii, 354-67. **Lameere, A.**—La metabolie des insectes, **509,** xxvii, 370-76. **Meade-Waldo, G.**—Obituary notice, **4,** 1916, 196. **Moore, W.**—How gases enter insects, **180,** ix, 224-6. **Pergande, T.**—Obituary notice, **4,** 1916, 213-4. **Shannon, H. J.**—Insect migrations as related to those of birds, **519,** iii, 227-40. **Slosson, A. T.**—Entomology and literature, **411,** xi, 49-52. **Swynnerton, C. F. M.**—Experiments on some carnivorous insects, especially the driver ant Dorylus, and with butterflies' eggs as prey, **36,** 1915, 317-50. **Wells, B. W.**—The comparative morphology of the Zoocecidia of Celtis occidentalis, **143,** xvi, 249-98. **Williams, J. B.**—Obituary notice, **4,** 1916, 248. **Woglum, R. S.**—A handy field and laboratory binocular magnifier, **179,** ix, 370-1.

PHYSIOLOGY AND EMBRYOLOGY. Hegner & Russell—Differential mitoses in the germ-cell cycle of Dineutes nigrior, **532,** ii, 356-60. **Metz, C. W.**—The paired association of chromosomes in the diptera, and its significance, **184,** xxi, 213-280. **Robertson, W. R. B.**—Chromosome studies, **322,** xxvii, 179-333. **Throw, A. H.**—A criticism of the hypothesis of linkage and crossing over, **407,** v, 281-97.

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ARACHNIDA, ETC. Baylis, H. A.—The types of the species of Ascaris described by Baird, **394,** viii, 411-19. **Hilton, W. A.**—The central nervous system and simple reactions of a rare whip scorpion, **189,** viii, 74-9.

NEUROPTERA, ETC. Evans, A. T.—Dragonflies of the Douglas lake region, Michigan, **290,** Pub. 20, 39-60. **Hood, J. D.**—Oedaleothrips hookeri, a new genus and sp. of Thysanoptera, **411,** xi, 64-5. **Ris, F.**—Ueber ontogenese der flugeladerung bei den Libellen, **56,** xii, 328-32. **Tillyard, R. J.**—On the development of the wing-venation in Zygopterous dragonflies, with special reference to the Calopterygidae; On the physiology of the rectal gills in the larvae of anisopterid dragonflies, **128,** xl, 212-30; 422-37. **Walker, E. M.**—The nymphs of Enallagma cyathigerum and E. calverti, **4,** 1916, 192-6. **Wildermuth, V. L.**—California green lacewing fly, **447,** vi, 515-25.

Folsom, J. W.—North American collembolous insects of the subfamilies Achorutinae, Neanurinae and Podurinae [many new], **50,** l, 477-525. **Hood, J. D.**—A synopsis of the genus Oxythrips [1 new], **420,** iv, 37-44.

ORTHOPTERA. Bordage, E.—Phenomenes histologiques de la regeneration des appendices autotomises chez les orthopteres pentameres, **200,** xlix, 199-35. **Bugnion, E.**—Les pieces buccales de la Blatte (Blatta americana et australasiae), **56,** xii, 383-400. **Burr, M.**—The opisthomeres and the gonapophyses in the Dermaptera, **36,** 1915, 257-73. **Carl, J.**—Acridides nouveaux ou peu connus du Museum de Geneve, **278,** xxiv, 461-518. **Crampton, G. C.**—A comparative study of the maxillae of the Acridiidae, Phasmidae and Phylliidae, **5,** 1916, 83-7. **Foucher, G.**—Etudes biologiques sur quelques orthopteres, **16,** 1916, 263-73 (cont.). **Turner, C. L.**—Breeding habits of O., **180,** ix, 117-135.

HEMIPTERA. Cogan, E. S.—Morphological studies of the superfamily Jassoidea, **143,** xvi, 299-325. **Dietz & Morrison**—The coccidae or scale insects of Indiana, **535,** viii, 191-321. **Ewing, H. E.**—Eighty-seven generations in parthenogenetic pure line of Aphis avenae, **198,** xxxi, 53-112. **Ferris, G. F.**—A catalogue and host list of Anoplura, **534,** vi, 129-213. **Horsfall, J. L.**—Additions to the Jassoidea of Missouri, **143,** xvi, 354-5. **Lees, A. H.**—Some observations on the egg of Psylla mali, **480,** ii, 251-7. **Maulik, S.**—The respiratory system of Nepa cinerea, **529,** l, 41-58. **Osborn, H.**—Studies of life histories of leafhoppers of Maine, **240,** Bul. No. 248, 53-80.

Drake, C. J.—A new tingid from Tennessee, **143,** xvi, 326-8. **Quaintance & Baker**—Aleyrodidae, or white flies attacking the orange, with description of three new sps. of economic importance, **447,** vi, 459-72. **Van Duzee, E. P.**—Monograph of the No. Am. sps. of Orthotylus [many new], **534,** vi, 87-128. **de la Torre Bueno, J. R.**—A new tingid from New York state; The Veliinae of the Atlantic states [4 new], **411,** xi, 39-40; 52-61.

LEPIDOPTERA. Dognin, P.—Heteroceres nouveaux de l'Amerique du Sud, Fasc. IX-X. **Essig, E. O.**—A coccid-feeding moth (Holococera iceryaeella), **179,** ix, 369-70. **Hampson, G. F.**—Descriptions of new Pyralidae of the subfamilies Epiposchianae, Chrysauginae, Endotrichinae and Pyralinae, **11,** xviii, 126-160 (cont.). **Holloway, T. E.**—Larval characters and distribution of two sps. of Diatraea, **447,** vi, 621-26. **Johnson, C. W.**—Parasites of Archips cerasivorana, **5,** 1916, 81. **Joicey, J. J.**—New South-American Arctiadae, **11,** xviii, 53-62. **Meijere, J. C. H.**—(See under Diptera).

Mosher, E.—The classification of the pupae of the Saturniidae, **180,** ix, 136-58. **Pearsall, R. F.**—Operophtera (Rachela) bruceata, **411,** xi, 68-9. **Tower, D. G.**—Comparative study of the amount of food eaten by parasitized and nonparasitized larvae of Cirphis unipuncta, **477,** vi, 455-58. **Welch, P. S.**—Contribution to the biology of certain aquatic L., **180,** ix, 159-90. **Whittle, F. G.**—L. collected on a trip around the world, **9,** 1916, 135-9 (cont.). **Woodlock, J. M.**—Some experiments in heredity with Abraxas grossulariata and two of its varieties, **407,** v, 183-7.

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DIPTERA. Cory, E. N.—Notes on Pegomyia hyoscyami, **179,** ix, 372-5. **Dyar & Knab**—Eggs and oviposition in certain species of Mansonia, **420,** iv, 61-8. **Evans, A. T.**—Some observations on the breeding habits of the common house fly (M. domestica), **179,** ix, 354-62. **Graham-Smith, G. S.**—Observations on the habits and parasites of common flies, **394,** viii, 440-544. **Knab, F.**—Dispersal of some Ortalidae, **411,** xi, 40-46. The earliest name of the yellow fever mosquito, **420,** iv, 59-60. **Malloch, J. R.**—A comparison of the pupae of Promachus vertebratus and P. fitchi, **411,** xi, 66-8. **Meijere, J. C. H.**—Zur zeichnung des insekten-, im besonderen des dipteren- und lepidopteren-flugels, **46,** lix, 55-147. **Parker, R. R.**—Dispersion of Musca domestica under city conditions in Montana, **179,** ix, 325-54. **Townsend, C. H. T.**—Muscoid flies from the southern U. S., **420,** iv, 51-59.

Banks, N.—Synopsis of Zodion and Myopa with notes on other Conopidae [13 new], **180,** ix, 191-200. **Cole, F. R.**—New sps. of Asilidae from So. California [6 new], **5,** 1916, 63-9. **Dyar, H. G.**—Mosquitoes at San Diego, Calif. [1 new], **420,** iv, 46-51. **Johnson, C. W.**—Some New England Syrphidae [3 new], **5,** 1916, 75-80. **Shannon, R. C.**—Two new N. Am. D., **420,** iv, 69-72. **Van Duzee, M. C.**—Table of males of the N. Am. species of the genus Asyndetus with descriptions of six n. sps., **5,** 1916, 88-94.

COLEOPTERA. Beaulue, J. I.—Les coleopteres du Canada, **37,** xliii, 10-16 (cont.). **Bernhauer & Schubert**—Coleopterorum catalogus, Pars 67, Staphylinidae V, pp. 409-498. **Champion, G. C.**—Notes on Melandryidae, **8,** 1916, 144-157. **Clausen, C. P.**—Life history and feeding records of a series of California Coccinellidae, **524,** 1, 251-99. **Harris, J. A.**—The habits in oviposition of the beetle Bruchus, **324,** vi, 325-6. **McIndoo, N. E.**—The reflex "bleeding"

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Angell, J. W.—Two new lucanids from No. America, **411,** xi, 70. **Fall, H. C.**—New N. Am. species of Notoxus [7 new], **411,** xi, 33-38. **Swaine, J. M.**—New sps. of the family Ipidae [7 new], **4,** 1916, 181-92. **Wickham, H. F.**—New fossil C. from the Florissant beds [many new], **350,** vii, No. 3, 20 pp.

HYMENOPTERA. Cornetz, V.—Sur l'orientation chez des fourmis, **278,** xxiv, 519-20. **da Costa Lima, A.**—Consideracoes sobre a campanha contra a formiga sauva (Atta sexdens); Sobre alguns Chalcidideos parasitas de sementes de Myrtaceas, **389,** xix, 179-192; 193-203. **Cresson, E. T.**—The Cresson types of Hymenoptera, **533,** No. 1, 141 pp. **Frison, T. H.**—Note on the habits of Psithyrus variabilis, **411,** xi, 46-7. **Holland, E. B.**—Detection of arsenic in bees, **179,** ix, 364-6. **Lutz, F. E.**—The geographical distribution of Bombidae, with notes on certain sps. of Boreal America, **153,** xxxv, 501-21. **Meade-Waldo, G.**—Notes on the Apidae in the collection of the British Museum, with descriptions of n. sps., **11,** xvii, 448-70.

Andrews, H.—A new ant of the genus Messor from Colorado, **5,** 1916, 81-3. **Cockerell, T. D. A.**—Some Rocky Mts. andrenid bees [2 new], **4,** 1916, 252-4. Descriptions and records of bees [1 new], **11,** xvii, 428-35. New and little known bees from California [27 new; 1 n. gen.], **189,** viii, 43-64. **Girault, A. A.**—Descriptions of and observations on some Chalcidoid H. [7 new]; A new gen. of pteromalid chalcidoid H. from N. Am. [2 new], **4,** 1916, 242-46; 246-48. **Timberlake, P. H.**—Revision of the parasitic H. insects of the genus Aphycus, with notice of some related genera [many new], **50,** 1, 561-640.

Etudes de Lepidopterologie Comparée, by Charles Oberthür, Rennes, France. Volume eleven of this important work has been recently issued. It is in two parts, the first consisting of text and portraits of Lepidopterists, and the second comprises the colored plates. There are 288 pages and twelve portraits. One hundred and seventeen pages are devoted to tropical American Rhopalocera of the genera *Catagramma, Callicore* and *Perisama,* and a number of new species are described. Several pages are occupied by historical matters in relation to the war of 1870 and then some of the Lepidoptera of Madagascar

are studied. Interesting studies of the genitalia of *Acraea* are given with figures of the organs of generation. Certain species of the Lycaenidae, Satyridae and Hesperidae are studied and figured, and among the Heterocera certain species of Agaristidae, Saturnidae, Noctuidae and Nyctemeridae. The fifth part of the text is devoted to biological observations by M. G. Melou. The volume closes with remarks by M. Oberthür.

There are fifty-six colored plates with 448 illustrations. These plates for accuracy and beauty have never been surpassed and seldom equalled. Of these many illustrations, 185 are devoted to the tropical American genera *Catagramma, Callicore* and *Perisama.* They are now on a much firmer basis for study as not much has been added to our knowledge of these butterflies since the time of Hewitson. The geographical individual variation is quite remarkable and is well shown by Mr. Oberthür in the *excelsior* group, where the undersides of the insects are practically alike, and the uppersides show much variation. It is always a pleasure to see a volume of the *Etudes* appear.—Henry Skinner.

Doings of Societies.

Entomological Section, Academy of Natural Sciences of Philadelphia.

Meeting of December 13, 1915. Seven persons present, Dr. Philip P. Calvert presiding. The annual reports were read. Mr. Wm. T. Davis was elected a member. The following were elected officers for 1916; *Director,* Philip Laurent; *Vice Director,* R. C. Williams, Jr.; *Treasurer,* E. T. Cresson; *Conservator,* Henry Skinner; *Secretary,* J. A. G. Rehn; *Recorder,* E. T. Cresson, Jr.; *Publication Committee,* E. T. Cresson, E. T. Cresson, Jr., P. P. Calvert.

Lepidoptera.—Mr. R. C. Williams, Jr., exhibited specimens of the chrysalids of *Lycaena sonorensis.*—Henry Skinner, *Recorder.*

Meeting of January 27, 1916. Eleven persons present. Director Philip Laurent presiding. Prof. C. E. McClung and Dr. Witmer Stone were elected members.

Dr. Skinner complained of the pernicious use of the pest-breeding cigar boxes by many collectors and students. He also spoke of the power of naphthalene in keeping collections free from museum pests, and exhibited specimens collected in 1835 by Maj. John E. LeConte, which are still in good condition.

Odonata.—Dr. Calvert, commenting on an article by Alfred Warren, entitled "A Study of the Food Habits of the Hawaiian Dragon flies or Pinau" (Bulletin No. 3, College of Hawaii), called attention to the proportion of the various orders of insects devoured. He ex-

hibited the illustrations—charts showing these proportions of which the Diptera represented nearly one-half of the total. He also remarked on his own experience along this line. Mr. Baylis said that he had caught a dragonfly in the act of devouring a *Vespa maculata*.

Meeting of March 23, 1916. Seven persons present, Mr. Morgan Hebard presiding. Mr. William S. Huntington was elected a member.

Hymenoptera—Mr. G. M. Greene exhibited a specimen of *Atta cephalotes*, collected Aug. 9, 1911, at Chaco, Argentine Republic. Dr. J. C. Bradley exhibited some Mutillidae, calling attention to some structural characters which he discovered to be very constant and much more satisfactory than the color characters. In working out these characters he found that there are several distinct forms contained within the limits of some of the present species as based upon the color characters.

Orthoptera.—Mr. Rehn exhibited a box of striking species of tropical American Tettigoniidae and Mantidae chiefly from Costa Rica. Three of the species shown are undescribed and two of the genera have not been recorded from Central America. He made a few remarks on the specimens shown.

Mr. Hebard spoke of the high prices asked by foreign dealers for such striking insects, while the more inconspicuous specimens, even if they are types, may be purchased at a proportionately much lower price.—E. T. Cresson, Jr., *Recorder*.

American Entomological Society.

Meeting of February 24, 1916, at the Academy of Natural Sciences of Philadelphia, Dr. Henry Skinner, President, in the chair. Ten members present. Dr. Witmer Stone was elected a member.

Lepidoptera. Dr. Calvert reported the presence of fragments of insects on the silk larval cases of a lepidopterous insect in bag worms from Costa Rica (see also below). He also reported having seen sleeping clusters of *Heliconius charitonius* there. Dr. Skinner exhibited a photograph of some of the types of the American species of the genus *Parnassius*.

Coleoptera. Dr. Skinner exhibited a specimen of *Megasoma elephas* ♀ and also a live ♂; both were brought in alive by an officer of the United Fruit Co.; they were fed on bananas; attention was called to the great strength of this insect as exhibited by the living example.

Hymenoptera. Prof. Bradley reported that in 1907, in an arid district in California, he found Hymenoptera sleeping in clusters, there being five species so found; they attach themselves by their mandibles, their bodies and hind legs being extended.

Orthoptera. Mr. Rehn made a few remarks on asymmetry in the

genital plates and appendages of certain roaches. He also called attention to the great extent to which sexual dimorphism is developed in the same group, illustrating this point by specimens. Dimorphism and polymorphism within the male sex in several species of roaches was also mentioned.

Meeting of April 27, 1916, Dr. Henry Skinner presided. Twelve members present. Mr. William S. Huntington was elected a member.

Lepidoptera. Dr. Skinner exhibited the imago of the Hesperid, *Megathymus yuccae,* which emerged from the larva in the yucca plant secured by Dr. Castle, May 20, at Enterprise, Florida (see Ent. News, xxvii, 45). Mr. Laurent recorded his capturing a ♂ and ♀ *M. yuccae,* in March, 1907, at Melbourne, Florida. Dr. Calvert, referring to his remarks at the previous meeting on larval cases, reported that he had examined more of these, and had found the conditions to be the same in all; he believed, however, that the portions of insects so attached to the cases, were not from insects captured alive by the larvae, but were more likely fragments of dead insects, found and so attached by it.

Orthoptera. Mr. Rehn called attention to and read extracts from an interesting paper by Mr. E. D. Ball on "Estimating the number of Grasshoppers" (Jour. Econ. Ent., viii, No. 6, 1915). He exhibited the Academy's series of the gigantic Katydids of the Group Steirodontes, including all but two of the known genera, and comprising half of the known species of the genera represented. The rarity of certain of the species in collections was commented upon, and remarks on the distribution of the forms of the *marginella* group of the genus *Stilpnochlora* illustrated. Mr. Laurent exhibited a grasshopper (*Romalea microptera*) impaled on a twig of pecan tree probably done by a shrike or butcher bird (Laniidae); this was collected by him at Gulf Hammock, Levy County, Florida, March 15, 1916.

Odonata. Dr. Calvert exhibited *Gomphus amnicola* Walsh, ♂ Marysville, Pennsylvania, July 14, 1912; ♀ Harrisburg, Pennsylvania, July 9, 1910, by H. B. Kirk. The only previous eastern record is from Bethlehem, New York, 1870. *Gomphus quadricolor* Walsh, one ♂ Heckton Mills, Dauphin County, Pennsylvania, June 15, 1909, by H. P. Bailey; two more (supposedly local) individuals of the latter species, from the Academy's collection, with insufficient labels were also shown, leading to remarks by several members on the importance of accurately labeling all captures.

R. C. Williams, Jr., *Secretary.*

Feldman Collecting Social.

Meeting of April 9, 1916, at the home of H. W. Wenzel, 5614 Stewart Street, Philadelphia. Twelve members were present. President H. A. Wenzel in the chair.

Coleoptera. Mr. Kaeber exhibited a specimen of *Ligyrus rugiceps* LeC., which he collected at light, Philadelphia Neck, July 19, 1915. Mr. H. W. Wenzel exhibited two boxes of about a thousand specimens of Aleocharinids, which were collected by the Wenzels, Senior and Junior, the past summer; he showed a funnel arrangement containing a wire mesh, the funnel fitting in the neck of a cyanide bottle, and when fungi are placed in the funnel the staphylinids drop through the wires into the bottle.

Diptera. Mr. Daecke exhibited a specimen of *Promachus rufipes* Fabr., collected by Morgan Hebard, at Cedar Springs, New Jersey, August 26, 1914. This is new to the State.

Adjourned to the annex.

Meeting of May 17, 1916, at the same place. Twelve members and one visitor present. President H. A. Wenzel in the chair.

Diptera. Mr. Hornig stated he had seen the first live local larvæ of *Aedes canadensis* Theob. on April 13, and of *A. sylvestris* Theob. on April 21. Mr. Daecke exhibited some leaves from an oak tree near Conewago, Pennsylvania, May 13, which with the rest of the leaves on this tree had the edges rolled up and browned; these contain Cecidomyid larvæ.

Coleoptera. Mr. Haimbach said he had seen the first *Lachnosterna* at light on his place, Homebrook, Narberth, Pennsylvania, on May 1. Mr. Laurent said he had collected many *Silpha* on a dead hog in Levy County, Florida, this spring after the buzzards finished with it and was surprised to notice that many of them had a small piece missing from the edge of one elytron, and in most cases the right one; *S. americana* Linn. and *inaequalis* Fabr. were exhibited showing this. Mr. H. W. Wenzel exhibited *Pseudocleis picta* Rand. and both its varieties, *minor* Casey and *hudsonica* Casey.

Coleoptera and **Hymenoptera.** Mr. Daecke exhibited three galls from *Pinus americanus*, collected at Rockville, Pennsylvania, April 16, 1916, from which on April 30, 1916, one *Podapion gallicola* Riley emerged with two small Hymenoptera, presumably parasites of same.

Adjourned to the annex.

GEO. M. GREENE, *Secretary.*

Chicago Entomological Club.

Meeting of March 19, 1916, at home of Mr. Emil Beer. Seventeen members present.

Lepidopterists had the Sesiidae as a subject and compared specimens. Local captures reported were: *Melittia satyriniformis* feeding in melon vines, *Podosesia syringae* feeding in ash and lilac, *Memythrus tricinctus* feeding in poplar, *Memythrus asilipennis* feeding in oak

stumps, *Memythrus dollii* feeding in poplar, *Bembecia marginata* feeding in raspberry roots, *Sesia tipuliformis* feeding in currant, *Sesia pictipes* feeding under bark of cherry trees, *Sesia albicornis* feeding in willows, *Sesia acerni* feeding in maple, *Sesia corni* and two or three others not satisfactorily identified.

Coleopterists had the Hydrophilidae as a subject and compared specimens. A. KWIAT, *Secretary.*

OBITUARY.

GEOFFREY MEADE-WALDO, in charge of the Hymenoptera at the British Museum of Natural History since 1909, died very suddenly on March 11, 1916, of the after-effects of an attack of pneumonia. He was born in January, 1884, educated at Eton and at Oxford, took part in the cruise of Lord Crawford's "Valhalla" to the Malay Federated States and Borneo in 1907-08 and had published on various groups of Hymenoptera in the *Annals and Magazine of Natural History* and in the *Transactions of the Entomological Society of London.* Obituary notices in *The Entomologist* for April and *The Entomologist's Monthly Magazine* for May, 1916, give further particulars.

FREDERICK ENOCK, known for the beauty of his microscopical preparations and for his studies of those minute Hymenoptera, the Mymaridae, died at Hastings, England, May 26, 1916. He was born at Birmingham, April 17, 1845. In 1887-88 he engaged in a controversy with Prof. C. V. Riley respecting the Hessian Fly. According to an obituary notice in the *Entomologist's Monthly Magazine* for July, 1916, he leaves a number of manuscripts and photographs illustrative of undescribed Mymaridae.

DR. KARL KRAEPELIN, Director of the Natural History Museum at Hamburg since 1889, who died June 28, 1915, was the author of memoirs on the structure, mechanism and development of the sting of bees (1873), the anatomy and physiology of the proboscis of *Musca* (1883), of the sections on Scorpions and on Palpigrades in *Das Tierreich* and of other

entomological contributions. He was born in Neustrelitz, December 14, 1848, and studied at Göttingen and Leipzig. A brief notice of his life, chiefly from the geographer's standpoint, is given in *Petermann's Mitteilungen*, lxi, 315.

Lucas Friedrich Julius Dominikus von Heyden, who died September 13, 1915, at Frankfurt am Main, is the subject of an appreciative obituary notice and portrait in the *Entomologische Blätter* (Berlin) for December 30, 1915. Von Heyden was born in Frankfurt, May 22, 1838, and spent most of his life in that city, although he made entomological excursions into Spain, Portugal, Croatia, Slavonia and Bosnia, as well as in the neighborhood of his home. His associates included Reitter* and Hopffgarten, the coleopterists, Saalmüller (whose work on the Lepidoptera of Madagascar he completed), Moritz Schmidt, Oskar Böttger and Albrecht Weiss. He devoted himself chiefly to palaearctic insects, accumulating a collection of 20,000 species, chiefly Coleoptera. By an agreement with the late Dr. Kraatz, his beetles go to the German Entomological Museum in Berlin; his other insects he presented to the Senckenberg Naturforschenden Gesellschaft in Frankfurt, which in June, 1911, established the Karl and Lucas von Heyden Fund (after father and son), of 50,000 marks, the income of which is expended for scientific publications. Von Heyden was the author of more than 350 papers and was very generous in loaning material from his collection to various specialists.

Elie Metchnikoff, who died in Paris, in an apartment of the Pasteur Institute, of which he was Sub-director, on July 15, 1916, was chiefly known in recent years for his researches into the causes of old age, into various human diseases and into the functions of the white blood corpuscles. But as a note in the News for February, 1915 (page 83), pointed out, he had, in the third decade of his life, devoted much time to investigations on the terrestrial Arthropods. Such were his

*Edmund Reitter celebrated his 70th birthday on Oct. 22, 1915.

Embryologische Studien an Insecten (1866), *Untersuchungen über die Embryologie der Hemipteren* (1866), *Embryologie des Scorpions* (1871), *Entwicklungsgeschichte des Chelifer* (1871), *Embryologie der doppeltfüssigen Myriopoden* (*Chilognatha*) (1874) and *Embryologisches über Geophilus* (1875); all of these memoirs appeared in the *Zeitschrift für wissenschaftliche Zoologie*. His *Untersuchungen über die intracelluläre Verdauung bei wirbellosen Thieren* (Arb. Zool. Inst. Univ. Wien, 1883) formed a transition to his later studies alluded to above. Among his more general writings were *Immunity from Infective Diseases, The Nature of Man and Prolongation of Human Life*. He was born in Kharkov, Russia, May 15, 1845, studied at Giessen and Munich, was Professor of Zoology and Bacteriology in the University at Odessa 1870-1882, and went to the Pasteur Institute in 1888.

An obituary notice of IGNAZ MATAUSCH (September 1, 1859—December 14, 1915) known for his papers on Membracidae and especially for the large models of insects and other invertebrates which he constructed for the American Museum of Natural History in New York, has appeared in the June, 1916, number of the *Journal of the New York Entomological Society* (received August 15, 1916).

In the *Journal of Economic Entomology* for February last, Dr. A. Böving gave an extract from Dr. C. Aurivillius' obituary notice, in *Entomologisk Tidsskrift*, 1915, of SVEN LAMPA (1839—December 2, 1914), one of the founders of the Swedish Entomological Society in 1879, editor of the *Tidsskrift*, 1891-1901, and chief of the Swedish entomological service 1897-1907. Dr. Aurivillius' notice includes a bibliography.

Miss CORA HUIDEKOPER CLARKE, born in Meadville, Pennsylvania, February 9, 1851, died in Boston, April 2, 1916, was the author of several papers on caddis worms and a successful rearer of gall-flies. A brief account of her life is in *Psyche* for June, 1916.

NOVEMBER, 1916.

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E. T. CRESSON, Jr., Associate Editor.

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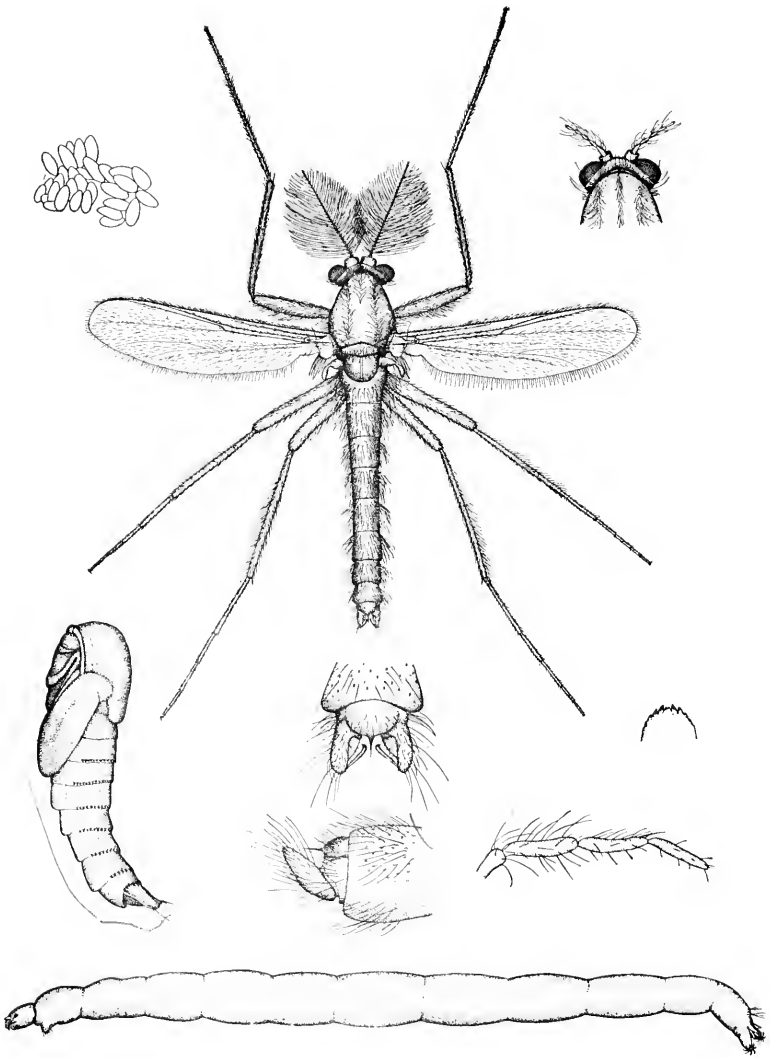

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ENTOMOLOGICAL NEWS

AND

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Two Insect Associates of the California Pitcher-plant, Darlingtonia californica (Dipt.)

By FRANK MORTON JONES, Wilmington, Delaware.

(Plates XX, XXI.)

Metriocnemus edwardsi nov. sp. (Diptera: Chironomidae.) (Plate XX.)

In September, 1875, Mr. Henry Edwards communicated to the California Academy of Sciences the results of his observations on the insect associates of the California Pitcher-plant, *Darlingtonia californica*. Following thus closely after Mellichamp's and Riley's papers on our eastern Sarracenias and their insect victims and guests, it is noteworthy that *Darlingtonia*, by its peculiar structure, its insect-catching activity, and the number and variety of its victims evidently closely com-

parable with the better known Sarracenias, yet seemed to be almost destitute of insect associates other than victims of its traps. For example, with our eastern *Sarracenia purpurea*, from Canada to the Gulf, are found *Exyra rolandiana*, *Wyeomyia smithii*, *Metriocnemus knabi*, *Sarcophaga sarraceniae* (or related species), *Papaipema appassionata*, *Olethreutes daeckeana*, and other less constant associates; in *Darlingtonia* Mr. Edwards found only numerous small spiders (these are also abundant in *Sarracenia*) and "invariably .....among the mass of decay some living larvae of a small dipterous insect, probably one of the *Tipulidae*."

By the examination of numerous freshly-gathered vigorous plants of *Darlingtonia* furnished me at intervals through the summer of 1915 by Mr. A. A. Heller and Mr. G. M. Pendleton, I secured many living examples of the small dipterous larva noticed by Mr. Edwards, and also of another and larger species, both of which I succeeded in rearing in some numbers. The former proves to be closely related to *Metriocnemus knabi* Coq., the almost invariable associate of *Sarracenia purpurea*, differing but little in the imago, but as might be anticipated presenting more evident structural divergence in the larva and pupa; for the water-filled leaf of *purpurea* offers to the early stages of *knabi* a habitat almost strictly aquatic, whereas the new species, which may be called *Metriocnemus edwardsi*, seems perfectly at home among the insect remains in *Darlingtonia* as long as they are even slightly moist, and its pupal stage is passed, not as by *knabi* enclosed in a watery welt-like gelatinous mass on the inner wall of the pitcher, but (in captivity) outside the leaf, naked and loosely adherent to the moist basal portion of the plant or in the adjacent moss, over which it wriggles actively when disturbed. A single egg-mass, probably unfertilized, was obtained by confining the flies with *Darlingtonia* leaves and moist moss, but as they were not detected until after the death of the female which was found clinging to the partially-dried egg-mass, it is possible that further observation may modify the following description of the eggs and their method of deposition.

Egg.—Approximately circular in cross section, elongated, slightly more pointed at one end, clear pale yellow in color, of smooth and somewhat polished texture; length .22 mm.; cross diameter .11 mm.; deposited in a strongly adherent irregular mass; examined and measured at 100 X.

Larva.—Slender, almost cylindrical; smooth, pale, but darker than *knabi* and of a decidedly brownish rather than yellow-white tone; head darker, tending toward pale ferruginous; eye-spots black, prominent, sub-oval, not so obviously formed by the fusion of two spots as in *knabi;* antennae inconspicuous, shorter than in *knabi;* mandibles and labium dark brown, the former with five teeth proportioned as in *knabi* (Knab's illustration), the latter with a single pair of small teeth medially (not two pairs as in *knabi*) followed by a series of larger ones; claws of anterior and posterior prolegs yellowish-brown, in form as in *knabi;* dorso-caudal papillae slightly darkened and much lower, smaller, and less conspicuous than in *knabi,* in height about once their diameter, and armed with fine black setae which are often appressed into apparently one; some of these setae are frequently broken at various lengths or entirely missing, and the normal full number is probably six; four retractile anal blood-gills on the twelfth segment; length before pupation about 7 mm.

Pupa.—At first pale, soon darkening to dull brown and then to almost black with the pigmentation of the enclosed imago; of the usual form, with enlarged thorax but without projecting respiratory tubes or filaments; caudal end broadened, paddle-like, partly cleft, the two flattened lobes held in the same plane and rounded, each with three fine black setae usually appressed and appearing as a single tapering bristle on its exterior edge; the abdominal segments near their dorsal posterior edge have a fringe of short stout downward-pointing spines, amber-colored tipped with brown. The pupa is naked and quite active, travelling over moist surfaces with considerable facility. The duration of this stage is very short.

♂. Smoky brown to black; antennae 14-jointed, strongly plumose with black hairs, the disc-like basal joint more densely colored than the remaining somewhat translucent joints; eyes black; palpi four-jointed, the first joint shortened and bulb-like, the remaining three of approximately equal length, the first three joints bearing long hairs, the last joint with a few very short fine ones.

Thorax dark, concolorous, and with three lines of hairs springing from minute polished black rounded granules, the median line posteriorly abbreviated at less than half the length of the mesonotum, the lateral lines broadening and terminating only slightly in advance of the scutellum; a minute double pit medially, in line with the termination of

the lateral stripes; post alar callus somewhat produced and flattened, strongly haired; prealar callus protuberant, roughened, and strongly haired; scutellum narrow, rounded, pale brownish-gray, with a transverse row of long fine hairs; post-scutellum deep dull black, faintly polished and obscurely pitted; halteres club-shaped, usually pale, but smoky in heavily-pigmented examples; legs smoky brown with dark vestiture, the femora hairy; vestiture of tibiae shorter, though successively longer and more hair-like on the second and third pairs; front metatarsi about half the length of their tibiae; all tibiae spurred. Wings not very densely clothed with fine short gray-brown hairs, stronger on the costal edge; the R-M cross-vein either barely in contact with the radius without fusion, or in some examples failing to reach the radius by its own width; fork of cubitus slightly distad of origin of cross-vein.

Abdomen unmarked, smoky brown to dull black; clothed dorsally and ventrally with long hairs, black but in some lights with pale brown reflections, springing from slightly elevated polished bases; hypopygium with a central needle-like dorsal keel, the point translucent, the broadened rounded base hairy; its lateral lobes strongly haired, their slender inward-hinged terminal joints somewhat clubshaped and ending with a pointed lateral projection on each. Length, dry examples, 3 mm.; in balsam, nearly 4 mm.

♀. Much paler and more yellowish-brown than the male; the abdomen distended, not so conspicuously hairy; the wings slightly shorter and broader; antennae of six visible joints, the disc-like basal joint smaller than in the ♂ and yellowish-brown; the second joint slightly larger than the remaining four, which are of nearly equal length; all but the basal and terminal joints bear a few long sub-erect hairs; hairs of terminal joint very fine and short; palpi as in the ♂; eyes black; thorax more densely colored than the abdomen; its hairs pale yellowish-brown; leg-vestiture dark. The large bodied females shrink so in drying that measurements of them are deceptive; in balsam they slightly exceed the ♂ in length.

Described and illustrated from many examples of both sexes, of which I designate as types, ♂ and ♀, a pair mounted dry and deposited in the U. S. National Museum (Cat. No. 20317); paratypes are with the Academy of Natural Sciences, Philadelphia, and in my own collection.

Type locality, Mount Eddy, near Sisson, Siskiyou County, California; occurrence of larvae, pupae and flies, apparently throughout the warm months; hibernation probably as larvae of various ages.

This insect, which I provisionally describe under *Metriocnemus,* eventually may find its place in a related genus; *knabi* already has been separated by a European student of the group, who finds that it has well-developed pulvilli, a character which I have been unable to detect in *edwardsi;* slides of the ♂ genitalia of the two species indicate that in *knabi* the keel is shorter, slighter and more transparent, and the lateral lobes proportionately shorter and broader. The presence of larvae of *edwardsi* in almost every suitable leaf of *Darlingtonia* containing insect remains indicates that its association with this plant, like that of *knabi* with *purpurea,* is habitual, and possibly exclusive.

In the leaves of *Darlingtonia,* along with the larvae of *Metriocnemus* and as far as was observed living in amicable relationship with them, was found another dipterous larva sharing the same food-supply of captured insects. The larvae of the two species, often more or less entwined in their confined quarters, are not conspicuously different in size or form though separable to the naked eye by their different methods of progression; under low magnification it becomes immediately apparent that their relationship is remote. Eggs and empty puparia were also found in abundance in the leaves, and from the larvae numerous flies were bred to maturity. These prove to belong to the family *Chloropidae,* and, I am informed, belong to one of the three or more species standing in American collections under the name of *Botanobia trigramma* Loew; *trigramma* was described from the District of Columbia, its size is given as only about half the average and much less than the apparent minimum size of the present species, for which I propose the name of

Botanobia darlingtoniae n. sp. (Diptera: Chloropidae.) (Plate XXI.)

The eggs of this fly are deposited singly on the inner wall of the leaf, above the mass of insect remains and often well up toward the orifice of the pitcher; they are not strongly adherent and are frequently wedged under the fine elastic hairs which clothe the leaf-wall. From one to twenty eggs may be

found in a leaf, but even when most numerous they do not appear to have been laid in groups or clusters, and the maximum number is attributable to the visits of more than one female to the same leaf.

Egg.—Cigar-shaped, roundedly-pointed at one end, the other with a short cylindrical or collar-like cap of less diameter than the body of the egg; obscurely and shallowly wrinkled longitudinally; white, opaque, pearly, faintly polished, under 100 X finely punctate; length .9 mm., and greatest diameter .2 mm.

Larva.—Slender, cylindrical, tapering and strongly retractile anteriorly; white, translucent, smooth, but segmentally with narrow ventral fusiform areas marked by short acute granules, coarser beneath and fading out laterally; black cephalo-pharyngeal skeleton with two great hooks visible through the translucent anterior segments; anterior spiracle inconspicuous, few-lobed, concolorous, not protruded; the two posterior dorsal stigmata in form of even-armed crosses surmounting prominent dome-shaped processes, the inner arm of each cross partially obliterated by the circular extremities of the tracheal tubes; anal lobes low, smoothly rounded; extreme length about 5 mm. The larvae are active, moving freely about among the insect remains and climbing up the vertical wall of the pitcher in search of food or when ready to pupate.

Puparium.—Shorter and stouter than the larva and hardening to a dull bronzy-brown color; flattened ventrally where in contact with the leaf; segmentation not distinct; first visible segment flattened, transversely wrinkled, darker in color; anterior spiracles small, hand-like, slightly projecting, black; second segment low-arched, the succeeding segments more highly arched until posteriorly they become almost cylindrical; the anterior segments on their lateral edges above have a well marked longitudinal angular depression, outside of which the margin is produced and rounded; the terminal dome-shaped processes bearing the shrunken larval stigmata are prominent but less regularly shaped than in the larva, concentrically wrinkled, and the dorsal area immediately preceding them is also roughened and transversely wrinkled; length, 3.5 mm.; pupation usually occurs among the dry insect remains or on the inner wall of the leaf often well up toward the orifice or even in the hood; pupal stage (in August) eight to ten days.

♂ ♀. Black, head and thorax not shining, surface roughened and thinly white-pollinose; mesonotum and scutellum studded with short spine-like black hairs; mesonotum three-striped, with an additional abbreviated dark stripe above each wing base; abdomen dark brown above (almost black when dry), broad, flattened, slightly glossed, microscopically punctate, finely haired; legs yellow and black.

Eyes widely separated, dark bronzy brown, finely pubescent; ocellar tubercle slightly raised, usually paler by denser pollinosity, the anterior ocellus inclined on its front edge; no frontal triangle, but a prominent slightly sunken narrowly oval dark marking, laterally pale-bordered, extending forward from anterior ocellus; orbits pale gray, those of the front sometimes tinged with brownish-yellow; the front produced, broadly snout-like, over the base of the antennae, this produced and rounded area being pale dull brownish-yellow, with several rows of recumbent and convergent hairs; a pair of post-ocellar bristles, erect, converging, their points crossed; these, with a pair of erect and divergent outer verticals, are the strongest of the head bristles, which are black, usually from black bases.

Antennae large, directed laterally, appressed to head; the first joint hidden, the second broadly bell-shaped, yellow often partially obscured with dark and with a marginal row of spur-like hairs from black bases; the third joint much enlarged, longer than broad, rounded apically, basally on inner side dull salmon-yellow, sometimes ferruginous, the remainder dark purplish gray, almost black, and both joints thinly and finely white pollinose; arista black and tapering, shortly and sparsely haired. The cheeks produced in advance of the face, in color pale dull brown sometimes varying to and always merging into the gray of the posterior orbits; cheeks conspicuously marked with black dots which form the bases of recumbent forward-pointing hairs; a pair of well-differentiated brown vibrissal hairs; the black dots continued in a regular row around the posterior orbits. Face black; clypeus and well defined median carina pale. Mesonotum with a narrow black median stripe (a dull black area destitute of pollen) extending to scutellum, two similar lateral stripes abbreviated slightly in advance of scutellum, and two short dark markings above the wing bases. On each side two humeral bristles, one to two anterior and two posterior notopleurals, two post alar and one pre-scutellar; the uppermost anterior notopleural weak and apparently sometimes missing.

Scutellum broad, rounded, almost semi-circular in outline, discally flattened, in color and texture like the mesonotum, but laterally broadly darker; marginal scutellars black, four pairs distinguishable; median pair best developed, their points approaching or crossed.

Halteres long, club-shaped, white, unmarked, their stems sometimes darkened to almost black.

Wings transparent, unmarked, iridescent, their surface roughened with minute evenly distributed rasp-like hairs; veins dark brown; anterior edge closely set with short bristly hairs directed obliquely forward, gradually merging into the short fine even-length fringe; the costal thickening obvious to V 1 plus 2 (4th longitudinal); axillary incision very deeply cut, its extremity rounded, separating from the rest

of the wing a long finger-shaped axillary lobe which is edged interiorly with long black hairs; second and third costal divisions equal, each twice as long as first; hind cross-vein twice its length from small cross-vein; III 4 plus 5 and V 1 plus 2 (third and fourth longitudinal) parallel.

Femora and tibiae set with stiff hairs; femora black usually shortly tipped with ferruginous yellow; tibiae yellow, broadly black-banded beyond the middle; tarsi yellow, terminal joints darkened to almost black; middle and hind legs with short tibial spurs.

Abdomen as stated, that of the ♂ rounded posteriorly, of the ♀ with an extruded hypopygium which is slender, tapering, finely haired, furcate and appressed, a long bristle terminating each fork; lateral and ventral posterior margins of segments gray-edged.

Average length, dry specimens, ♂, 2.1 mm.; ♀, 2.4 mm.; minimum and maximum of twelve examples 1.9 mm. and 2.8 mm.

Type locality Mount Eddy, near Sisson, Siskiyou County, California; types ♂ and ♀, are in the U. S. National Museum (Cat. No. 20318), paratypes with the Academy of Natural Sciences, Philadelphia, and in my own collection.

Eggs, larvae and puparia were abundant in the plants July 26; emergences of the flies took place from July 29th to August 19th; plants examined September 26th contained many empty puparia, no living early stages, and a single ♀ fly, indicating probable hibernation in the final stage.

In the preparation of this paper I am indebted to several entomologists for examination of specimens and courteous reply to my inquiries, and especially to Mr. Frederick Knab and Mr. E. T. Cresson, Jr., without whose generous assistance and criticism its completion would have been most difficult.

EXPLANATION OF PLATES.

PLATE XX.

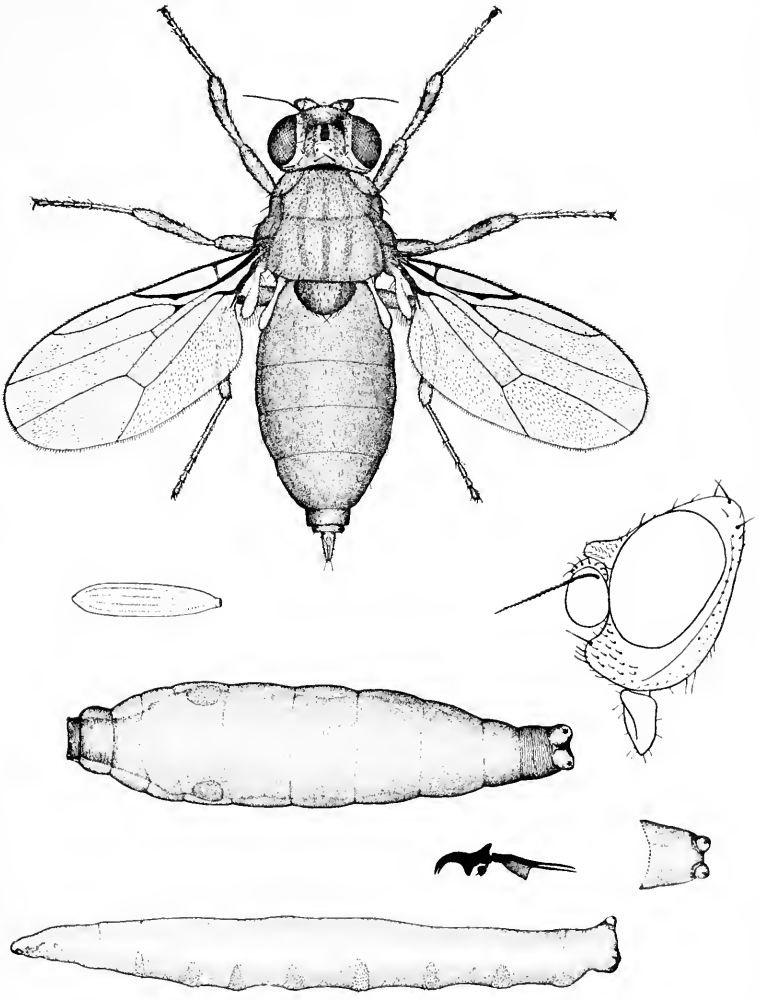
Metriocnemus edwardsi. Egg mass, male, female head, pupa, male genitalia, labium of larva, male palpus, larva.

PLATE XXI.

Botanobia darlingtoniae. Female, egg, head-profile, puparium, larva, cephalopharyngeal skeleton, dorsal view of caudal end of larva.

Change of Address.

Mr. NATHAN BANKS, of East Falls Church, Va., Assistant Entomologist, Division of Entomology, U. S. Dept. of Agriculture, since 1896, announces that, after November 1, his address will be Museum of Comparative Zoology, Cambridge, Mass.



BOTANOBIA DARLINGTONIAE—JONES.

On the Types of Certain Noctuid Genera occurring in North America (Lepid.).

By J. McDunnough, Ph.D., Decatur, Illinois.

In the course of the preparation of a list of North American Lepidoptera the problem has presented itself to us as to whether the genera of the Noctuidae as used by Sir George Hampson, in the *Catalogue of the Lepidoptera Phalaenae of the British Museum*, can be accepted according to the current codes on nomenclature. Sir George Hampson has in every instance, irrespective of the work of any previous entomologist, fixed the type of each genus, when not particularly specified by the author, as the *first species* placed under the generic name; this procedure has resulted in numerous alterations in our usual conception of the Noctuid genera and in many instances of most confusing interchanges of generic names. While personally we are rather in favor of this "first species" principle of type fixation we find both from personal conversation and from our correspondence that the majority of systematists are decidedly against such a procedure and are more or less agreed that the type of a genus should be fixed according to rules such as are laid down in Banks & Caudell's *Entomological Code*, Washington, 1912. Believing that the true interests of science will be better served if we abandon our own personal leanings and follow the ruling of the majority we have endeavored in the following paper to give the results of our search for the types of a number of Noctuid genera according to the rules of the above-mentioned Code, and it will doubtless be noted with pleasure by non-systematic entomologists that by this method the old conception of many genera has again been restored.

We have decided to disregard Hübner's *Tentamen* names and credit them mostly to Ochsenheimer (1816); even if later it be decided that the *Tentamen* is valid and the genera therefore be attributed to Hübner very little change in the generic conception will be necessary as in most instances the genotype proves to be the species mentioned by Hübner in the aforesaid work.

The sequence is that of Hampson's Catalogue and we have in general confined ourselves in this article to those genera the genotype of which, as determined by our method, is markedly different from that as determined by Hampson.

Heliothis Ochs., 1816.

Type designated by Duponchel (1829, Lep. Fr. VII (2) p. 71) as *dipsacea* L. and confirmed by Curtis (1836, Br. Ent.), Westwood (Gen. Syn. 1840), Guenée (1852, Hist. Nat. Lep. Noct. II, 181), and Grote (1874, Buff. Bull. II, 35). Hampson's conception of the genus with *cardui* Esp. as type cannot stand; *Heliothis* will replace *Chloridea* West. as used by Hampson.

Melicleptria Hbn. (1825).

Type designated by Grote (l. c. I, 116, 1873) as *cardui* Hbn. *Anthoecia* Bdv. (1840) will fall before *Melicleptria,* the type having been designated by Guenée (1852, l. c. II, 187) as *cardui* Hbn. This genus will replace *Heliothis* as used by Hampson, whilst *Canthylidia* Butl. may apparently be used for his conception of *Melicleptria.*

Agrotis Ochs. (1816).

Type designated by Curtis (1827, Brit. Ent.) as *segetum* Schiff. and confirmed by Westwood (1839) and Grote (1874). Hampson places *segetum* in *Euxoa,* owing doubtless to the slightly tuberculate front; the male genitalia as figured by Burrows & Pierce (Gen. Brit. Noct.) show however a structure of the harpe quite dissimilar to the bifid one characteristic of Grote's genus *Carneades* which is made a synonym of *Euxoa* by Hampson. The type of *Euxoa* has been fixed by Hampson as *decora* Schiff. and a study of the genitalia of this species will be necessary before we can determine with certainty the correct usage of these three genera. According to J. B. Smith's revision of the Agrotid moths *segetum* is structurally very closely related to *ypsilon* so that very possibly Hampson's usage of *Agrotis* may be in a broad sense correct.

Noctua Linn (1758).

The first real designation of the type of this genus seems to have been by Latreille in 1810 as *pronuba* Linn., Duponchel's designation of *exclamationis* L. as type in 1829 being thus invalid. *Pronuba* being designated by Duponchel (1829) as the type of *Triphaena* Ochs. it would seem that *Triphaena* falls as a synonym of *Noctua* L. In any case Hampson's usage of *Noctua* with *strix* as type and of *Triphaena* (which he credits to Hübner) with *interjecta* as type will certainly not hold. *Pronuba* is placed by Hampson under *Agrotis* and, if this association be correct, it will cause *Agrotis* possibly to fall before *Noctua,* but as we have already stated more careful study of the structure of

the generic types is necessary to establish the relationships of the various Agrotid genera. Our N. American species listed by Hampson under *Triphaena* will fall into *Rynchagrotis* Sm. as the type of this genus was distinctly stated by Smith in his Agrotid revision (p. 9) to be *cupida* Grt. For further references regarding the types of *Noctua* and *Triphaena* we would refer the reader to a paper by Grote in Proc. Am. Phil. Soc. Vol. XLI, 1902.

Mythimna Ochs. (1816).

The type was first specified by Duponchel in 1829 as *albipuncta* Fabr., but Hübner in 1822 (Verz. p. 239) had already restricted the genus to *oxalina* Hbn. and *acetosellae* Schiff., a fact which was overlooked by all subsequent authors. Hampson's usage with *oxalina* as type would be therefore correct. *Mesogona* Bdv., the type of which was specified by Guenée (1852) as *acetosella* Schiff., will fall as a synonym.

Eurois Hbn. (1822).

Type specified by Grote (1874, Buff. Bull. II, 12) as *occulta* L. and the genus will probably fall before *Lycophotia* Hbn., the type of which Hampson specifies as *porphyria* Schiff. Hampson's usage of *Eurois* with *prasina* L. as type is incorrect. *Aplecta* Gn. (placed in the synonymy by Hampson) cannot be used in its place as the type was designated by Guenée (1852) as *nebulosa* Hfn., a hairy-eyed species placed by Hampson in *Polia*. *Matuta* Grt. (type *tenebrifera* Wlk.) must apparently be used.

Polia Ochs. (1816).

The type of the genus was designated by Curtis in 1828 as *nebulosa* Hfn. Hampson's usage of the genus is therefore correct. Duponchel's fixation in 1829 of the type as *compta* Esp. (*concinna* Hbn.) is antedated by Curtis' action.

Mamestra Ochs. (1816).

The type was designated by Duponchel in 1829 as *brassicae* L. Grote, however, justly contends that Hübner's restriction of the genus in the *Verzeichniss* (p. 214) rendered Duponchel's action *ultra vires* and specifies the type as *pisi* L., which would cause *Mamestra* to fall as a synonym of *Polia*.

Xylomyges Gn. (1852).

Grote specified the type of the genus in 1874 as *conspicillaris* Schiff. and Guenée's name will therefore replace *Xylomania* Hamp.

Hadena Schr. (1802).

The type of this genus has been variously chosen by Duponchel, Curtis, Westwood and Guenée, but none of the authors has mentioned one of the original specimens as type. Grote (Ent. Rec. VI, 78, 1895) designates the type as *cucubali* Schiff. and makes *Dianthoecia* Bdv. synonymous. We would refer students to this paper and to the paper

in Proc. Am. Phil. Soc. 1902, p. 13, for further evidence. Lederer's conception of *Hadena* which has been followed largely in Europe cannot hold nor can Hampson's with *reticulata* Will. (*typica*) as type. In place of *Hadena* as used by Hampson *Neuria* Gn. may be used.

Meliana Curt. (*Melia* Curt.) (1828).

Hampson's use of this as a Noctuid genus with type *flammea* Curt. is quite erroneous, as Curtis designates the type of the genus as *sociella*, one of the *Galleriinae*. Curtis in the text uses the spelling *Melia*, which name is preoccupied, but in the index he has changed it to *Meliana*, either in error or on account of discovering that the generic name already existed. *Neleucania* Sm. may again be substituted for *Meliana*.

Orthosia Ochs. (1816).

Curtis specified the type in 1828 as *instabilis* Schiff. (*incerta* Hufn.). This genus will therefore replace *Momina* Hbn. as used by Hampson. If the Tentamen be adopted *Orthosia* will fall to *Graphiphora* Hbn. with type *gothica;* otherwise *Graphiphora* Ochs. (1816) will fall in the *Agrotinae* with type specified in 1839 as *c-nigrum* by Westwood.

Cloantha Gn. (1839).

The type was specified by Guenée in 1852 as *perspicillaris* Schiff. (*polyodon* Cl.). Hampson in Vol. IV of his Catalogue sinks *Chloantha* Gn. (*sic*) with type *hyperici* Schiff. to *Actinotia* Hbn. and later in Vol. VI. uses the name *Cloantha* with same reference and type as *solidaginis* Linn. The first reference is correct in the light of Guenée's type fixation; *Xylophasia* Steph., the type of which was fixed by Westwood (1840) as *polyodon*, will also become a synonym of *Actinotia*. In Vol. VI the name will be replaced by *Lithomoia* Hbn., the type of which was fixed by Curtis in 1838 as *solidaginis* Hbn.; in place of *Lithomoia* as used by Hampson *Hyppa* Dup. should again be valid.

Xylena Ochs. (1816).

Misspelt *Xylina* by Treitschke and all following authors. The type was designated in 1829 by both Curtis and Duponchel as *exoleta* L. so that Hampson's usage is perfectly correct.

Tethea Ochs. (1816).

Type specified in 1829 by Curtis as *or* Fabr. and the genus therefore falls into the *Thyatiridae*. Hübner in 1822 had already restricted the genus to *duplaris* L. and *fluctuosa* Hbn. which are congeneric with *or*.

Atethmia Hbn. (1822).

The type of the genus was designated by Grote in 1874 as *xerampelina* Hbn.; later in 1895 he changes this to *subusta* Hbn., but his first action must hold. *Cirrhoedia* Gn., with type specified by the author as *xerampelina* Esp., will fall as a synonym. Hampson's usage is correct.

Xanthia Ochs. (1816).

The generic type was specified by Curtis (1825) as *flavago* Fabr. (*lutea* Strom) and *Xanthia* will therefore replace the genus *Cosmia* of Hampson.

Glaea Steph.

The genus, apart from the *Tentamen*, was apparently first used by Stephens in 1829 and *vaccinii* L. specified as type by Curtis in the same year; it will therefore sink to *Conistra* Hbn.

Cosmia Ochs. (1816).

Duponchel specified the type as *diffinis* Linn. in 1829; the genus must replace *Calymnia* Hbn. as used by Hampson.

Parastichtis Hbn. (1822).

Grote specified the type of this genus (Can. Ent. 1900, p. 212) as *suspecta* Hbn. The genus therefore replaces *Amathes* Hbn. of Hampson, which in any case could not be used as Hampson uses it, the type having been fixed by Grote in 1895 (Ent. Rec.) as *baja* L.; for *Parastichtis* as used by Hampson, *Septis* Hbn. is apparently the only available generic name.

Trachea Ochs. (1816).

Hampson's usage is correct in a broad sense as the type of the genus was restricted by Hübner in 1822 to *atriplicis* L. and specified by both Curtis (1839) and Westwood (1839) as the same species.

Perigia Gn.

Type specified by Grote (1874) as *xanthoides* Gn.; Hampson's usage is correct.

Oligia Hbn. (1822).

Type specified by Grote (1895) as *strigilis* L. *Miana* Steph. with the same type, fixed by Westwood in 1839, falls as a synonym. Hampson's usage is again correct.

Luperina Bdv. (1829).

The type was fixed by Duponchel in 1829 as *testacea* Schiff. and this usage is followed by Guenée, Grote and Hampson.

Caradrina Ochs. (1816).

The type was designated in 1829 by Duponchel as *i-intactum* Hbn.; Hübner however in the *Verzeichniss* had already restricted the genus to the species *neglecta* Hbn., *respersa* Schiff., *laevis* Hbn., *blanda* Schiff., *alsines* Bork. and *taraxaci* Hbn., so that Duponchel's designation was presumably incorrect. Curtis in 1837 gave *morpheus* as the type and Westwood in 1840 *cubicularis* Schiff., both of which for the same reason cannot be accepted. Guenée in 1852 named *alsines* Bork. as type and this, being one of the species included in Hübner's restriction, is valid. *Caradrina* will therefore replace *Athetis* Hbn. as used by Hampson.

Trigonophora Hbn. (1822).

The type was specified by Grote (1874) as *empyrea* Hbn. (*flammea* Esp.) and the genus must therefore replace *Rhizotype* Hamp. (l. c. Vol. VI, 373) leaving *Phlogophora* Tr. with type *meticulosa* L., fixed by Duponchel in 1829, to be used in its place. *Solenophora* H. S. and *Brotolomia* Led. fall as synonyms.

Callopistria Hbn. (1822).

This genus will have priority over *Eriopus* Tr. according to the latest investigations regarding the dates of the various parts of the *Verzeichniss* (*vide* Ann. Mag. N. Hist. Jan. 1912).

Bryophila Tr. (1825).

This genus, the type of which was designated by Duponchel (1829) as *glandifera* Schiff. (*muralis*), will fall before *Metachrostis* Hbn. (1822), the type of which is fixed by Hampson as *muralis* Forst.

Diphthera Ochs. (1816).

The type was fixed by Duponchel (1829) as *orion* Esp. and the genus must therefore replace *Dascochacta* Warr. as used by Hampson (l. c. Vol. VIII, p. 22).

Acronycta Ochs. (1816).

Type fixed by Duponchel (1829) as *leporina* L. following Hübner's restriction in 1822 to *leporina* and *bradyporina*.

Lithomoia Hbn. (1822).

The type was fixed by Curtis (1838) as *solidaginis* Hbn. the genus however being misspelled *Lithomia*. As already stated *Hyppa* Dup. will be used in place of Hampson's *Lithomoia*.

Gortyna Ochs. (1816).

The genus was restricted in 1822 by Hübner to the single species *micacea* Esp. We imagine therefore that Grote (Ent. Rec. 1895) is correct in designating this species as type and overlooking the naming by Curtis, Westwood and Guenée of *flavago* Schiff. as type. If Grote be followed *Gortyna* will replace *Hydroecia*, the type of which was specified by Guenée (1852) as *micacea* Esp. Instead of *Gortyna* as used by Hampson Lederer's genus *Heliotropha* may be employed.

Apamea Ochs. (1816).

The type of the genus was fixed in 1829 by Curtis as *chrysographa* Schiff. (*nictitans* L.); Grote's remarks (1902 Proc. Am. Phil. Soc. XLI) are hardly to the point after Curtis' action. Hampson's usage is correct.

Nonagria Ochs. (1816).

Type designated by Duponchel in 1829 as *typhae* Hbn. and *Nonagria* will therefore replace *Phragmatiphila* Hamp. a genus not represented

in N. America. *Senta* Steph. should apparently be used for *Nonagria* as employed by Hampson (*vide* Grote, 6th Rep. Peab. Acad. p. 29).

Calamia Hbn. (1822).

This genus, erected in 1822 for the three species *virens* L. *phragmitis* Hbn. and *fluxa* Hbn. was restricted by Lederer (1857, Noct. Eur. p. 125) to *phragmitis* Hbn. and *lutosa* Hbn.; as the former species is the only one of the original species included it virtually became type in 1857 and has been employed in this sense by all later authors. With *phragmitis* as type *Calamia* will replace *Arenostola* Hamp., leaving *Luceria* Hein. to be employed for Hampson's *Calamia*.

Erastria Ochs. (1816).

Type designated by Curtis in 1826 as *uncana* L. The genus will therefore replace *Eustrotia* Hbn. (type *unca* Schiff.) and *Emmelia* Hbn. must be used to replace *Erastria* of Hampson.

Acontia Ochs. (1816).

Hampson's usage is apparently correct as Hübner restricted the genus to the sole species *malvae* in 1825 (Verz. p. 257) and the later actions of Curtis, Duponchel and Guenée were therefore *ultra vires*.

Euclidia Ochs. (1816).

Type was specified by Duponchel in 1829 as *glyphica* L. and the genus will therefore replace *Gonospileia* Hbn. as used by Hampson.

Drasteria Hbn. (1818).

The genus was first used in the *Zuträge* in connection with *graphica* Hbn. which therefore as sole species becomes the type; it has been misapplied by Guenée for *erechtea* and allies and in this later authors have concurred.

Mocis Hbn. (1825).

This genus was restricted by Guenée (1852) to a group which included only *levina* Stoll of the original species which thus virtually became type at this time and would replace *Celiptera* Gn. as used by Hampson, although the two genera may be held separate on secondary sexual characters. In place of *Mocis* as employed by Hampson *Pelamia* Gn. (syn. *Remigia* Gn.) must be employed.

Colocasia Ochs. (1816).

Type was specified by Guenée in 1852 as *geographica* Fabr. but in view of Hübner's restriction in the *Verzeichniss* 1825 to *coryli* L. and *scoriacea* Esp. Hampson's usage with *coryli* as type must be held correct.

Panthea Hbn. (1825).

This genus, erected for the sole species *coenobita* Esp., will replace *Diphtera* Ochs. as used by Hampson.

Moma Hbn. (1822).

The genus was restricted by Lederer in 1859 to the sole species *orion* Esp. (*aprilina* Hbn.) which thus virtually became type and Grote's action in 1875 in selecting *astur* Cram. as the type of *Moma* can hardly be followed. *Moma* in our opinion will sink to *Diphtera* Ochs. and *Trichosea* Grt. will replace *Moma* as used by Hampson. This will necessitate changing the family name *Mominae* and we propose instead to use *Pantheinae*.

Phytometra Haw. (1809).

Following Stephens' doubtful restriction in 1829 the type of the genus was designated by Westwood in 1840 as *aenea* Schiff.; *Prothymia* Hbn. with the same species as type will fall as a synonym; *Autographa* Hbn., the type of which was fixed by Grote in 1895 as *gamma* L., will replace *Phytometra* of Hampson and the family name may be changed to *Plusiinae*. *Parilis* Hbn., the sole species placed by Hampson in the genus *Autographa*, may for the present be removed to *Syngrapha* Hbn., the type of which Grote designated as *devergens* Hbn. in 1895, the two species differing merely in some slight points of tibial spining. For *Syngrapha* as used by Hampson it may be necessary to erect a new genus but we would leave this to some future reviser to decide.

Plusia Ochs. (1816).

The type of the genus was fixed in 1829 by Duponchel as *chrysitis* L. Hampson does not separate *Plusia* from *Autographa* but for the present we would prefer to associate *Plusia* with the species of a metallic lustre; if Hampson be followed *Plusia* has priority over *Autographa*.

Caloplusia Sm. (1891).

The genus was apparently first mentioned in the Brooklyn Bull. VII, p. 68, 1884, but unassociated with any named species; in the 1891 Check List Smith uses it for *devergens* and *hochenwarthi;* the latter species being designated as type by Hampson, the genus therefore falls to *Syngrapha* Hbn.

In conclusion we give a partial list of some of the most important works where generic types of Noctuidae have been definitely designated.

Curtis. British Entomology, Lepidoptera, 1824-39.

Duponchel. Hist. Nat. d. Lépid. de France VII (2), 71, 1829.

Grote. Buffalo Bull. II, 5, 1874. Ent. Record. VI, 27, 1895. List N. Am. Eupterotidae, etc. (Ab. Naturw. Verein, Bremen) 1895. Proc. Am. Phil. Soc. XLI, 1902.

Guenée. Hist. Nat. des Lepid. Vols. V-VII, 1852.

Westwood. Intro. Mod. Class. Ins. Gen. Syn., 1840.

Descriptiones Hymenopterorum Chalcidoidicorum Variorum cum Observationibus. II.*

By A. A. Girault, Glenndale, Maryland.

Signiphora dipterophaga new species.

♀. Length, 1.00 mm. In the table of species (Proc. U. S. National Museum, 45, pp. 227 ff.) runs to the *nigra* group and in that runs to *nigra* itself from which it differs in having the wings hyaline and the body much more robust and the caudal wings broader. Differs from *hyalinipennis* in being wholly dark metallic green except the tarsi, the marginal fringes of the fore wing are considerably shorter (those at apex being not quite a fourth of the greatest wing width), the pedicel longer (2½ times longer than wide), the club shorter. Middle femur compressed, convexed ventrad (like a dilated scape) as in *hyalinipennis* but here the middle tibial spur is black and barely longer than the stout curved spine from the dorsal aspect of the middle tibia (between middle and knee), longer in the other species. Fore wing slightly yellowish along the venation. Mandibles acutely bidentate. Caudal wings three-fourths or more the width of the fore wings. Thorax finely transversely lined, the abdomen scaly. Head lined like the thorax and with a few pin punctures scattered. Pronotum large, half the length of the scutum. Body glistening. Fore tibiae yellowish.

Described from a large number of females reared from the pupa of a dipteron collected on sugar cane in a tunnel of *Diatraea*, Diego Martin, Trinidad, British West Indies, January, 1914 (F. W. Urich).

Types: Catalogue No. 20222, United States National Museum, six females on a slide.

Coccophagus aleurodici new species.

♀. Length, 1.00 mm. Habitus of the species usually referred to *Prospaltella*. Lustrous purplish black, the wings hyaline, the fore tibiae and tarsi dull yellow, funicle 3 dull white. Venation pale yellow. Club as long as the funicle and distinctly wider; funicles 1 and 3 subequal, each a third longer than wide; 2 twice longer than wide. Pedicel subequal to funicle 2, the scape pallid, except the dusky dorsal edge. Mandibles with the second tooth broadly truncate yet with its dorsal angle acute (so that there are apparently two small acute teeth and an inner truncation from the base of the second). Marginal vein somewhat longer than the submarginal, the stigmal oblique, of nearly uniform

*The first of this series was published in this journal in May, 1916, pp. 223 ff. and marked III by mistake.

width, neckless. Marginal cilia of the fore wing short, the discal cilia uniform, about twenty-three lines where the wing is broadest. Strigil large. Thorax flat, with a velvety sheen due to the dense minute scaly sculpture. Abdomen shining. Distal four tarsal joints short, the first joint long, very much longer. Middle tibial spur long, a little stout. Ovipositor not extruded. Funicle 2 and all tibiae sometimes suffused with yellow.

♂. Similar but the flagellum is filiform, the pedicel globular, the funicle joints subequal, each over twice longer than wide, the club joints each somewhat shorter. The male organ is projected for a length equal to that of the abdomen and is tapering and curved upward

Described from a large number of specimens reared from *Aleurodicus* on *Theobroma bicolor*, Trinidad, British West Indies, December, 1914 (F. W. Urich).

Types: Catalogue No. 20223, United States National Museum, two pairs on separate tags with a slide bearing one male, three females and a female head (crushed).

Encyrtus cecidomyiae Howard. Genotype of *Pseudencyrtus* Ashmead.

Original description of the species correct but the scape has a moderate uniform ventral dilation (seen mostly at apex) and thus appears rather much compressed, the dilation not being convexed. Funicle 1 is a little shorter than the pedicel and only a third longer than wide, 2 quadrate; 6 a little wider than long. The club is 3-jointed, ovate, wider than the funicle, obliquely truncate at apex. The body is not punctured but scaly with very minute setigerous punctures scattered over the thorax. The marginal vein is twice longer than wide, subequal to the postmarginal, the stigmal a third longer. The fore wing is infuscated lightly under the marginal and stigmal veins and there is a small substigmal spot directly from the end of the stigmal vein. Discal cilia of fore wing very dense, very fine, many somewhat coarser cilia proximad of the hairless line. Mandibles tridentate, the first tooth acute and longer than the subequal other two yet not projecting beyond them. Axillae just meeting, narrow. Propodeum very short at the meson, transverse. Face inflexed, the scrobes joined above. Frons not prominent, broad. Cheeks as long as the eyes. Ovipositor valves a little extruded. Abdomen depressed. Funicle joints in the male about twice longer than wide, the club solid and much longer; male scape short, greatly convexed-dilated (not twice longer than wide by far), the pedicel globular. Flagellum (male) clothed with rather long hairs. From the male and female types in the United States National Museum.

Neocatolaccus syrphidis new species.

♀. Length, 1.50 mm. Differs from *Zatropis deuterus* Crawford in having the femora concolorous and a transverse carina on the propodeum at proximal third which forms the caudal margin of a transverse sulcus of some width and which terminates laterad in a fovea at cephalic margin (two-thirds the way over to the spiracle); from *Z. catalpae* Crawford in having the transverse carina on the propodeum and all the tibiae testaceous; from *Neocatolaccus tylodermae* (Ashmead) in being very much less robust, in lacking the lateral carina on the propodeum, in having the cross-carina abbreviated (ending at the fovea but in the other species much more extended, running caudodistad from the fovea to nearly over the caudal coxa, hence to a point laterad of the spiracle and far caudad); also the spiracular sulcus is complete, distinct (in *tylodermae* abruptly cut off by the cross-carina); from *Neocatolaccus nigrocyaneus* Ashmead in having all the tibiae testaceous, *nigrocyaneus* is much more robust, lacks a cross-carina on the subglabrous propodeum and the lateral carina (but with a complete spiracular sulcus and a small fovea at cephalic margin half-way to the spiracle from the meson); also it bears two caudal tibial spurs.

Dark metallic green and with the usual flattened setae on the head and thorax; wings hyaline, the venation pale yellow; scape, pedicel (except above), legs (except coxae and femora), yellowish brown. Head and thorax finely, densely scaly punctate, the abdomen shining. Pubescence very sparse on the scutellum. Funicle 1 twice longer than wide, longer than the pedicel, 5 subquadrate. Mandibles 4-dentate. Postmarginal vein longer than the stigmal.

♂. Abdomen narrower, the legs pale except the coxae and the caudal femur; the proximal third of the abdomen is yellow (except at extreme base and the lateral margins). Antennae with two ring-joints; funicle 6 a half longer than wide, 1 nearly thrice longer than wide. Mandibles 4-dentate. Antennae yellowish.

Described from a large series of both sexes reared from a Syrphid pupa, Cocal, Trinidad, British West Indies, July, 1913 (F. W. Urich).

Types: Catalogue No. 20224, United States National Museum, three pairs on separate tags.

The genus *Zatropis* Crawford is probably a synonym of *Neocatolaccus* which has a very short propodeal neck not a distinct one; the median carina usually dilates at apex. *Zatropis*, however, may be distinguished from *Neocatolaccus* in lacking the cross-carina on the propodeum. *N. nigrocyaneus* Ashmead is not described; it is an Italian species. The male

type of *Catolaccus pallipes* Ashmead has no cross-carina on the propodeum. *Catolaccus carinatus* Howard is a *Neocatolaccus* and differs in having the pubescence less conspicuous yet much denser and quite normal; also the cross-carina of the propodeum does not limit a sulcus but a plain surface and the spiracular sulcus is a mere fovea in which is situate the spiracle; also funicle 1 is thrice longer than wide (a ♀ of *carinatus* in the United States National Museum and apparently a paratype specimen, "St. George's, Grenada, H. H. Smith"). The propodeal neck in *carinatus* is somewhat more distinct.

Eulophus magnisulcatus new species.

♀. Length, 2.00 mm. Dark metallic green, the wings hyaline, the venation, tibiae, tarsi and scape pale straw yellow. Head delicately scaly, the thorax densely scaly punctate, the propodeum more densely so and with a long median carina which joins the semi-circular carinated apex of the propodeum and a deep distinct spiracular sulcus whose margins are carinated and which narrows caudad. Abdomen delicately scaly distad, round-ovate (dorsal aspect), its second segment occupying about a fourth of the surface, the region not as long as the thorax. Propodeal spiracle small, round, placed in a boomerang-shaped sulcus. Marginal vein somewhat (about a third) over twice the length of the stigmal, the latter distinctly shorter than the postmarginal. Axillae half advanced into the parapside. Pronotum transverse quadrate. Antennae inserted on a level with the ventral end of the eyes, the scrobes soon uniting and running as a narrow sulcus to the cephalic ocellus. Funicle 1 twice longer than wide, 3 quadrate, as long as the pedicel which is yellowish ventrad. Club 1 somewhat shorter than funicle 3, largest, the third joint terminating in a distinct nipple which appears to be articulated. Genal suture present. Mandibles 7- and 8-dentate.

Described from one female in the collections of the United States National Museum, reared from a cherry "Coleophor," Jamesburg, New Jersey.

Type: Catalogue No. 20225, United States National Museum, the female on a tag, the head, a caudal leg and the antennae on a slide.

Sympiesis massasoit Crawford.

This is a valid species. It differs from *nigrifemora* Ashmead in having the cephalic tibiae black and the other tibiae more or less so.

Aphelinus speciosissimus Girault.

From eggs of *Xiphidium* (?), Richmond, Indiana, W. J. Phillips, 1906.

Aphelinus subapterus new species.

♂. Length, 0.75 mm.; short. Black and scaly, the tips of the tibiae, tarsi and the funicle and club dull yellow. Fore wings very small, only somewhat longer than wide, smoky, with a hyaline cross-stripe at the bend of the submarginal vein, naked, the marginal vein bearing three long bristles, the apex of the wing's blade squarely truncate. Second tooth of mandible truncate. Funicles 1-2 subequal, each a half wider than long, 3 a half longer than wide, longer than the preceding two joints taken together but not half the length of the club, subequal to the pedicel. Scape long and slender. Strigil present. With the generic characters except the wings.

Described from three males labelled *Baocharis marlatti* Ashmead, Riley County, Kansas, May (Marlatt).

Type: Catalogue No. 20226, United States National Museum, two of the specimens in fragments on a slide, a third on a tag.

New Species of Buprestidae (Col.) from the Pacific States,

With Notes Concerning a Few Others.

By Edwin C. Van Dyke, University of California, Berkeley, California.

Of the four insects described below, three have been known to me for a long time, while the fourth was found among a series of Buprestidae collected by Mr. W. J. Chamberlin, in Oregon. The *Anthaxia* bears no close relationship to any of our other Pacific species, but superficially resembles certain forms of *A. quercata* Fab., and may have been what Dr. Horn referred to when he spoke of specimens of that being found in California.[1] It, however, differs entirely as regards its tarsal claws from that species.

The first two species of *Chrysobothris* described are an addition to that large series of species which superficially closely

[1]Revision of the species of some genera of Buprestidae, by George H. Horn, M.D., Trans. Am. Ent. Soc., Vol. x (1882), p. 111.

resemble each other and are so characteristic of the coniferous forests of the western part of our country. They all fall into Dr. Horn's group IV.[2] As regards certain of the species placed in this group, some mistakes were made because of the lack of sufficient material and data. Later, some of these were corrected and the status of a number more definitely outlined in a paper by Mr. H. C. Fall.[3] The two species described by me and mentioned above have, no doubt, if known, always been placed with *C. carinipennis* Lec. Having good series of all three in my hands, I found that I could quite readily separate them and I hope that I have been able to bring out the differentiating points so that others may do likewise.

Anthaxia sublaevis n. sp.

Oblong, moderately depressed; bluish black, beneath slightly greenish, front of head and sides of pronotum somewhat cupreous; front slightly depressed at middle, surface reticulate and clothed with a sparse short silky white pubescence, clypeus slightly projecting and shallowly and broadly incised with a V-shaped incision; prothorax slightly less than twice as wide as long, broader at middle than elytra, sides feebly and regularly arcuate, posterior angles obtuse, disc slightly convex, a slight depression on each side just anterior to basal angles, surface finely reticulate; elytra with sides parallel to posterior third, thence convergent and with slight sinuation to apex, the apices rather broadly and individually rounded and very finely serrate. Surface somewhat shining and with reticulations so planed down that surface is fairly smooth; body beneath more shining than above, the thorax reticulate, the abdomen quite smooth, claws slender and but slightly broader at base. Length, 4 mm.; breadth, 1.25 mm.

This species somewhat resembles and is perhaps closest to *A. viridifrons* Lap., but it is proportionately shorter, smoother, with the apical portion of the elytra more definitely sinuate, and with the clypeus much more broadly and shallowly incised.

My series consists of nine specimens, eight from Tuolumne County, California, collected June 14, 1914, by F. W. Nunenmacher, and one from Shasta County, California, collected

[2]A monograph of the species of Chrysobothris inhabiting the United States, by George H. Horn, M.D., Trans. Am. Ent. Soc., Vol. xiii (1886), p. 84.

[3]On *Chrysobothris californica* and allies, by H. C. Fall, Journ. N. Y. Ent. Soc., Vol. xviii, No. 1, Mch., 1910, pp. 45-52.

many years ago by myself. There is practically no variation.

The type male and female, Tuolumne County, California, June 14, 1914, in my own collection, one paratype deposited with United States National Museum and another with California Academy of Sciences.

Chrysobothris pseudotsugae n. sp.

Form nearly that of *femorata*, sub-depressed with aeneous surface lustre, the punctured spaces of the elytra a greenish bronze, body beneath, legs, antennae, and front a brilliant green; antennae gradually more slender to tip, third joint as long as the next two, front flat with two callosities between eyes, clypeus rather broadly and semicircularly emarginate; thorax with length two-thirds of breadth, sides almost parallel for middle two-thirds, slightly convergent near posterior angles and more convergent and rounded in front, disc moderately convex, a rather shallow though well defined median sulcus densely punctured, an irregular elevation on each side, broader and distinctly defined in anterior half, narrower and illy defined posteriorly, a barely perceptible parallel elevation between this and sides with anterior and posterior portions slightly defined as callosities, the surface otherwise densely and coarsely punctured.

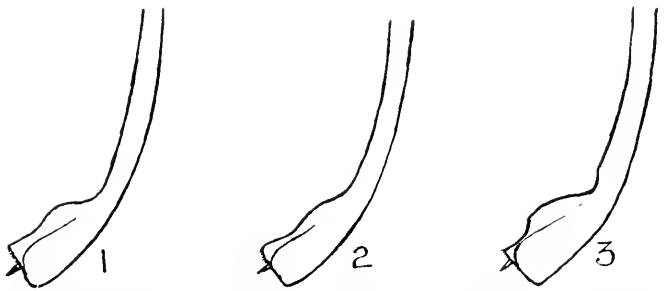
Elytra well rounded at humeri, parallel for middle two-thirds, thence slightly arcuate and convergent to individually rounded and serrate hind angles, disc slightly convex, the sutural costa well defined, broader and flatter in front, narrower and cariniform posteriorly and from middle to apex slightly but perceptibly diverging from suture; the second costa beginning near base in a broad and flat callosity, then interrupted but just anterior to middle continued again but as a narrow elevation to near apex, the third and fourth costae forming irregular and oblique zig-zag elevations; all costae joined by certain irregular flat and transverse elevations, especially in posterior half, depressions all coarsely and densely punctured.

Body beneath smooth and shining, sparsely and coarsely punctate on thorax and sparsely and finely on abdomen, prosternum not lobed in front. Anterior femora with a broad and obtuse tooth, feebly serrate on its outer edge; last ventral with its margin serrulate. Length, 11 mm.; breadth, 4.25 mm.

♂. Prosternum not densely punctured and sparsely pubescent; anterior tibia arcuate, rather abruptly dilated at tip, the dilatation being a lamina arising from the posterior side about one-fourth distance from apex and forming an elongated trapezium; middle tibia less arcuate, gradually broader from apical third to tip, the posterior tibia straight; last ventral segment broadly semi-circularly emarginate, the last dorsal sparsely punctuate with a triangular emargination.

♀. Prosternum more coarsely and more densely punctured; anterior tibia moderately arcuate, gradually wider to tip, the middle less arcuate and gradually wider to apex, the posterior straight; last ventral longer than in male and with a shallow semi-circular emargination; last dorsal more punctuate than in the male and with a small apical notch; the sides of the ventral segments, the tibia, and the front quite cupreous.

This species is probably most closely related to *C. carinipennis* Lec., but it has a decidedly different facies, being less elongate and with the elevated sculpturings of the elytra much



Outline drawings of anterior tibia of males of *Chrysobothris*: 1, *pseudotsugae*; 2, *carinipennis*; 3, *laricis*.

broader and coarser. In *C. carinipennis* Lec. the tibial dilatation in the male is always distinctly longer than broad, at least twice, while in this species it is somewhat less than twice.

My series of twenty-five mounted specimens represents material mainly collected by myself at Carrville, Trinity County, California, June 30, 1913, on Douglas fir, *Pseudotsuga taxifolia* Britt., and from near Fallen Leaf Lake, Lake Tahoe, California, June 2, 1915, on white fir, *Abies concolor* Lindl. & Gord. I have also seen a fair series in the collection of Mr. Ralph Hopping. The species is apparently moderately abundant in Northern California and the Northern Sierras about the trees mentioned, and, no doubt, extends much farther north. It apparently is one of the species which replaces *C. carinipennis* Lec. west of the Cascades and Sierras, the other seeming to be restricted to the Rockies and the northern portion of the Great Basin. Most of the specimens examined are quite constant as to size and their characters, but they

often vary considerably as shown by the fact that I have two females from my first mentioned locality which are very much larger in every way than typical forms, one 13 mm. long and 6 mm. broad, the other 15 mm. long and 7.5 mm. broad.

Type male and female from Carrville, Trinity County, California, June 30, 1913, in my own collection, paratypes deposited in United States National Museum, California Academy of Sciences, and Academy of Natural Sciences of Philadelphia.

Chrysobothris laricis n. sp.

Form and superficial appearance nearly that of *femorata,* sub-depressed, piceous, with aeneous surface lustre, the punctured spaces of the elytra cupreous, body beneath, legs, antennae, and front metallic green passing in places into cupreous; antennae gradually more slender to tip, third joint almost as long as the next two; front flat with two oblique converging callosities between eyes; clypeus rather broadly and slightly angulately emarginate; thorax with length two-thirds of breadth, broadest in front of middle, sides almost straight for middle two-thirds and slightly convergent posteriorly, more acutely near posterior angles, and slightly rounded in front; disc moderately convex, a rather shallow and poorly defined median sulcus densely punctured, the lateral boundaries forming slight callosities only anteriorly, a secondary elevation barely perceptible between this and sides and without callosities, a well defined depression anteriorly near margin, the surface coarsely and densely punctured.

Elytra well rounded at humeri, gradually and but slightly arcuately widening to posterior two-thirds, thence slightly arcuate and convergent to individually rounded and serrate hind angles; disc slightly convex, the sutural costa poorly defined anteriorly but well marked for posterior three-fourths and from middle backwards at first gradually diverging from suture then more widely and arcuately separating and toward apex rather suddenly approaching again; the second and third costae irregular, somewhat flattened in places and interrupted, the fourth narrow, moderately well defined and near margin, all costae more or less joined by various short cross bands, two well defined slightly oblique and irregular transverse depressions, one slightly in front of middle and the other midway between this and apex, simulating closely those so generally seen in *Chrysobothris femorata* Fab.; all depressions coarsely and densely punctured.

Body beneath shining, densely punctured and pubescent on thorax, more sparsely punctured on the abdomen, prosternum not lobed in front. Anterior femora with a broad and obtuse tooth, feebly serrate on its outer edge; last ventral with its margin serrulate. Length, 11 mm., breadth, 4.5 mm.

♂. Prosternum densely and finely punctured and rather densely pubescent;; anterior tibia arcuate, somewhat suddenly constricted at junction of middle with outer third, then abruptly dilated, the dilatation being a lamina arising from the posterior side which forms an arcuate enlargement that is distinctly constricted apically; middle tibia less arcuate, gradually broader to tip, the posterior tibia straight; last ventral segment broadly semi-circularly emarginate, the last dorsal sparsely punctate at middle, more densely at sides and with a triangular emargination.

♀. Prosternum more coarsely and sparsely punctured and sparsely pubescent; anterior tibia moderately arcuate, gradually wider to tip, the middle almost straight and slightly wider toward tip, the posterior straight; last ventral longer than in male and with a small semi-circular emargination, last dorsal more punctate at middle than in the male and with a small apical notch; the under surface, head, antennae, and legs being more cupreous than in the male.

This species superficially has the facies of *C. femorata* Fab. and because of the greenish under surface and head, especially in the male, might be confused with *C. carinipennis* Lec. and *C. pseudotsugae*. It, however, differs from the latter two as regards the prosternal characters of the male as well as the type of tibial dilatation. Among the Pacific species, it would, according to its characters, come closest to *C. sylvania* Fall, but it has quite a different facies and besides has a different type of male tibial dilatation. In fact the only western species which has the same type of male tibial dilatation is *C. caurina* Horn, a species which belongs in the series possessing a lobed prosternum.

My series contains eleven specimens, nine collected on the western larch, *Larix occidentalis* Nutt., and one on the lodge pole pine, *Pinus contorta* var. *murrayana* Balf., in Grant County, Oregon, during various days in July, 1914, by Mr. W. J. Chamberlin, and one collected by Mr. E. P. Van Duzee at Angora Lake, near Lake Tahoe, California, July 7, 1915, presumably on the lodge pole pine. I have also examined another and even greater series of specimens collected by Mr. Chamberlin which is now at the Oregon Agricultural College. This species seems to belong in the northern part of the Great Basin and normally on the larch and lodge pole pine, and to

have followed the last in its distribution down through the high altitudes of the Cascades and Sierras. The specimens examined are also quite constant as to size and characters.

Type male and female from Grant County, Oregon, July 22 and 23, 1914, in my own collection, paratypes deposited in United States National Museum, California Academy of Sciences and Academy of Natural Sciences of Philadelphia.

Chrysobothris mali var. **lineatipennis** n. subsp.

The more typical form of *C. mali* Horn which ranges throughout the Pacific States, though to a certain degree variable as are all of the species of the genus, still preserves a general facies and constancy of characters which enables it to be readily recognized. In the essential characters such as the slightly lobed prosternum, the usual feebly developed median sulcus of the pronotum, the disc without defined callosities, and the form of tibial dilatation in the male, this subspecies resembles it. It, however, differs in being generally smaller, 7 mm. in length as against the usual 8 or 9 mm., in being narrower and more parallel, more brilliantly cupreous and shining, with the head and pronotum excessively brilliant and contrasting with the elytra, as against a duller bronze and more uniform coloration, in the upper surface being without the usual sparse pubescence, in having all of the elytral costae more definitely elevated and defined, the second and third only slightly interrupted, in having the clypeal excavation more acute and with the sides not rounded externally, the anterior femoral tooth more acute, and the anterior tibial dilatation of the male but slightly developed as against the well developed dilatation in typical forms.

This insect I have for some time been considering as a distinct species, but upon further study find that I cannot consider it as anything more than a well marked and somewhat local subspecies. Its brilliancy, lack of pubescence, and costate elytra will enable it to be readily separated from the typical form.

Four specimens, a male and three females, in my own collection, collected in 1887 in the Santa Monica hills near Santa Monica, California, critically examined. Several others have been seen.

Type male and paratype in my own collection.

Chrysobothris cyanella Horn.

A good series of this beetle collected under the same conditions and in the same locality, the Kings River, in the South-

ern Sierras, shows that it varies in color from a brilliant blue green through bronze green to cupreous. In the middle Sierras and north, it is more apt to be of a bluish green and somewhat constant. It is generally to be found in the flowers of a species of wild white buckwheat, *Eriogonum*.

Chrysobothris dentipes Germ.

This species Dr. Horn had not seen from California. It is, however, very common in the northern counties of the State where it may be seen about the dead trunks and larger limbs of the western yellow pine, *Pinus ponderosa* Dougl.

Chrysobothris silvania Fall.

This species, first found by L. E. Ricksecker in northern Sonoma County, has been since found by F. W. Nunenmacher in Del Norte County, California, and by J. C. Bridwell and W. J. Chamberlin on Mt. Jefferson, Oregon.

New North American Gall Midges (Dipt.)

By E. P. Felt, Albany, New York.

This paper includes descriptions of recently characterized forms, one of the most interesting being the *Retinodiplosis* reared from the cones of Bald Cypress. In this connection it appears desirable to place on record, the capture by Dr. W. L. McAtee, April 12, 1914, on Plummer's Island, Maryland, of additional specimens of *Neocatocha marilandica* Felt, a species first taken by this collector in the same locality almost exactly seven years earlier. The female has been described and the male is still unknown.

Asynapta marilandica n. sp.

The species described below runs in our key to *A. cerasi* Felt, from which it may be easily separated by the pulvilli being distinctly shorter than the claws. The male was received from Dr. E. W. Nelson, labeled Plummer's Island, Maryland, August 17, 1912, Dr. W. L. McAtee, collector.

♂. Length 1.5 mm. Antennae longer than the body, thickly long-haired, yellowish brown; 23 segments, the fifth with a stem three-fourths the length of the subcylindric basal enlargement, which latter has a length about one-half greater than its diameter; terminal seg-

ment reduced, irregular. Palpi: first segment subquadrate, the second with a length three times its diameter, the third longer and stouter than the second, the fourth one-half longer than the third, irregular, somewhat capitate.

Mesonotum light yellowish brown. Scutellum, postscutellum and abdomen mostly light yellowish. Halteres yellowish white. Coxae pale yellowish. Legs mostly light straw; claws moderately stout, strongly curved, unidentate, the pulvilli shorter than the claws.

Genitalia, yellowish brown; basal clasp segment rather long, stout; terminal clasp segment moderately stout, recurved apically; dorsal plate divided, the lobes moderately broad, broadly rounded and sparsely setose apically; ventral plate shorter, the lobes narrow, obliquely truncate apically.

Type: Cecid. 1660.

Dasyneura lupini n. sp.

The galls from which this species was reared were collected by Mr. L. H. Weld at Buena Vista Park, San Francisco, California, August 25, 1915. They occurred on a perennial species of *Lupinus* which was shrubby at the base, much branched, 2 to 4 ft. high and perhaps *Lupinus propinquus*. The galls were kept outdoors by Mr. Weld and a lot forwarded to the writer early the following May from which specimens of both sexes were obtained May 10. The male of this species runs in our key to *D. meliloti* Felt, from which it may be separated by differences in the genitalia, especially in the shape of the lobes of the dorsal plate. The female of this Lupine species is remarkable for the very long lobes of the ovipositor.

Gall. Irregularly fusiform, presumably stem gall, light green when fresh, fleshy, quite firm, polythalamous, the interior fibrous and inhabited by a number of larvae; length, 1.5 to 2.5 cm.; diameter, 1 to 1.5 cm.

Cocoon. Oval, length about 2 mm., rather firm in texture and light yellowish.

♂. Length, 1.75 mm. Antennae about as long as the body, thickly haired, reddish brown; 16 or 17 segments, the fifth with a stem three-fourths the length of the cylindric basal enlargement, which latter has a length about one-half greater than its diameter and a moderately thick whorl of long, stout setae; terminal segment slightly produced, narrowly oval, with a length about twice its diameter. Palpi: first segment irregularly quadrate, the second a little longer, more slender, the third one-half longer than the second, more slender, the fourth one-half longer and more slender than the third.

Mesonotum dark red, the submedian lines sparsely haired. Scutellum and postscutellum dark reddish brown. Wings hyaline, the third vein nearly straight. Coxae dark brown; legs mostly a brownish straw, the tarsi somewhat darker; claws long, unusually slender, the pulvilli about as long as the claws.

Abdomen sparsely haired, the sclerites dark brown, the incisures and pleurae fuscous yellowish. Genitalia fuscous yellowish; basal clasp segment stout, tapering; terminal clasp segment short, tapering; dorsal plate deeply and narrowly incised, the lobes tapering slightly to a narrowly rounded apex; ventral plate moderately long, broad, deeply and roundly emarginate, the lobes slender, tapering and sparsely setose apically.

♀. Length, 2.5 mm. Antennae extending to the base of the abdomen, sparsely haired, dark reddish brown; 17 subsessile segments, the fifth with a length three-fourths greater than its diameter; terminal segment reduced, narrowly oval. Palpi: first segment irregularly oval, the second subquadrate, the third one-half longer than the second, more slender, the fourth one-half longer than the third, more slender.

Mesonotum reddish brown or dark brown, the submedian lines sparsely haired. Scutellum and postscutellum dark reddish. Halteres mostly yellowish. Coxae dull yellowish; legs mostly dark brown.

Abdomen sparsely haired, dark brown, the incisures and pleurae reddish orange. Ovipositor as long as the abdomen, the terminal lobes sparsely haired, narrow, with a length about six times the width.

Type. Cecid. a2723.

Asphondylia shepherdiae n. sp.

The midges described below were reared from a bud gall on *Shepherdia canadensis*, collected June 27, 1914, by Prof. E. Bethel, at Lake Eldora, Colorado. The species runs in our key to *A. sambuci* Felt, from which it is most easily distinguished by the pale yellowish legs. It is easily separated from the western *A. diplaci* Felt by the distinctly narrower wings.

Gall. This is a globose, thin-walled, yellowish green, bud gall, variably spotted with reddish, and having a diameter of 4 to 5 mm.

Exuvium. Length, 4 mm., cephalic horns and the dorsum of the thorax mostly yellowish, the remainder of the body dark brown, the terminal segment being lighter. The dorsum of the abdominal segments with a transverse row near the posterior third, of moderately long, stout spines, and from the middle to the anterior third, an irregular series of three or four rows of smaller, similar spines; terminal

segment with two latero-posterior diverging, triangular spines and an irregular arc extending from one of these groups to the other and composed of approximately nine smaller, though stout spines, the basal portion of the terminal segment with an irregular series of similar though somewhat smaller spines.

♂. Length, 3 mm.. Antennae nearly as long as the body, sparsely haired, dark brown; 14 segments, the third with a length five times its diameter, the terminal segment somewhat reduced, with a length four times its diameter. Palpi: the first segment quadrate, the second with a length more than twice that of the first, the third more slender and one-half longer than the second. Mesonotum slaty brown. Scutellum and postscutellum brownish red. Halteres fuscous yellowish Coxae dark brown; legs mostly pale yellowish; claws stout, strongly curved, the pulvilli as long as the claws.

Abdomen dark brown. Genitalia: basal clasp segment short, very broad; terminal clasp segment short, stout; dorsal plate divided, the lobes triangular, the inner margins broadly rounded and setose; ventral plate suborbicular, deeply and roundly emarginate posteriorly, the lobes narrowly rounded apically.

♀. Length, 3 mm. Antennae nearly as long as the body, sparsely haired, dark brown; 14 segments, the third with a length six times its diameter; terminal segment with a length three-fourths its diameter. Palpi: first segment subquadrate, the second with a length about twice that of the first, the third more slender, with a length about one-fourth greater than the third.

Mesonotum slaty brown, the submedian lines sparsely haired. Scutellum and postscutellum reddish brown. Halteres yellowish white. Coxae dull reddish, the legs mostly fuscous yellowish; claws stout, strongly curved.

Abdomen dark reddish brown. Ovipositor about as long as the abdomen.

Type. Cecid. a2550.

Retinodiplosis taxodii n. sp.

A number of midges tentatively referred to this genus were reared April 27, 1916, by Mr. George W. Barber, Charleston, Missouri, from cones of Bald Cypress, *Taxodium distichum*. The food habits, as well as certain structural characteristics serve to distinguish this species from related forms. This gall was also collected November 14, 1910, by Dr. W. L. McAtee at Mud Lake, Arkansas, though no adults were reared.

Gall. This is an irregular, thick-walled, somewhat spongy, usually monothalamous gall with a diameter of 5 to 7 mm., which occurs

tightly packed in Cypress cones. These galls are evidently modified seeds and the shape is determined to a great extent by the growth of those adjacent.

Larva. Length, 3 mm., moderately stout, yellowish white or yellowish orange. Head short, broad, the antennae short, tapering, apparently uniarticulate; breastbone distinct, brown, with anterior and posterior, somewhat crescentic prolongations, the former bidentate, the teeth being widely separated and sublateral; skin coarsely shagreened, posterior extremity broadly rounded.

Pupa. Length, 4 mm., stout, mostly reddish orange, the thoracic horns slender, tapering, light brown, with variable fuscous markings, the antennal horns short, stout, obtuse, the antennae hardly extending to the base of the abdomen, the wings to the third abdominal segment, and the leg to the fourth abdominal segment, the last three in nearly mature pupae, black; posterior extremity obscurely lobed, rounded.

♂. Length 2 mm. Antennae a little longer than the body, rather thickly haired, fuscous yellowish; 14 segments, the fifth having the stems with a length one and one-half and two and one-half times their diameters, respectively; the distal enlargement with a length one-half greater than its diameter and a distinct constriction near the basal third; circumfili moderately stout, the loops numerous, the distal filum having 16 to 20. Palpi: first segment subquadrate, the second one-half longer, more slender, the third as long as the second, more slender, the fourth one-half longer than the third, somewhat dilated.

Mesonotum fuscous yellowish, the submedian lines yellowish. Scutellum and postscutellum reddish orange. Halteres whitish transparent, yellowish apically. Coxae, femora and tibiae mostly pale yellowish, the tarsi with the most of the second segment, the third and fourth pinkish, the remainder fuscous yellowish; claws moderately slender, somewhat curved, the pulvilli about half the length of the claws.

Abdomen with deeper red, the lateral margins rather thickly clothed with short, fuscous hairs. Genitalia fuscous; basal clasp segment stout; terminal clasp segment moderately stout, long, strongly curved; dorsal plate deeply and triangularly emarginate, the lobes somewhat divergent, broadly and irregularly rounded; ventral plate broad, somewhat spatulate, broadly and roundly emarginate, both thickly setose.

♀. Length 4 mm. Antennae extending to the fourth abdominal segment, sparsely haired, reddish; 14 segments, the fifth with a stem one-fourth the length of the cylindric basal enlargement, which latter has a length four times its diameter, the circumfili at the basal third and apically, stout and rather high; terminal segment somewhat produced, with a length five times its diameter and a knob-like process apically. Palpi: first segment roundly subquadrate, the second with a length nearly twice the first, the third a little shorter than the second, more

slender, the fourth almost twice the length of the third, more slender.

Mesonotum fuscous yellowish, the submedian lines yellowish-orange. Scutellum and postscutellum reddish orange, the former somewhat fuscous. Halteres mostly whitish transparent, pale orange distally. Legs mostly a pale yellowish orange.

Abdomen deep reddish orange, irregularly fuscous basally; ovipositor yellowish, short, the lobes with a length about three times the width, narrowly rounded apically and thickly setose.

Type Cecid. a2722.

This species presents in both sexes, many characters in common with typical species of *Retinodiplosis* and is noteworthy because the larva has no chitinized tubercles supporting the posterior spiracles. This latter is evidently a modification resulting from environmental necessities and would hardly be expected to appear in a species inhabiting seeds and not occurring more or less submerged in a pitchy medium.

A new Cratomus (Hym.).

By T. D. A. Cockerell, Boulder, Colorado.

The remarkable Pteromalid genus *Cratomus* was founded by Dalman in 1820 for *Cynips megacephala* of Fabricius, which occurs in northern and central Europe. Two years later Dalman wrote the name *Caratomus*, the original form having been, we may suppose, due to a misprint or slip of the pen. It is a question which to maintain; but Ashmead, in his Classification of Chalcid Flies, returned to the original spelling, *Cratomus*.

A second species of the genus was described from Britain in 1833 by Walker; and in 1888 Ashmead described another, *C. leucophthalmus*, from a specimen collected by Fletcher on a window in Ottawa, Canada. In May of this year I found a specimen on a window in my house in Boulder, Colorado, and as it is evidently distinct from the Canadian species, it may be described as follows:

Cratomus cancellatus n. sp.

♂. Length about 2.5 mm., robust, with the extraordinary head characteristic of the genus. It differs from *C. leucophthalmus* Ashm. as follows:

General color pure black on head and thorax, perhaps a slight metallic (bluish) tint at sides; head and thorax minutely cancellate; eyes wholly dark; antennæ black or almost so, the scape above and club at end reddish; legs black, the anterior tibiæ clear red, all basitarsi pallid reddish; central blotch of wings very dilute, not very conspicuous.

The eyes are hairy; face with strong striae converging toward mouth; mandibles dark red, with very large triangular teeth, 3 on left mandible, 4 on right. The following measurements are in microns: width of head, about 1250; width of antennal club, 112; length of submarginal vein, 830; marginal, 240; stigmal, 208; postmarginal, 270. The submarginal vein is longer in proportion to the marginal than Ashmead indicates for his species.

Type in the writer's collection.

An Easy Method of making Insect Labels.

By R. H. Beamer, the University of Kansas, Lawrence, Kansas.

The inconvenience of printer's labels has led to the adoption of photographed labels in the Entomological Collections in the University of Kansas. The photographed labels have the advantage of being smaller and less expensive than those made at the print shop. The printed labels formerly used were 8x18 millimeters in size while the labels now used are commonly half that size. The advantage of the small labels is very apparent when the two sizes are seen in cases of small insects.

The labels are first written out with a typewriter on white paper of good quality so that the ink will not blur. The machine should have a black record ribbon to give the type as strong contrast as possible on the white paper. Locality labels are written in rows, two spaces being left between each two labels and between each two rows of labels. When the page is full it is then photographed to any size desired.

When material has been determined by a specialist it is very important that these determinations be preserved. This is accomplished by placing upon each individual specimen a small label bearing the generic and specific name, the name of the describer of the species and the name of the specialist who has determined it. These labels are made in the following manner:

The part of the label (Det. by —— ——) as it is uniform throughout is written on the typewriter. The scientific names, however, are so variable in size that they must be printed in by hand with india ink. Two spaces are left between the labels and at least four spaces between the rows of labels. When the sheet is filled with labels it is placed on a drawing board and two lines one-eighth inch apart drawn between the labels both horizontally and vertically with india ink. This facilitates the cutting out of the labels when they are finished and the black around the border adds to the neatness of their appearance. When the names of the insects have been printed in the rectangular spaces made by the ruling, the sheet is ready to be photographed.

Duplicate specimens of the same species are taken care of very nicely. An estimate is made of the number of prints to be made from the sheet in question and the number of duplicate labels will be governed accordingly. For example, if there are a hundred specimens of one species and twenty of another and the negative is to be printed twenty times, five labels would be made of the one species and but one of the other. The number of prints made from one label sheet will necessarily depend upon individual cases.

The best photographic results have been obtained with Cramer's Contrast Plates developed by the formula enclosed with the plates. Contrast Cyko No. 6 is used in printing.

It is needless to add that the labels must be very thoroughly fixed and washed in order to insure permanency.

Tenthecoris bicolor Scott. in New Jersey Greenhouses (Hemip.). This blue and red member of the family Miridae is occasionally met with in New Jersey greenhouses where orchids are grown and has been taken at various times by inspectors examining orchids from South America. It is a common occurrence to find the leaves of Cattleya orchids imported from Brazil sometimes covered with irregular white spots due to the abstraction of chlorophyll by these bugs. As a rule, it is never abundant enough in New Jersey greenhouses to do much damage, although it has been known in the past to occur in numbers sufficient to seriously weaken and disfigure the orchids. It is incorrectly known to many orchid growers as the Brazilian thrips. Additional notes on this species and its introduction into England can be found in the *Gardeners' Chronicle* for May 16, 1908.—Harry B. Weiss, New Brunswick, New Jersey.

Notes on Zonocerus elegans Burm. (Orthop.)

By Stephen G. Rich, Adams Institute, Amanzimtoti, Natal, South Africa.

Zonocerus elegans Burm. is a very common Acridid in the coast and central districts of Natal. It is 1½ to 2 inches long; the abdomen is very thick, in both sexes.

This animal shows "flash coloration" in a most interesting way. Its blood and saliva both possess an extremely disgusting odor, not unlike that of the skunk in America, but less penetrating. Both these fluids are irritating to the skin and mucous membrane. The abdomen of *Z. elegans* is bright yellow, the wings vermilion to Indian red, the prothorax gray-green, and the head black-and-orange mottled. The antennae show alternate bands of black and orange, and the eyes are dark red.

These animals are exceedingly conspicuous, and gather on dry, sunny, open places, especially on hard roads. Fowls, birds, etc., do not touch them at all. So thoroughly protective is this coloration that, when disturbed, *Zonocerus* does not even jump far, but hops perhaps ten inches. Repeated urging will produce a jump of some three feet at most.

The wings are not functional. About a third of the males and a tenth of the females have wings of usual size, which they flutter when jumping: but these do not jump any farther or better than the common forms. The more usual form in both sexes has wings not over half an inch long, which are never moved. A few forms with wings of intermediate size are found in both sexes, but more often in the male.

That none of these are nymphal is shown by their all being found in copulation. The various forms copulate with each other freely, and quite as often with those of different-sized wings as with those of like wings.

Copulation takes place in March and April, and oviposition, in the ground, occurs at once. The male remains on top of the female during oviposition. The females die immediately after oviposition and the males a little later. The earliest nymph I

have seen was about May 5. There are two generations a year. The nymph is yellow, with black longitudinal stripes, and lacks the bad odor for three instars; its coloring is protective. As adult form is approached, the adult color and odor are assumed. The last nymphal instar has black wing-pads.

Zonocerus is a garden pest and also on sugar cane. The natives (Zulus) call it "intotoviyana": the commonest names among Europeans are "Totoviana" and "Soldier Grasshopper."

No control seems to be known: I have detected red hymenopterous eggs and larvae under the wings in a few specimens.

Ants Caught on a Trip to California (Hym.).

By Hazel Andrews, University of Colorado, Boulder, Colorado.

During the summer of 1915, in company with Professor and Mrs. T. D. A. Cockerell, of the University of Colorado, I went to the California Exposition. Interesting as the trip itself was it took on an added interest because it gave me an opportunity to add to my collection of ants. Of all insects, ants are the most easily collected on a railway journey, because they are usually to be found around the stations and along the tracks. The collecting facilities are simple, all that is necessary being small bottles of alcohol and a note-book for data concerning locality and habitat. Many an otherwise tiresome delay may be made interesting by hunting near the tracks for ants.

Such a collection may not add anything new to science but it certainly adds to one's knowledge of the general distribution of various genera, as in this case of *Pogonomyrmex*. With the new forms it is possible to make more comparisons and to realize better the relationship between species and genera. This trip was not primarily a myrmecological expedition but the following list shows what a good collection can be acquired with only a little effort.

Dr. W. M. Wheeler has kindly examined the list and confirmed the identification of a number of the specimens.

MYRMECINAE.

Monomorium minutum ergatogyna Wheeler. Coronado Island, Mexico (T. D. A. Cockerell); Berkeley, California (Hazel Andrews.)

Solenopsis geminata maniosa Wheeler. La Jolla, California. (H. A.)

Pheidole grallipes Wheeler (*longipes* Pergande). Coronado Island, Mex. (T. D. A. C.); La Jolla, Calif. (H. A.)

———**hyatti** Emery. Avalon, St. Catalina, California. (H. A.)

Crematogaster lineolata Say. var. La Jolla, Calif. (H. A.)

Messor andrei Mayr. Coronado Island, Mex. (T. D. A. C.); La Jolla, Calif. (H. A.); Long Beach, California (H. A.)

Pogonomyrmex barbatus fuscatus Emery. Lamy, New Mexico. (T. D. A. C.)

———**barbatus marfensis** Wheeler. Los Cerillos, New Mexico (T. D. A. C.)

———**barbatus rugosus** Emery. Goffs, California (T. D. A. C.)

———**occidentale** Cresson. Las Vegas, New Mexico (H. A.); Wells, Nevada (H. A.); Raton, New Mexico (H. A.); Seligman, Arizona (H. A.)

———**subdentatus** Mayr. Long Beach, Calif. (H. A.)

———**californicus** Buckley. Long Beach, Calif. (H. A.); Needles, California (H. A.); Glendale, California (T. D. A. C.); Pasadena, California (H. A.)

DOLICHODERINAE.

Liometopum apiculatum occidentale Emery. Orange County Park, California (H. A.)

———**apiculatum luctuosum** Wheeler. Lamy, New Mexico (H. A.)

Dorymyrmex pyramicus Roger. Lookout Mountain near Los Angeles, California (T. D. A. C.); Glendale, California (T. D. A. C.); Albuquerque, New Mexico (H. A.)

Dorymyrmex pyramicus bicolor Wheeler. Kingman, Arizona (H. A.)

Tapinoma sessile Say. Lookout Mt., California (T. D. A. C.); La Jolla, California (H. A.)

Iridomyrmex humilis Mayr. (Argentine ant). Long Beach, California (H. A.); Avalon, Sta. Catalina (H. A.); La Jolla, California (Dr. F. B. Sumner); San Diego, California (H. A.); Berkeley, California (H. A.); Pasadena, California (H. A.)

CAMPONOTINAE.

Formica rufa aggerans Wheeler. Kaw, Nevada (W. P. Cockerell).

———**rufibarbis occidua** Wheeler. Nigger Slough, Los Angeles County, California (T. D. A. C.); Palo Alto, California (H. A.); Berkeley, California (H. A.).

———**rufibarbis guava** Buckley. Albuquerque, New Mexico (H. A.)
———**subpolita camponoticeps** Wheeler. Mt. Tamalpais, California (T. D. A. C.)
———**cinerea pilicornis** Emery. Glendale, California (T. D. A. C.).
———**(Proformica) neogagates** Emery. Wells, Nevada (H. A.).
Myrmecocystus melliger lomaensis Wheeler. La Jolla, California (H. A.).
Camponotus maculatus plorabilis Wheeler. Between Valley Pass and Moor, Nevada (H. A.).

New Lepidoptera from South America.

By Levi W. Mengel, Reading, Pennsylvania.

Catagramma horstii n. sp.

Expanse 43 mm. Primaries black with bluish reflection toward the apex. Base of wing, through discoidal cell, red. From the costa, a red band extends across the wing, almost to the inner angle. There is a thin orange band in the apex. The exterior margin has a broken white edging.

The secondaries are black, along the anterior portion, shifting to dark blue toward the exterior margin. A red bar projects from the base through the discoidal cell. The entire wing has a broad white unbroken margin. Antennae and upper part of body, dark brown.

Under side in general as in the other of the *sorana* forms. The solid white margin of the inferior wing is as pronounced as on the upper side.

Described from two specimens from Cavinas, Bolivia.
Type.—Academy of Natural Sciences of Philadelphia.
Paratype.—Collection Mengel.

Perisama inconspicua n. sp.

Expanse 42 mm. Upper sides in general as in the species of the *humboldtii* group. The marginal blue band of the inferior wings is much nearer the margin of the wing than in *humboldtii*, and is more inclined to gray in color. Under side of primary wing shows no red whatever. The base is buff and covers the discal cell. Along the costa a narrow blue band extends from the cell to the white diagonal spot, which appears midway in the wing, and points to the angle. This white spot terminates in a blue edging. Apex broadly yellow, with a few isolated white marks on the edge. Balance of wing black.

Secondary wings solidly buff. A black bar extends from the middle of the anterior margin almost to the angle. Another black bar passes from the anterior surface, parallel with the external margin, to the

inner angle. There is a row of 5 black spots in the wing between the bars. Body on upper part black, gray beneath.

Described from two specimens from Chaochi, U. S. of Colombia.

Type.—Academy of Natural Sciences of Philadelphia.

Paratype.—Collection Mengel.

Coleophora laricella Hübn. in New Jersey (Lep.).

This insect, known as the Larch Case Bearer and recorded from Rutherford, N. J., (Ent. News, vol. XXVII, p. 13), does not seem as yet to have a very extensive distribution in New Jersey. It was evidently introduced on imported nursery stock as it has a wide distribution in continental Europe and hundreds of cases of stock are consigned to Rutherford every year. The larvae mine the distal halves of the larch needles and later construct cases in which they live while feeding during the remainder of the season, these cases later being fastened to stems and twigs and serving as a protection for the larvae while overwintering. The injury to the tree is very apparent in the discoloration, shriveling and withering of the tips of the needles. In the spring, growth is completed and pupation takes place. Quite extended accounts of this species can be found in F. V. Theobald's Report on Economic Zoology for year ending April 1st, 1905, S. E. Agric. Col. of Wye.; Felt's work on *Insects Affecting Park and Woodland Trees* and in Bull. 322 of the Cornell Agric. Exp. Sta.—Harry B. Weiss, New Brunswick, New Jersey.

The House Cricket a Pest in St. Louis (Orth.).

I beg to make a report on the House Cricket (*Gryllus domesticus*) which is a house pest at the present time (Sept. 1, 1916) in North St. Louis, Missouri. I investigated and found them by the hundreds in private homes, and in one store by the thousands, eating the labels off the canned goods, and eating paper bags and other goods, even clothing. I have always noticed them in the yard and even in the house for the last fifteen years, but this is the first time I noticed them by the thousands. I enclose a clipping of a report of one of our evening papers on the pest, and hope this will prove of interest to the News.—Charles L. Heink.

[The clipping enclosed is from the *St. Louis Times* for August 23, 1916, as follows:]

A new bug pest, a cross between a grasshopper and a cricket, with the appetite of a goat, inasmuch as it devours clothes and paper, is pestering residents in Northeast St. Louis, and they have issued an appeal to the police and health departments to aid them in their efforts to destroy the insects.

Jacob Weinberg, proprietor of a store, 4337 North Broadway, was the first to appeal to the police. He said the insects invaded his place of business, ate holes in clothing and paper bags.

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., NOVEMBER, 1916.

How Knowledge of Insects Grows.

We have been looking up the literature on the natural history of Costa Rica recently, with results which, we hope, will appear shortly in another place. A couple of incidents in our search may be not inappropriately mentioned in our monthly editorial. In 1901 Prof. Cockerell wrote of the scale insect, *Aspidiotus articulatus,* that it was the first Coccid reported from Costa Rica, "not one Costa Rica record" in the *Biologia Centrali-Americana.* The passing of the years enabled him and a coadjutor to describe, in 1915, a new species, *Eriococcus costaricencis,* from twigs of *Vaccinium* with much black fungus, Mt. Irazú, Costa Rica, 11,300 feet, and to add the comment that this form "comes from the highest altitude yet known for a Coccid."

The Volcano Irazú has a crater nearly a mile in diameter, containing in turn daughter- and grand-daughter-craters, all inactive for many years. Its great bowl is mist-filled for much of the time and as a result is often gaily decked with flowers and inhabited by a variety of insects. There is no reason why scale-insects should not thrive there and these two bits of historical entomology afford but one more instance of our lack of knowledge of much of insect life.

Questions and Answers.

The NEWS invites those having any entomological questions which they wish answered to send such in for publication under this heading, and also invites answers from its readers or others to these questions. Questions and replies should be as brief as possible and the Editors reserve the right not to publish any of either class which seem to them objectionable or inappropriate. Those sending in contributions to this department will please indicate whether they wish their names or merely one or more initials to appear in connection with their communications, but all such must be accompanied by the full name and address of the writer for the information of the editors.

ANSWER TO QUESTION No. 1 (October, 1916, NEWS, p. 371).—The matter of mounts for insects such as mentioned by "C" in the last "NEWS" interests me. That I approve of protective mounts is undoubted, as I have long practiced the placing of types of fragile insects in mounts for their protection. But the best mounts for the

purpose I have found are the so-called Riker mounts. This type of mount does not permit one to see both sides of the insect but allows the removal of the top for a more careful examination of all parts of the specimen. If the above mentioned writer, "C," has a better mount I would be interested to receive a sample.—A. N. Caudell, U. S. National Museum, Washington, D. C.

Question No. 2.—I wish to ask the opinion of entomologists as to which is the best way to keep overwintering pupae that pupate in the ground. Should they occasionally be moistened and if so how often? —H.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

Argyresthia thuiella Pack. in New Jersey (Lep.).

This species, known as the Arbor vitae leaf miner, has a much more extended distribution in New Jersey than is generally supposed. Smith in his Cat. Ins. of N. J., p. 554, lists it only from Essex Co., (Kf.). As a matter of fact, it occurs in many of the large nurseries in the northern part of the state and is undoubtedly being further distributed by them. The larvae mine the terminal sprays, the tips of which eventually turn brown. In severe infestations, which however appear to be rare, the foliage has a rusty, brownish appearance, detracting much from its ornamental use. Light infestations escape the attention entirely of most nurserymen, who assume that the discolored tips are due to root troubles or adverse weather conditions.—Harry B. Weiss, New Brunswick, New Jersey.

Agrilus viridis L. in New Jersey (Col.).

An account of the occurrence of this member of the family Buprestidae in New Jersey and its damage to *Rosa rugosa* can be found in the *Jour. Econ. Ent.*, Dec., 1914. Inasmuch as I said nothing in this account concerning its life history, it might be well to state that Theobald in his bulletin on *The Animal Pests of Forest Trees,* gives beech, alder, birch, aspen and oak as food plants and states that the adults appear in June and July and fly in bright sunshine. Eggs are deposited singly on the bark near the ground and the larvae live under the bark, boring in the sap wood and into the wood itself, living in the trees for two or three winters and pupating in April or May. It attacks healthy as well as unhealthy saplings. Its long larval period makes it an unsatisfactory insect to breed out in the laboratory and accounts for the few adults which I obtained from many infested stems. It was evidently introduced into New Jersey in woody roses or shade trees imported from Europe.—Harry B. Weiss, New Brunswick, New Jersey.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

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

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new species are all grouped at the end of each Order of which they treat. Unless mentioned in the title, the number of the new species occurring north of Mexico are given at end of title, within brackets.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

2—Transactions of the American Entomological Society, Philadelphia. **3**—The American Naturalist. **4**—The Canadian Entomologist. **5**—Psyche. **6**—Journal, New York Entomological Society. **8**—The Entomologist's Monthly Magazine, London. **9**—The Entomologist, London. **68**—Science, New York. **87**—Bulletin, Societe Entomologique de France, Paris. **102**—Proceedings of the Entomological Society of Washington. **105**—Videnskabelige Meddelelser, Naturhistoriske Forening i Kjobenhaven. **159**—Bollettino, Laboratorio di zoologia generale e agararia della R. S. Superiore d'Agricoltura in Portici. **161**—Proceedings Biological Society of Washington. **179**—Journal of Economic Entomology. **195**—Bulletin, Museum of Comparative Zoology, Cambridge. **204**—New York State Museum, Albany. **304**—Annals of the Carnegie Museum. **324**—Journal of Animal Behavior, Cambridge. **399**—Proceedings of the Cambridge Philosophical Society, Cambridge, England. **447**—Journal of Agricultural Research, Washington. **450**—Ohio State University Bulletin, Columbus. **518**—Tennessee, Agricultural Experiment Station of the University, Knoxville. **519**—The Scientific Monthly, Lancaster, Pa. **536**—Journal, Bombay Natural History Society. **537**—Proceedings, Entomological Society of Nova Scotia, Truro. **538**—Lorquinia, Los Angeles.

GENERAL SUBJECT. Allen, E. C.—Protective coloration, **537**, i, 78-84. **Kermode, F.**—Report of the Provincial Museum (British Columbia) of Nat. History for the year 1915. Entomology, pp. 16-18. **Matausch, I.**—Obituary note by R. W. Miner, **6**, xxiv, 155-7. **May, R. M.**—Insect collecting in the San Bernardino range, **538**, i, 11. **Osborn, H.**—Agricultural entomology for students, farmers, fruit-growers and gardeners. 347 pp. illus. (Lea & Febiger, 1916). **Swaine, J. M.**—Eighth annual report of the Quebec Society for the protection of plants from insects and fungous diseases, 1915-16. 116 pp. **Webster, F. M.**—Obituary by L. O. Howard, **102**, xviii, 79-83. **Weiss, H. B.**—The insect fauna of N. Jersey greenhouses, exclusive of the Coccidae, **6**, xxiv, 144-50. New Jersey insects, **519**, iii, 385-88.

PHYSIOLOGY AND EMBRYOLOGY. Doncaster, L.—On some gynandromorphic specimens of Abraxas grossulariata, **399**, xviii, 227-9. **Metz, C. W.**—Additional types of chromosome groups in the Drosophilidae, **3**, l, 587-99. Linked mendelian characters in a new species of Drosophila, **68**, xliv, 431-2.

ARACHNIDA, ETC. **Petrunkevitch, A.**—The shape of the sternum in scorpions as a systematic and a phylogenetic character, **3**, 1, 600-8. **Silvestri, F.**—Contribuzione alla conoscenza degli Stemmuiloidea, **159**, x, 287-347.

NEUROPTERA, ETC. **Ferris, G. F.**—Notes on Anoplura and Mallophaga, from mammals, with descriptions of 4 n. sps. and a n. var. of Anoplura, **5**, xxiii, 97-120.

ORTHOPTERA. **Allard, H. A.**—Some northern Georgia Acridiidae, **4**, 1916, 274-79. **Caudell, A. N.**—An economic consideration of O. directly affecting man, **102**, xviii, 84-93. **Rehn, J. A. G.**—Dermaptera & Orthoptera, I. (The Stanford Expedition to Brazil, 1911), **2**, xlii, 215-308.

HEMIPTERA. **Baker, A. C.**—A review of the Pterocommini, **4**, 1916, 280-289. **Harrison, L.**—A preliminary account of the structure of the mouth parts in the body louse (Pediculus vestimenti), **399**, xviii, 207-26. . **Matausch, I.**—Notes on a peculiar nymph-variation of Enchenopa binotata, **6**, xxiv, 151-2. **Van Duzee, E. P.**—Check list of the Hemiptera (excepting Aphididae, etc.) of America, north of Mexico. 111 pp. (New York Entomological Society), 1916.

DeLong, D. M.—The leafhoppers or Jassoidea of Tennessee [14 new], **518**, Bull. 17. **Osborn & Drake**—The Tingitoidea of Ohio [2 n. gen.; 10 n. sps.], **460**, xx, 217-51.

LEPIDOPTERA. **Davis & Satterthwait**—Life history studies of Cirphis unipunctata, the true army worm, **447**, vi, 799-812. **Dognin, P.**—Heteroceres nouveaux de l'Amerique du Sud, Fasc. XI. **Forbes, W. T. M.**—On certain caterpillar homologies, **6**, xxiv, 137-42. **Grinnell, F., Jr.**—Butterfly records, **538**, i, 5. **Holland, W. J.**—The L. of the Isle of Pines, being a list of the species collected on the island in 1910-13, **304**, x, 487-518. **Woodruff, L. B.**—The occurrence of Archips infumatana in the eastern U. S., **6**, xxiv, 153.

Barnes & McDunnough—A new Noctuid genus, **4**, 1916, 290-1.

DIPTERA. **Aldrich, J. M.**—More light on Myiophasia, **102**, xviii, 98-100. **Bardenfleth & Ege**—On the anatomy and physiology of the air-sacs of the larva of Corethra plumicornis, **105**, lxvii, 25-42. **Corry, E. N.**—The Columbine leaf-miner, **179**, ix, 419-24. **Felt, E. P.**—A study of gall midges, IV, **204**, Bul. 186, 101-172. **Nielsen, J. C.**—Undersoglser over entoparasitiske muscidelarver hos Arthropoder, V, **105**, lxvii, 9-24. **Townsend, C. H. T.**—Note on Myiophasia aenea, **102**, xviii, 100-101.

Alexander, C. P.—New Limnophiline crane-flies from the U. S. and Canada [7 new], **6**, xxiv, 118-25. **Banks, Greene, etc.**—District

of Columbia Diptera: Syrphidae [4 new], **161,** xxix, 173-204. **Knab, F.**—A new mosquito from the eastern U. S., **161,** xxix, 161-4. **Parker, R. R.**—Sarcophagidae of New England: genus Sarcophaga [1 new sp.], **179,** ix, 438-41. **Shannon, R. C.**—Notes on some genera of Syrphidae with descriptions of new species [9 new], **102,** xviii, 101-113. **Smith, H. E.**—New Tachinidae from No. America [1 n. gen.; 5 n. sps.], **102,** xviii, 94-98. **Swenk, M. H.**—Descriptions and records of No. Am. Hippoboscidae [5 new], **6,** xxiv, 126-136.

COLEOPTERA. Barber, H. S.—A review of No. American tortoise beetles, **102,** xviii, 113-127. **Bourgoin, A.**—Description de deux Gymnetis nouveaux du Bresil, **87,** 1916, 198-200. **Champion, G. C.**—Note on the curculionid genus Mascarauxia; On some weevils attacking orchids, **8,** 1916, 185; 200-202. **Desbordes, H.**—Description d'un Orphinium nouveau et tableau des especes de ce genre, **87,** 1916, 200-2. **Howard, L. O.**—Lachnosterna larvae as a possible food supply, **179,** ix, 389-92. **Leng, C. W.**—Notes on Alleculidae, **6,** xxiv, 142-3. **Pierce, W. D.**—Notes on the habits of a dangerous genus of weevils, **179,** ix, 424-31. **Sheriffs, W. R.**—Food of the Carabidae, **536,** xxiv, 607-8.

HYMENOPTERA. Cushman, R. A.—Thersilochus conotracheli, a parasite of the plum curculio, **447,** vi, 847-55. **Elliott, E. A.**—A puzzle in the nomenclature of the hymenopterous family Stephanidae, **9,** 1916, 174-5. **Mann, W. M.**—The Stanford Expedition to Brazil, 1911. The ants of Brazil, **195,** lx, 399-490. **Pennington, W. E.**—Notes on Rhogas terminalis, **179,** ix, 401-6. **Rau, P. & N.**—Notes on the behavior of certain solitary bees, **324,** vi, 366-70. **Wheeler, W. M.**—Notes on some slave-raids of the western amazon ant (Polyergus breviceps), **6,** xxiv, 107-118. **Williams, F. X.**—Notes on the life history of Methoca stygia, **5,** xxiii, 121-25.

Bradley, J. C.—Contributions toward a monograph of the Mutillidae and their allies of America, north of Mexico, I-III [15 new], **2,** xlii, 187-198, 199-214, 309-336. **Brues, C. T.**—A new sp. of Lepidopria from No. America, **5,** xxiii, 126-7. **Cockerell, T. D. A.**—Some bees in the British Museum [2 new], **4,** 1916, 272-74. New and little known bees [2 new], **9,** 1916, 156-60. **Crawford, J. C.**—Some American H. [2 new], **102,** xviii, 127-8. **Doane, R. W.**—A new sp. of Isosoma attacking wheat in Utah, **179,** ix, 398-401. **Girault, A. A.**—A n. gen. of Ielapine chalcid flies from the U. S. [1 n. sp.], **4,** 1916, 263-64. **Sladen, F. W. L.**—Bees of Canada.—Family Megachilidae [4 n. gen.; 2 n. sps.], **4,** 1916, 269-72. **Viereck, H. L.**—One new gen. and five n. sps. of ichneumon-flies, **161,** xxix, 165-72.

Doings of Societies.

American Entomological Society.

Meeting of June 12, 1916, in the Academy of Natural Sciences of Philadelphia. Dr. Henry Skinner, President, in the chair; nine persons present.

Economic Entomology.—Mr. Laurent exhibited some mounted Marguerite plants from the hothouse of M. Rothe, at Mt. Airy, Philadelphia, May, 1916, showing the ravages of an insect which destroyed hundreds of them. Dr. Skinner suggested that the first brood of potato beetles (*Leptinotarsa*) could be destroyed by removing them before they oviposited rather than by the poisoning method and at less expense and damage to the plant. Mr. E. T. Cresson, Jr., exhibited a box of insects infested by a species of Phoridae (Diptera).

A new code of by-laws was adopted and other business transacted.

R. C. Williams, Jr., *Secretary*.

Entomological Section, Academy of Natural Sciences, Philadelphia.

Meeting of May 25, 1916. Eleven persons present. Mr. Philip Laurent, Director, presiding.

Dr. Calvert read an extract from a letter from Dr. Ris, of Switzerland, complaining of the uncertainty in the delivery of mail matter to and from Europe on account of the war.

Lepidoptera. Dr. Skinner exhibited chrysalids of *Megathymus cofaqui* and *M. yuccae* collected in the yucca of Florida. He spoke on the possible abundance of these species when special attention is given to their habitats. He said that this is no doubt the case with many other apparently rare species.

Orthoptera. Mr. Rehn commented on a recent paper reclassifying the Orthoptera. Exception was taken to certain portions, particularly those referring to the "leaf-insects" or the genus *Phyllium*. He exhibited specimens of both sexes of species of this genus and one of another genus of "walking sticks," *Tropidoderus*, which shows a very great resemblance to the male sex of *Phyllium*.

Diptera. Mr. Hornig commented on the scarcity of mosquito larvae in and about Philadelphia. He said that the first brood had emerged and noticed that the females are still carrying eggs. In the discussion which followed it was the general opinion that this scarcity of the second brood was due to the continued cool weather.

Meeting of September 28, 1916. Nine persons present. Mr. Philip Laurent, Director, presiding.

Mr. Greene and Mr. Rehn discussed the persistency with which

some synonyms are still retained as valid species in some catalogues and lists. Mr. David E. Harrower was elected an associate.

Orthoptera. Mr. Hebard made a communication on four species of the genus *Periplaneta*. All were stated to be native in the United States, though but three from this country have been recognized in the literature. Certain features of coloration were shown to be of diagnostic importance, but recession and intensification of the color pattern was stated to be sometimes sufficient to lead to confusion in determining individuals of some of the species. The male primary and secondary sexual features were said to be of the greatest diagnostic value, rarely showing even slight individual variation, and differing widely in each of the species exhibited The remarkable development of the male concealed genitalia was discussed for each species. In the discussion which followed comments were made on the views of some of the early students on the systematic value of the genitalic characters, most authors not recognizing such especially where there was any asymmetry. Mr. Rehn spoke of the importance of the genitalic characters in the separation of species and genera.

Lepidoptera. Dr. Skinner read a communication from Mr. Howard J. Shannon, 73 Union Ave., Jamaica, New York, asking that records be made of the captures of *Anosia plexippus* along the Atlantic coast. He has liberated 1000 specimens which were marked with a design cut in one of the hind wings, and will gratefully acknowledge receipt of such records. Mr. Laurent spoke about the attraction of butterflies to the butterfly-weed and exhibited specimens of the following species which were captured on the flowers of the plant during the first five days of this month: *Danais plexippus* Fab., *Argynnis cybele* Fab., *Phyciodes tharos* Dru., *Vanessa antiopa* Linn., *Pyrameis huntera* Fab., *Limenitis ursula* Fab., *Lycaena comyntas* Godt., *Picris rapae* Linn., *Colias philodice* Godt., *Papilio glaucus* Linn. and var. *turnus* L., *P. philenor* Linn., *P. troilus* Linn., *P. polyxenes* Fab., *Pamphila hobomok* Harris, *P. peckius* Kirby, *P. cernes* Bd. & Lec. and *Eudamus tityrus* Fab. He called attention to the species *Vanessa antiopa* and *Limenitis ursula* which, he stated, seldom come to flower. Other species also were observed on this plant.

Diptera. Dr. Skinner spoke of a case of a white rabbit from a nearby suburb, infested with the larvae of a bot-fly. He commented on the apparent scarcity of adults of these flies about Philadelphia although many rabbits are found to be infested.—E. T. Cresson, Jr. *Recorder.*

Feldman Collecting Social.

Meeting of June 21, 1916, at the home of H. W. Wenzel, 5614 Stewart St., Philadelphia. Eleven members were present. Pres. H. A. Wenzel in the chair.

Coleoptera. Mr. Kaeber said he had found four pupae at Upper Darby, Pennsylvania, June 18, and one emerged on the 20th as *Pyrochroa flabellata* Fabr.; exhibited *Glischrochilus confluentus* Say from same place April 30, 1916. H. A. Wenzel exhibited *Oxyporus 5-maculatus* LeC. from Delaware County, Pennsylvania, which he collected on a very small species of fungus, *O. stygicus* Say same place, June 4, from large species of fungus and *Callimoxys sanguinicollis* Oliv., collected on hickory at Beechwood, Pennsylvania, June 4, by H. W. Wenzel.

Lepidoptera. Mr. Haimbach exhibited a box of about 100 moths collected this year at Homebrook, Pennsylvania, and recorded the following as interesting: *Apantesis figurata* Drury, *Homochlodes fritillaria* Guen., *Plagodis fervidaria* H.-S., *P. alcoolaria* Guen., *Cucullia philae* Smith and *Morrisonia sectilis* Guen. var. *vomerina* Grote.

Hymenoptera and **Strepsiptera.** Geo. M. Greene exhibited a wasp, *Sphex* sp? which he had collected at Miners Hill, back of East Falls Church, Virginia, August 14, 1914, the abdomen of which contained two examples of Strepsiptera.

Adjourned to the annex.—Geo. M. Greene, *Secretary.*

OBITUARY.

Science for October 13, 1916, announces the death of Albert John Cook on September 29. He was born in Owosso, Michigan, August 30, 1842, and attended the Michigan Agricultural College, from which he received the degrees of B. S. in 1862, M. S. in 1864, and honorary Sc. D. in 1905, and where he served as professor of zoology from 1866 to 1893. Removing then to California, he was professor of biology at Pomona College from 1894 to 1912 and State commissioner of Horticulture for five years. He was an active worker in economic entomogy, both in Michigan and in California, and contributed many brief articles on this subject to the bulletins and reports of the Michigan Agricultural Experiment Station, to various farming journals and, less frequently, to entomological periodicals. Lists of many of these papers may be found in the various installments of the *Bibliography of the more important Contributions to American Economic Entomology* published from time to time by the Bureau of Entomology, U. S. Dept. of Agriculture. He was also active in apiculture.

ENTOMOLOGICAL NEWS

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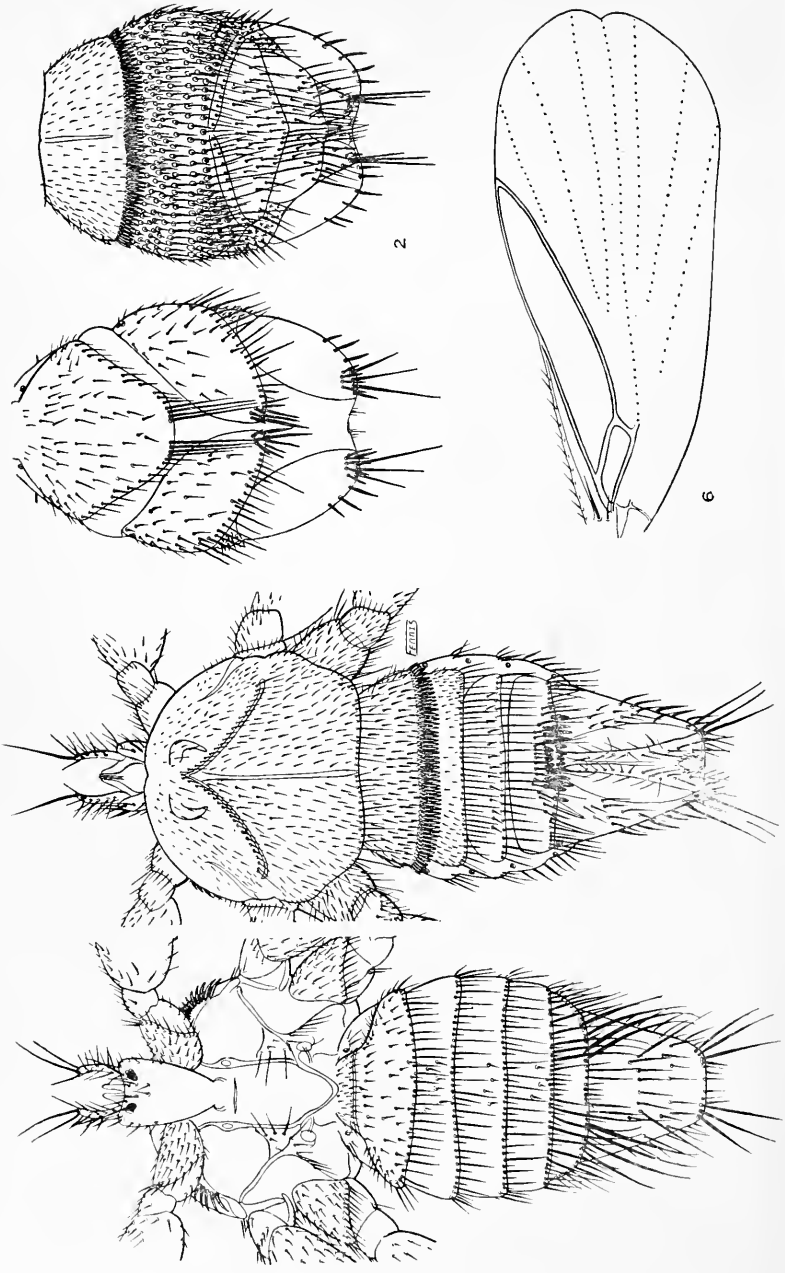

PENICILLIDIA ANTROZOI, 1, 2; NYCTEROPHILIA COXATA, 6.—FERRIS.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XXVII. DECEMBER, 1916. NO. 10.

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Some Ectoparasites of Bats (Dipt.)

By G. F. FERRIS, Stanford University, California.

(Plates XXII, XXIII.)

Those superlatively curious ectoparasites of bats, the Diptera of the families Nycteribiidae and Streblidae are among the least known of all the parasitic groups and but two species of Nycteribiidae and four of Streblidae have heretofore been recorded from North America. The Department of Entomology of Stanford University has accumulated a small amount of material belonging to both of these families and through the kindness of Professor Kellogg this has been turned over to me to work up. At the present time only part of the material can be reported upon, the remainder, belonging to the Streblid genus *Trichobius*, being withheld until a later paper.

The present paper presents the description of one new species and redescribes one species of Nycteribiidae and records and figures a third, and describes a new genus and species of Streblidae. The types of the new species are in the Stanford University collection.

NYCTERIBIIDAE.

Penicillidia antrozoi (Townsend). (Plate XXII, figs. 1, 2.)

Nycteribia antrozoi Townsend, Jour. New York Ent. Soc., Vol. I, p. 79 (1893).

Penicillidia mexicana (Bigot), Speiser, Zeitschrift für systematische Hymenopterologie und Dipterologie, Vol. II, p. 172 (1902).

Five specimens, two males and three females, from *Antrozous pallidus pacificus*, (Santa Paula, Ventura County, and Snelling, Merced County, California). The species was originally described from a single male taken from *Antrozous pallidus* in New Mexico.

Speiser is inclined to consider this species as identical with *Penicillidia mexicana* (Bigot), but, while this may be the case, such a conclusion is at present unwarranted. Speiser was able to examine the types of *P. mexicana* and redescribed the species but his redescription was not accompanied by figures and is not of such a nature as to throw much light upon the matter. For the present, at least, *P. antrozoi* should be allowed to stand.

♀. Length, 3 mm. *Head* rather slender with numerous short spines on the ventral side and along the anterior margin. Ocelli distinctly 2-facetted. Palpi rather long, with numerous stout spines.

Thorax somewhat broader than long. Legs of the type common to the genus.

Abdomen short oval, its shape varying with the degree of distention. On the dorsal side there are apparently three segments, but the exact number is difficult to determine due to the extent of the membranous areas. That this is the real number is indicated by the presence of but three pairs of spiracles. The first segment is very large, occupying nearly a third of the abdomen and is produced backward medially, the tip being broadly truncate. Following the first segment is a membranous area. The second tergite is divided medially into two plates and the third likewise into two plates which are widely separated. The first segment bears numerous short spines on its face and two clusters of long, stiff spines at the apex. Second segment likewise with numer-

ous short spines with a fringe of long spines along the posterior margin and a cluster of short heavy spines at the apex of each plate. Third segment with a cluster of stiff, heavy spines at the apex of each plate.

Ventrally there are apparently six sternites. The first occupies about a third of the abdomen and bears along its posterior margin the usual comb. Second segment membranous, beset with numerous short spines arranged in more or less regular rows, each spine set upon a chitinous papilla. Remaining sternites short and not extending across the abdomen, the lateral margins being filled by the pleurites of the apparent third dorsal segment, each of these sternites beset with numerous spines, the last having a cluster of stiff spines at each posterior lateral angle.

♂. Length, 3 mm. *Head* and *thorax* as in female.

Abdomen elongated, truncate at the tip. Dorsally there are seven segments each of which bears a pair of spiracles. First segment very short, indistinctly separated from the second. Second to sixth subequal in length. Seventh as long as any other three, about twice as wide across the anterior margin as across the posterior. Second to fourth segments with a row of slender spines along the posterior margin and a few short spines on the disk. Fifth and sixth segments with numerous very long stout spines along the posterior margin. Seventh with a number of stout spines on the disk and at the apex. Ventrally there are visible but five sternites, the first four subequal in length. First segment with numerous short spines on the disk and with the usual comb along the posterior margin. Second and third sternites with numerous short spines and with a row of slender spines along the posterior margin. Fourth with a row of slender spines along the posterior margin the median portion of which is occupied by a group of short and very heavy, almost tubercle-like, spines. Claspers on the last segment long and slender reaching to the anterior margin of the segment.

Penicillidia corynorhini n. sp. (Pl. XXIII, fig. 3.)

A single female, taken from *Corynorhinus townsendi* (White River, Tulare County, California) which, according to Miller, "List of North American Land Mammals in the United States National Museum, 1911," is probably *Corynorhinus macrotis pullescens*. The species is very distinct, differing from *P. antrozoi* in the remarkable backward prolongation of the first dorsal segment of the abdomen, in the short, broad head and in numerous minor details. A direct comparison with any of the European species is not possible, due to the insufficiency of the descriptions.

♀. Length, 2.3 mm. Color yellow. *Head* rather short and broad almost destitute of spines dorsally. Ocelli 1- or obscurely 2-facetted. Palpi short.

Thorax wider than long, not especially distinctive.

Abdomen dorsally with four apparent segments and with at least four pairs of spiracles. First segment produced backward medially, the apex rounded. Second composed of two medially separated plates which are produced back to the end of the abdomen. Third segment membranous. Fourth segment a small trapezoidal plate terminating the abdomen.

The chaetotaxy of the dorsal sides is as follows: First segment with a few short stout spines on the disk and with several long slender spines along the margin at the apex. Each plate of the second segment with numerous short spines on the disk and terminating in a cluster of exceedingly long stout spines. Third segment thickly beset with short spines, each arising from a papilla. Fourth segment with several stout spines along the posterior margin.

Ventrally there are apparently five segments. The first occupies about half the abdomen and bears the usual comb. Second membranous, thickly beset with short spines which are arranged in more or less definite rows, the base of each surrounded by a small chitinous area. Third divided medially into two plates. Fourth and fifth undivided, each with a row of small spines along the posterior margin.

Cyclopodia similis Speiser. (Plate XXIII, fig. 4.)

Cyclopodia similis Speiser, Archiv. für Naturgeschichte, LXVII Bd. 1, h. 1, pp. 51-52, tf. 2c., Taf. 3, f. 5 (1901).

A single male from an unknown bat (Apia, Samoa), which I refer to this species. There are certain minor details in which the specimen seems to differ from Speiser's description but they seem hardly important enough to justify the naming of a new species. The opportunity is taken to present figures.

STREBLIDAE.

NYCTEROPHILIA n. gen.

Streblidae of the subfamily Nycteroboscinae, with functional wings in which there are apparently nine longitudinal veins in addition to the costa, of these veins only the first two and a portion of the third being strongly developed, the others very weak. Tip of the wing notched. Thorax much compressed, high convex. Legs short, the posterior femora scarcely reaching beyond the end of the body, the anterior femora very short,

compressed. Abdomen with but three dorsal segments, the first two very short, and with six or seven ventral segments.

Type of genus *Nycterophilia coxata* n. sp.

The wing venation of this genus differs very much from that of any of the other Streblidae. The genus seems to be nearest to *Megistopoda*, but the functional wings, the short posterior femora and the much expanded anterior femora separate it at once.

Nycterophilia coxata n. sp. (Plate XXII, fig. 6 and text-fig. 5.)

Several males and females from a bat, *Macrotus californicus* (Santa Margherita River, Calif.).

♀. Length, 1.8 mm.; length of wing, 1.3 mm. Color yellow. *Head* rather small, apparently attached to the upper side of the prothorax. Apex with a crown of stout spines, occiput and cheeks with a few small spines. Eyes quite large, distinctly pigmented, situated close to the apex of the head and consisting of a single facet.

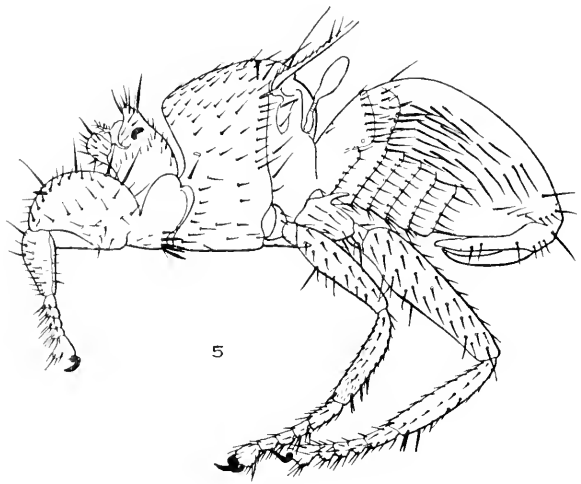
Prothorax very small, ventrally with a row of stout spines along the posterior margin. Mesothorax and metathorax high convex, much compressed, the mesothorax, in profile, slightly concave anteriorly. Both segments rather sparsely beset with small spines.

Anterior legs short, the femora much compressed and expanded dorsoventrally, the dorsal margin with numerous stout spines, the inner face with several short, stout, almost tubercle-like spines. Tibia slightly shorter than the femur. Tarsus equal to tibia, five segmented, the last segment somewhat expanded, the claws not cleft.

Middle and posterior legs in general similar to each other, slender, the middle pair somewhat the shorter. Posterior femora scarcely or not at all exceeding the abdomen. Coxae of middle pair very small. Coxae of posterior pair quite large and bearing a spur on the dorsal margin, this spur arising at the proximal end.

Wings large, apparently functional. First and second longitudinal veins distinct, the second meeting the anterior margin of the wing slightly beyond half way. A third longitudinal vein is distinct for a very short distance from the base and is connected to the second vein by a distinct cross vein, thence continuing much reduced to the tip of the wing, meeting the margin at the base of a distinct notch. The wing is apparently folded along this vein when at rest. Between the second and third veins are three interrupted veins, apparently branches of the second, and behind the third vein are three more which are apparently branches of the third. There are thus in all, nine longitudinal veins, exclusive of the costa, and one cross vein.

Abdomen soft, presenting two segments dorsally, the first segment very short. Ventrally there appear to be at least three segments but they are very indistinctly marked. The entire abdomen is beset with large spines with spiral markings.



Nyeterophila coxata n. sp. male, wings not shown.

♂. Similar to female except for abdomen. The first two tergites are weakly chitinized and bear a row of short spines along the posterior margin. The remainder of the dorsum is membranous and the median portion is entirely free from spines. Laterally, however, it is beset with long stiff spines. There are apparently seven sternites, the first six distinctly chitinized and with a row of spines along the posterior margin. The seventh sternite occupies about a third of the length of the abdomen. The male claspers are three in number and are appressed to the ventral side of the abdomen.

Explanation of Plates.

Plate XXII.

Fig. 1. *Penicillidia antrozoi* (Townsend): dorsal and ventral views of male.

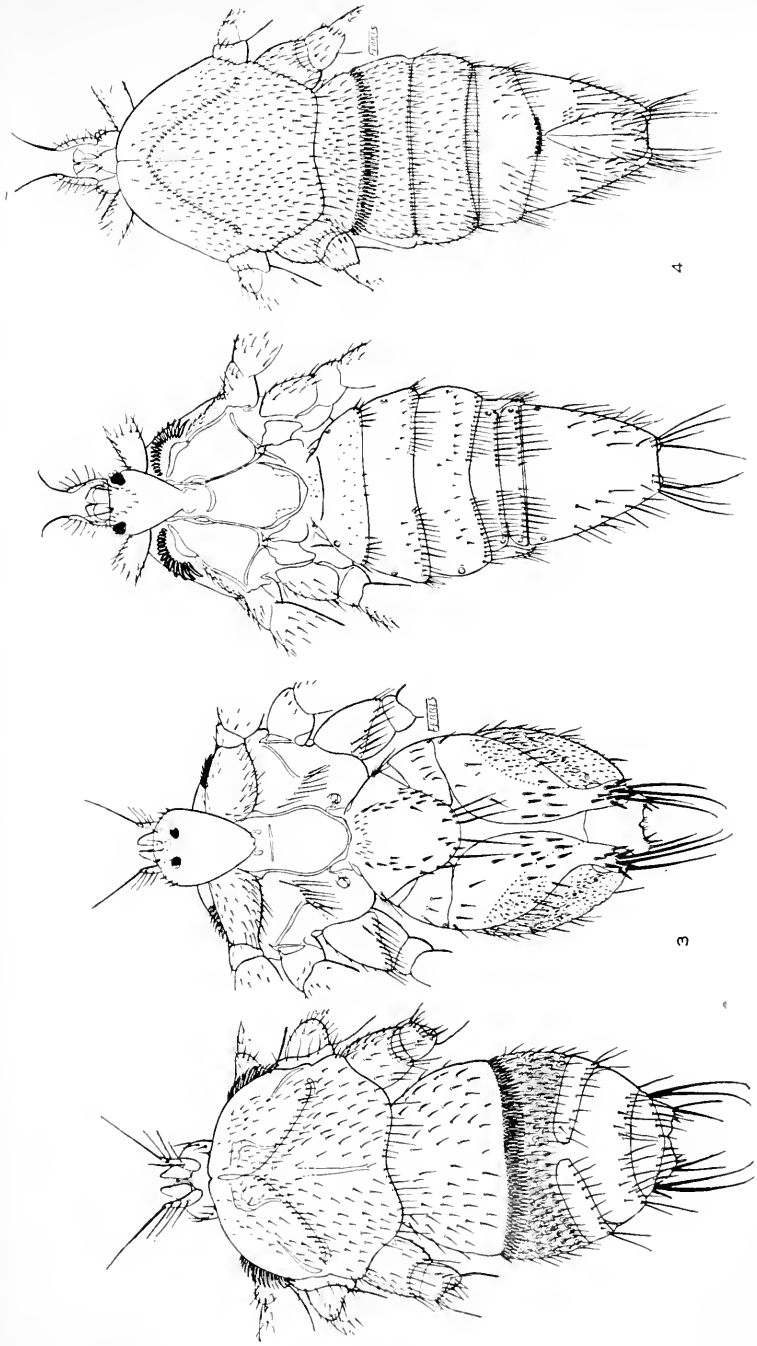
Fig. 2. *Penicillidia antrozoi* (Townsend): dorsal and ventral views of abdomen of female.

Fig. 6. *Nycterophilia coxata* n. sp.: wing.

Plate XXIII.

Fig. 3. *Penicillidia corynorhini* n. sp.: ventral and dorsal views of female.

Fig. 4. *Cyclopodia similis* Speiser: dorsal and ventral views of male.



PENICILLIDIA CORYNORHINI, 3; CYCLOPODIA SIMILIS, 4.—FERRIS.

Dipterological Notes. II.

A Study of the Lateralis-Group of the Bombyliid Genus Villa (Anthrax of Authors, in Part).

By E. T. Cresson, Jr., Academy of Natural Sciences, Philadelphia, Pa.

In working over the collection at the Academy of Natural Sciences of Philadelphia, this group of the Bombyliidae gave me some trouble. It includes Say's species *Anthrax lateralis* and *alternata*, and the original descriptions of these are so nearly alike in specific value that it is difficult to associate specimens with them satisfactorily. The next author to attempt to describe the two species as distinct is Coquillett,* and his attempt also does not seem to work out very well.

Before me is a series of specimens evidently belonging to this group, and to me it certainly contains two distinct species. Now as to which is *lateralis* and which is *alternata* is difficult to determine from Say's descriptions, with the possible exception of the sizes given. However, the two species in this series are easily separated by a character which has apparently been overlooked, or at least does not seem to have been mentioned, to my knowledge, in any descripiton of *lateralis* or *alternata*. That is the form of the vestiture of the lateral margins of the last four abdominal segments. In my series I can recognize two, with a doubtful third, distinct species from North America, belonging to this group, but there seems to be a number of possible varieties.

This group may be characterized as follows:

lateralis-group.

Third antennal joint onion-shaped with styliform apex. Face convex, epistoma not produced conically. Abdomen with black tomentum on dorsum; lateral pile of first and second segments pale; of third black. Fore tarsal claws minute.

The name *Villa* Lioy (1864), genotype *Anthrax abbadon* Fab. is congeneric with *Hemipenthes* Loew (1869), genotype *Musca morio* Linn.

Villa lateralis.

1823. *Anthrax lateralis* Say, Journ. Acad. Nat. Sci. Phila., iii, 42.
1887. *Hyalanthrax lateralis* Osten Sacken, Biol. Cent. Amer., i, 135.

*1887. Trans. Am. Ent. Soc., xiv, 166.

Say's original description is given here:

"Black; wings hyaline; sides with fulvous hair; tergum banded.

Inhabits Pennsylvania and Maryland.

Hypostoma and occipital orbits with white hair; stethidium with fulvous hair, particularly on the sides of the thorax, on the pleura and collar; wings as far as the basal transverse nervure fuscous, costal nervures fuscous, the included areola yellowish-brown; feet, the hair with a whitish reflection; tergum with a band of prostrate yellowish hair at the base of each segment, and with long fulvous hair each side as far as the middle of the length. Length nearly one-fourth of an inch. It belongs to Wiedemann's fifth tribe."

This species I have based upon the presence of the long scales on the lateral margins of the abdominal segments three to seven. There may be much variation in some of the other characters. I associate Say's name with this form on account of the smaller average size, the presence of "yellow prostrate hair on the bases of each segment.....the long fulvous hair on each side as far as middle of the length" of the abdomen.

The species may be described as follows:

Description.—Black, halteres yellow. Pile black on frons, face in part, first antennal joint, mesonotum, dorsum of scutellum and abdomen, and apical ventral segments; white on: face, pleura in part, pectus and basal ventral segments; golden yellow on: anterior and lateral mesonotal margins, prothorax, notopleura, meso- and meta-pleura, and lateral margins of abdominal segments 1 to 2. Tomentum black on: base of scutellum, apices of abdominal segments 1 to 8, bases of 5 to 7, and antecostal cell; white on: face, occiput, pectus, venter and legs; golden-yellow on: frons, lateral and posterior mesonotal margins, scutellar margin, lateral margins of abdominal segments 1 to 2, bases of 2 to 4, subapical bands of 5 to 7; bronze, sparsely, on disc of mesonotum and scutellum. Lateral margins of abdominal segments 3 to 7 with long cuneate scales intermixed with pile; those of 3, 5 and 6 are black, of 4 and 7 are white. Seventh of male with silvery scales.

Wings hyaline with humeral, subcostal, sometimes costal and first basal cells infuscate.

Bristles of mesonotum yellow, of scutellum and legs black. Hind legs not ciliate with scales.

Head hemispherical. Frons about twice as broad at antennae as at vertex. Face convex or epistoma slightly prominent. Post-orbital emargination distinct. Proboscis not protruding. First and second antennal joints subequal; third with styliform apex as long as remainder

of antennae. Scutellum apically pointed. Fore legs slender; their tibiae without extensor bristles or setulae. Middle and hind legs with distinct bristles and claws well developed. All pulvilli wanting or minute. Length 7.0 to 12.0 mm.

Variations.—Coquillett, in his paper previously mentioned, considers *lateralis* a variety of *alternata*, but later relegated it again to specific rank. It however has priority over *alternata*.

The amount of variation I cannot attempt to suggest with the small series before me, but even this shows some worthy of note.

The color of the pile and tomentum will vary from white to dark golden yellow. The yellow tomentum on the segments 3, 5, 6 may sometimes be absent, but it is always present on 2 and 4 and on 5 to 7; it may be apical, and apparently basal, depending on the amount of extension of the segments. The ground color of the basal angles of segments 1 to 2 is sometimes pale. In a few specimens the pile of the face, part of the pleura and more or less of the venter is black. In the males the lateral marginal scales of segments 4 to 7 are mostly black, but not in all cases.

variety **fulvipes.**

1887. *Anthrax fulvipes* Coquillett. Trans. Amer. Ent. Soc., xiv, 166 [Arizona].

This seems to be a good variety. The femora are, at least basally and sometimes entirely, pale.

variety **compressor.**

1887. *Anthrax compressor* Coquillett, Trans. Amer. Ent. Soc., 165 [California].

I do not consider this a distinct species. It seems to be based on the tomentum of segments 2-4 being lighter in color than that on segments 5-6.

variety **perimele.**

1830. *Anthrax perimele* Wiedemann, Aus. Zweifl. Ins., i, 583.

I have not seen this form to know it. Coquillett* records it from California. He characterizes it as having the tomentose

*1887. Trans. Am. Ent. Soc., xiv, 166.

bands on segments 3 and 5 yellow in contrast with the white on the others.

variety **nigra** new var.

Tomentum of abdominal dorsum, venter and patch on pleura entirely black or with narrow basal band on segment 4. Lateral scales of segments 3-6 entirely black or a few white on 4. The usual silvery scales on 7 present.

Holotype.— ♂, Beaverkill, Sullivan County, New York, August 10, 1909, (E. T. Cresson, Jr.), [A. N. S. P. No. 6106].

Paratypes.—2 ♂, topotypic.

I have seen only males of this form. The females probably are not to be differentiated from those of the typical form.

Villa alternata.

1823. *Anthrax alternata* Say, Jour. Acad. Nat. Sci. Phila., iii, 45.

Say's original description is given here:

"Body villous, above, beneath and sides cinereous; tergum fasciate with cinereous. Inhabits the United States.

Head black; eyes chestnut; front beneath the antennae bright cinereous; proboscis concealed in a groove to the tip; palpi distinct, exterior; thorax cinereous, tinged with fulvous each side, and at the scutellar suture; wings dusky, pellucid, nervures blackish-brown; base of the first transverse nervure brown opaque; pectus cinereous; feet blackish; scutel edged with cinereous; abdomen each side with dense long hair, which is cinereous on the first and second segments, but on the remaining segments alternating with black; tergum with six or seven cinereous lineolar bands; venter cinereous; segments particularly the third black at base. Length of body more than eleven-twentieths of an inch. Found in Pennsylvania, and also in Missouri. It belongs to Wiedemann's fifth tribe."

This species as I consider it differs from my conception of *lateralis* mainly in that the lateral margins of all abdominal segments are furnished with long pile, not intermixed with long scales on segments 3-7. Besides this the species is noticeably more robust in its build, the abdomen being distinctly broader than the thorax. The color of the pale pile is generally white, that of the lateral abdominal margins of segments 1-2 being long and especially conspicuous in contrast with the black on the others.

Description.—Black, halteres yellow. Pile black on: frons, part of face, disc of mesonotum, apices of segments 3 to 7, lateral margins of 3, 5, 6, apical segments of venter and legs; yellow or whitish on: part of face, mesonotal margins, pleura, pectus, segments 1 to 2, bases of 3 to 7, lateral margins of 4, 7, and basal segments of venter. Tomentum black on: mesonotum partly, base of scutellum, apices of segments 1 to 4, bases of 5 to 7, antecostal cell of wing partly; pale on: lower part of frons, face, occiput, mesonotum partly, scutellum except base, bases of segments 2 to 4, apices of 5 to 7, antecostal cell partly and legs.

Wings hyaline with extreme base infuscate, sometimes extending into the basal cells.

Structurally similar to *lateralis*, but the fore tibiae with extensor bristles or setulae. It is more robust with the abdomen noticeably broader than the thorax. Length 12-16 mm.

The above description is drawn from a female collected at Lloydminster, Saskatchewan, Canada, July 31.

A male, Aweme, Manitoba, Canada, Sept. 1, 1903 (N. Criddle), and two males, Fort Wingate, New Mexico, I also place here. They have the following characters:

Vertex broad as antennae; frons and face black pilose and tomentose; some black pile on pleura; mesonotum black tomentose and scutellum entirely so. No conspicuous band of pale tomentum on segments 2 to 3, but base of 4, apices of 4 to 5 and lateral margins of 6 with white tomentum.

Variations.—There seems to be little variation in this species. The following is the only one I have considered, and it is not very satisfactory.

variety **nigropectus** new variety.

Pleura, pectus and venter black pilose. Pale abdominal bands sometimes very narrow or even absent.

Holotype.— ♂, Highrolls, New Mexico, June 4, 1902, (Rehn and Viereck), [A. N. S. P. No. 6107].

Paratypes.— ♀, topotypic.

Of this form I have examined specimens from New Jersey, Pennsylvania, West Virginia, Georgia, South Dakota and Kansas, and these seem to be typical.

This form I suspect is conspecific with *hypomelas* Mcq., as a variety with fasciated abdomen. If this be correct, then *hy-*

pomelas can be separated from *alternata* only by the color of the pile on the pectus and venter.

A ♂, Elwyn, Pennsylvania (C. S. Welles) does not seem to have the fore tibiae bristly, but they may have been broken off, although I cannot find any trace of scars under high magnification.

Villa hypomelas.

1840. *Anthrax hypomelas* Macquart, Dipt. Exot., ii, 3, 1, 76, (pl. xxi, f. 1).

Pile of face, pectus, abdominal segments 3 to 6 and venter black. Abdominal segments black tomentose; lateral margins all pilose. Pile of segments 1 to 2 yellow or whitish; of apical segment white. Fore tibiae setulose; claws minute.

Described from North America.

It is a question to me whether this is a distinct species. It differs from males of *alternata,* var. *nigropectus* only in the absence of pale tomentum and lateral white pile on segment 4. These, however, are very faint on some specimens I have placed under *nigropectus.*

My limited series of this form does not contain any females, and this suggests to me the possibility that I have them among the females of *nigropectus.*

Summary.

The species *lateralis* and *alternata,* as I have recognized them, may be separated as follows:

Lateralis. Slender, with abdomen two or more times as long as broad; lateral margins of segments 3-7, furnished with long cuneate scales, which are more or less mixed with pile; fore tibiae not bristly. Length.—7.0-12.0 mm.

Alternata. Robust, with abdomen ovate, not more than twice as long as broad; lateral margins of segments 3-7 furnished with long pile which is not intermixed with scales; fore tibiae bristly. Length.—12.0-16.0 mm.

It is probable that these species in most collections are correctly determined as regards the typical and normally developed specimens. But the varieties and undeveloped specimens will no doubt be found in confusion.

Two new Aphids, Capitophorus shepherdiae and Siphocoryne aquatica (Hem., Hom.).

By C. P. Gillette and L. C. Bragg, Fort Collins, Colorado.

(Plates XXIV, XXV.)

Capitophorus shepherdiae, n. sp., Plate XXIV.

In the *Journal of Economic Entomology,* 1915, page 379, attention was called to an aphid that had been found associated with *Rhopalosiphum hippophaes* and *Myzus braggii* on *Elaeagnus* and *Hippophaes* as over-winter hosts, which so resembled either of these species in general appearance as to be easily mistaken for them. This species has since been isolated, and its development followed through the year, proving it to be a different species and one that seems to be undescribed. This species may have an alternate summer host plant, but we have not been able to find one and the lice remained on *Shepherdia* all summer in 1915.

This species is readily separated from any other we know by the combination of three characters, as follows: spur of antenna less than one-half as long as the cornicle in the apterous form, cornicle clavate, and dorsum of abdomen conspicuously decorated with several rows of short, stout, capitate hairs. Descriptions of the different forms of this species follow. All measurements are in millimeters.

Fundatrix.—Color pale green, or yellowish green; dorsal surface set with numerous short, stout capitate hairs on small, cone-shaped tubercles, there being one marginal and three lateral rows on either side of the median line of the abdomen and metathorax; antennæ barely reaching to the abdomen, set on short tubercules, 5-jointed, first joint with rather prominent swelling on the inner side, giving it the appearance of being bent at a right angle; joint III as long as IV and V together; relative lengths of joints beyond the second varying little from the following proportions: 16: 8: 6: 7 (spur); total length, .50 to .60; primary sensoria only; vertex flat, but set with tubercles that bear capitate hairs; capitate hairs on antennal tubercles and joints I and II of the antennæ; cornicles rather long, (.40), slender towards the base, clavate distally, due to a thickening on the inner margin, and slightly curved outward near the distal end; cauda but little longer than its width at base, and somewhat blunt at the tip; legs rather short

and stout, the hind tibiæ measuring .50; length of body to base of cauda 1.40.

Described from many examples taken on *Shepherdia argentea* at Fort Collins, Colo., during the year 1915, by L. C. Bragg. See Plate XXIV, figures 1, 2, 3 and 4.

Apterous Fundatrigene.—General color a pale yellowish green to greenish yellow with transverse dashes of darker green, much as in the oviparous form; antennæ, legs, cornicles and cauda concolorous with the body, except that the tarsi and the last segment and spur of the antennæ are blackish; eyes dark red; capitate hairs as in the fundatrix and the egg-layer; body, 1.40 by .80; antenna, .75; cornicle, .43; hind tibiae, .56; antenna 5-jointed, ordinarily, with the segments measuring about as follows: III (III and IV in one), .28; IV, .14; V, .08; spur, .16. In occasional examples a swelling near the middle undoubtedly indicates the location of a former joint between the segments, and in such examples the basal portion (old third joint) is a little longer than the distal portion, the ratio being about as 7 to 5. See Plate XXIV, figure 5.

Described from numerous examples taken from *Shepherdia argentea* growing on the grounds of the Colorado Agricultural College, July 1st, 7th and 20th, 1915, by L. C. Bragg

Alate Fundatrigene.—Color light-green with dorsum of head, thorax, meso-sternum, and a large quadrate area on the abdomen dusky or dark-green to blackish; antenna blackish except joints 1 and 2 and the extreme base of 3, which are pale greenish; legs greenish, except at the distal ends of the tibiæ and the tarsi which are blackish; distal half of the cornicles dusky; cauda and beak green, the latter attaining the 2nd coxæ; three dark-green spots upon either lateral margin of the abdomen; eyes dark-red, front of head considerably produced and bearing about 4 capitate hairs; first joint of antenna moderately gibbous on the under side; capitate hairs occurring on the pronotum, anterior lateral angles of the mesothorax, and in longitudinal rows over the abdomen; length of body about 1.30 to 1.50; wing, 2.50; antenna about 1.10 to 1.20; proportions of joints beyond the second about as follows:—100; 85; 90; 40; 100 (spur); cornicle, .40; cauda, .12; numerous (20 or more) oval sensoria on joint III of the antenna; joint IV with about half as many; joints V and VI with permanent sensoria only; beak attaining 2nd coxæ. See Plate XXIV, figures 6 and 7.

Described from numerous examples taken from *Shepherdia argentea*, Fort Collins, Colo., June 19, 1915, by L. C. Bragg.

Male.—Resembles the alate fundatrigene but is much smaller, about 1 mm. in length; antenna (figure 10) about 1.15 long, joint I strongly gibbous, joints II and III with sensoria about as in alate virgogene, joint V with about 10 to 12 sensoria; cornicles about .33; claspers black; cauda dusky; hind tibia .66.

Described from four specimens, two taken October 20, and two taken September 28, 1915, at Fort Collins, Colo., by L. C. Bragg, from *Shepherdia argentea.*

Oviparous Female.—Resembles the other apterous forms of the year very closely, is more yellow in color, averages a little longer than the stem-mother; antenna about .80, or nearly once and a half as long as the antenna of the stem-mother. Segments 3 and 4 united in one as in the other apterous forms; cornicles, .45; hind tibiæ moderately swollen throughout nearly their entire length, and with many small sensoria, see figures 8 and 9.

Described from specimens taken by Mr. L. C. Bragg, at Fort Collins, Colo., from *Shepherdia argentea*, Oct. 20, 1915.

Siphocoryne aquatica, n. sp., Plate XXV.

Alate Virgogene.—Head, thorax, antennæ, tarsi, distal ends of tibiæ, and cauda black or blackish; abdomen green with transverse dashes or blotches on most of the abdominal segments, which, in some, form a continuous area on segments 2, 3, 4 and 5. These dark markings largely disappear in balsam. Length of body 2; wing 3; cauda .20; antennæ 1.10; cornicles clavate without flange; venation normal; third joint of antenna with about 14 nearly circular sensoria; permanent sensoria ciliated; joint 3 about twice as long as 4, and joints 4, 5, 6 and spur sub-equal; a small but distinct wart-like tubercle on the hind margin of joint 8 of the abdomen, just before the cauda; figures 1, 2, 3, 4.

This is a very common louse on a water-grass (*Catabrosa aquatica*) growing on seeped land, usually found in the water along the margins of ditches. The lice often occur on leaves and stems beneath the water where they seem to be perfectly at home. This louse remains on the grass throughout the year, and has been found alive under ice following temperatures as low as 15 to 20 degrees below zero. We have made collections at thirty different dates in ten different years. Both alate and apterous forms have been taken in every month of the year, and, apparently, they occur at all times. No sexual form or eggs have been recognized. Mr. Bragg took this

species on sweet-grass in Cherokee Park (Campton's), Feb. 27, 1916, at an altitude of 7800 feet.

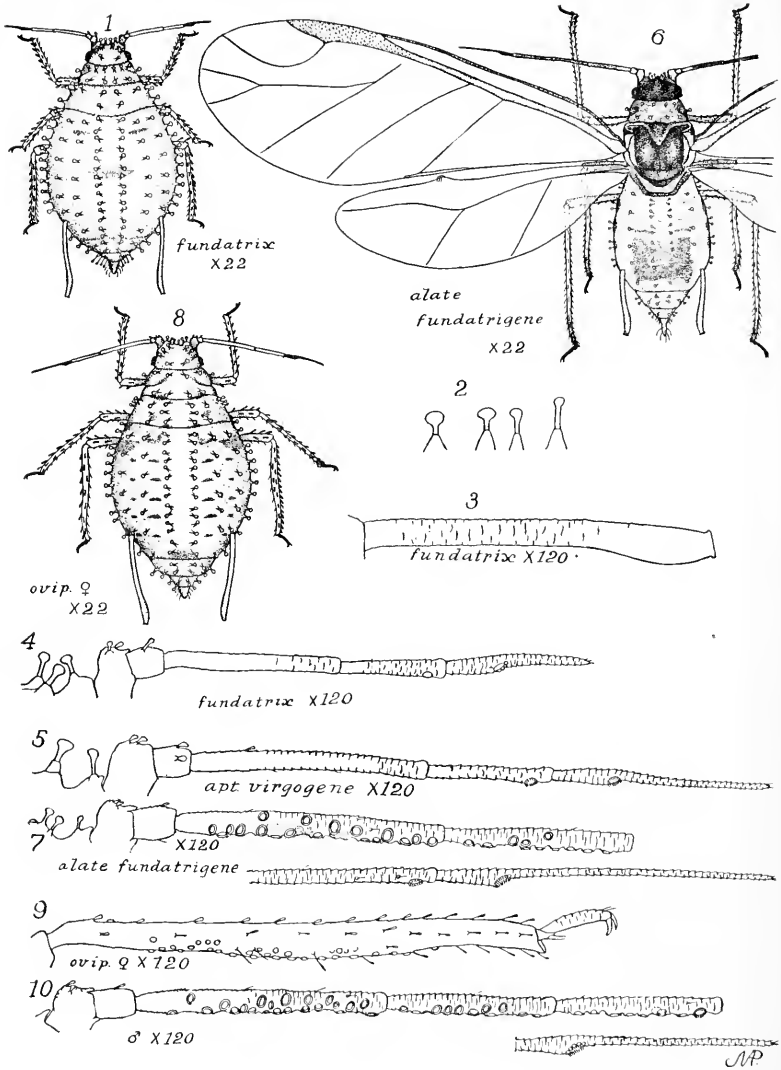
Apterous Virgogene.—Color light yellowish green, almost exactly the same as the grass leaves upon which it lives; rather heavily covered with white powder on the ventral surface, but little on dorsum; general form rather elongate (about 2.60 long by .70 to 1 broad); length of antenna, .85 to .95; cornicles and joints 1 and 2 and distal half of antennæ, dusky to black and powdered throughout; eyes prominent and black; legs yellowish and covered with powder; tarsi dusky to black; cauda concolorous with body or dusky, rather bluntly pointed at tip; beak short, barely attaining 2nd coxæ; cornicles weak recumbent on the abdomen, concolorous with the body with the extreme tips blackish, in form clavate, in the shape of a baseball bat, but with the small end attached to the body and with the free end rounded off and without any flange present; length, .25 to .30 The entire body is free from hairs, but has a roughness due to what appear to be minute wrinkles. The antenna is 6-jointed, joint 3 being about twice the 4th, and joints 4, 5, 6 and the spur are sub-equal; vertex, strongly convex.

A striking peculiarity of this species is a rather prominent tubercle on the middle of the hind margin of the dorsal segment preceding the cauda in the apterous form. The tubercle is present but quite small in the alate form. In some examples the third joint of the antenna has from 2 to 4 sensoria which are rather indistinct and possibly only vestiges as the merest outlines are all that can be seen, and these are sometimes more or less broken and irregular. Their location is as shown in Plate XXV, figure 2. The antennae are upon short but distinct tubercles, Plate XXV, figures 5, 6, 7 and 8.

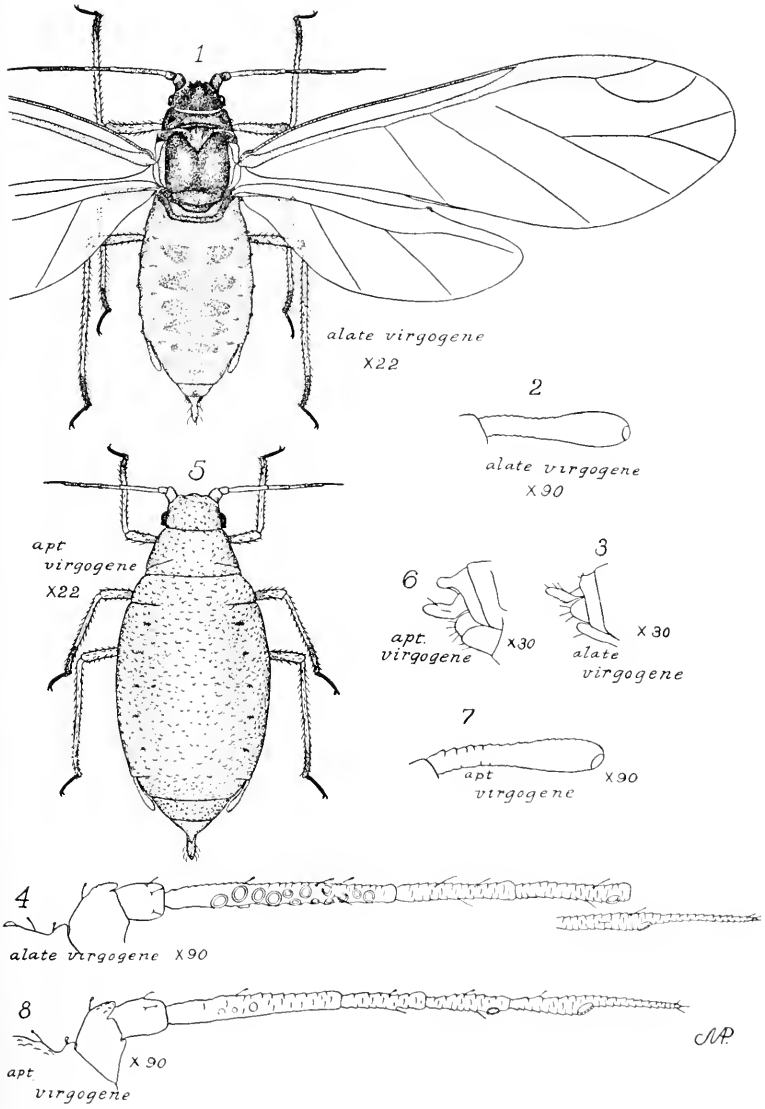
EXPLANATION OF PLATES XXIV, XXV.

Plate XXIV. *Capitophorus shepherdiae* n. sp.: 1, Fundatrix; 2, capitate hairs on tubercles; 3, cornicle; 4, antenna and vertex of same; 5, antenna of apterous fundatrigene; 6, alate fundatrigene; 7, antenna and vertex of same; 8, oviparous female; 9, hind tibia of same; 10, antenna of male. Figures 1, 6 and 8 x 22 diameters; other figures 120 diameters. Original. Miss Miriam A. Palmer, delineator.

Plate XXV. *Siphocoryne aquatica* n. sp.: 1, alate virgogene; 2, cornicle; 3, last three abdominal segments; 4, antenna of same; 5, apterous virgogene; 6, last three abdominal segments; 7, cornicle; 8, antenna of same. Figures 1 and 5 x 22 times; figures 3 and 6 x 30 times; figures 2, 4, 7 and 8 x 90 times. Original. Miss Miriam A. Palmer, delineator.



CAPITOPHORUS SHEPHERDIAE—GILLETTE & BRAGG.



SIPHOCORYNE AQUATICA—GILLETTE & BRAGG.

Notes on the Genus Hemiargus Hübner in Dyar's List (Lep.).

By G. T. Bethune-Baker, Edgbaston, Birmingham, England.

Months ago my friend, Dr. McDunnough, wrote to me in reference to the confused state of *Lycaena hanno* Stoll, and asked if I would attempt to clear up the synonymy of it and its near allies. The only way to do this was to see Boisduval's types and also to endeavor to settle whether *antibubastus* Hb. was the same species as *hanno*. The oft-experienced and renewed kindness of Monsieur Charles Oberthür has relieved me of the first difficulty, for he has been so good as to send me all the necessary specimens from the Boisduval section of his magnificent collection, so that, with these before me, the second point will be easier.

In Dyar's list we find all these species grouped as follows under the genus *Hemiargus*:

Hemiargus Hübner.

444 **isola** Reakirt, Proc. Acad. Nat. Sci. Phil. 332—1866.
Syn. *zachaeina* Butler & Druce—*alce* Edwards.
445 **gyas** Edwards, Trans. Am. Ent. Soc. iii. 210—1871.
446 **cyna** Edwards, Trans. Am. Ent. Soc. ix. 3—1881.
447 **hanno** Stoll, Pap. Exot. Suppl. pl. 39 f. 2—1790.
Syn. *antibubastus* Hübner, *hamo* Lucas, *pseudoptilctes* Boisduval & Le Conte, *astenidia* Boisduval (recte *astenidas*), *filenus* Poey.
448 **ammon** Lucas, Sagra Hist. Cuba. vi. 612—1856.

Taking these into consideration seriatim, we have first to settle the genus *Hemiargus* Hübner.

Scudder (Hist. Sketch p. 186) names *bubastus*, *parsimon* (*celaeus*), *lysimon* (*ubaldus*), *hanno*, *isis* (*isarchus*), *larydas*, and he says *hanno* may be selected as the type. In making this selection he gives Hübner's Verz. Bek: Schm. p. 69, as his only reference and he dates that work as 1816. We know, however, today that that date is an error; pages 65-80, with spp. 622-819, cannot have appeared earlier than 1822 (Durrant and Sherborn both agree on this point). This is proved by the fact that these pages of the *Verzeichniss* have several references to his (Hübner's) earlier work, the *Zuträge*, in them,

the first of which is to the genus we are considering. His first species is *"Hemiargus bubastus* Hübn. Zutr. 99-100." These figures are on plate 509, and the legend at the bottom of the plate is "99-100 *Hemiargus antibubastus."*

In Hübner's and Geyer's text belonging to this volume, the species and plate are referred to as *"Hemiargus antibubastus,* Zutr. I, figs. 99-100," and the preface to this part I of the Zuträge is dated 22-XII-1818, so that it is evident that if it did not appear before the end of 1818 it must have appeared early in 1819; in addition to other references there is on p. 74 of the *Verzeichniss* No. *"730 Lycus niphon,* Zuträge 203-204," which plate was issued in Part II of that work, the preface to that part being dated 23-XII-1822, whilst the Title is dated 1823. These references prove that the *Verzeichniss* could not have been issued before the end of the year 1822, therefore *Hemiargus bubastus* (1822) falls as a synonym to *Hemiargus antibubastus* (1818) if it should happen to be the same species. The genus *Hemiargus* was at its institution a monotypical genus, containing only *antibubastus.* This species, therefore, is its type, and as a consequence Scudder was acting *ultra vires* in selecting *hanno* as type. We get, therefore:

Hemiargus Hübner, monotypical genus, type *antibubastus.*

Returning now to Dyar's list, his first species is

H. isola Reakirt.

The genitalia of this species are extraordinary in that there is a large toothed hood above the furca, occupying an intermediate space between the tegumen and cingulum and the harpagines; it has its origin just above the very short furca; the aedoeagus is also different somewhat to the others of the genus, but in other characters the species would appear to be rightly placed in this genus.

H. zachaeina Butler & Druce.

This species has nothing to do with *isola;* it has two distinct anal spots with metallic edging in the hind wings and therefore belongs to the *catilina* group; it will be referred to

later on. Dyar probably placed it as a synonym of *isola,* because Butler & Druce's supposed ♀ is *isola,* as stated by Godman and Salvin in the *Biologia* II, p. 107, where they rectify the synonymy.

H. gyas Edwards.

This species is described by Edwards as having *two* distinct blackish spots next the anal angle. I have, therefore, little doubt that it is a near ally of *catilina* Fab.; it may be a local form of it. *Catilina* is a species that has escaped observation altogether until recently. It is close to *ammon* and will have to be referred to again later on.

H. cyna Edwards.

Edwards says this species stands next to *gyas,* but the description is very different from it, while the genitalia are totally diverse, so much so that the two species cannot possibly belong to the same genus. *Cyna* has a number of very long, stout hairs or bristles emanating from the base of the clasps (harpagines) and extending far beyond their apex; this peculiar character is analogous to the same feature that occurs in the genera *Zizina* and *Zizula;* the tegumen is, however, very different so that I think it is rather a case of parallelism than of kinship.

H. hanno Stoll.

The species generally accepted as *hanno* Stoll (nec Hübner) is that represented by Holland, Plate XXXII, f. 3, in his *Butterfly Book,* and by W. G. Wright, Plate XXX, figs. 397-397a. His figure 397b is certainly another species. I do not see anything antagonistic to Stoll's figures (Plate 39, 2 and 2b) in these identifications, and I think they should be accepted. It is, therefore, a species with a single distinct ocellated spot at the anal angle. *H. filenus* Poey and *pseudoptiletes* Bdv. are both synonyms of it. Poey's figure is very good and is without doubt *hanno,* though the undersurface is darker than is the case with most of the mainland specimens. Boisduval was aware that his *pseudoptiletes* was the same as *filenus,* for he

adds a footnote to his description, after correcting the synonymy at the head of his species:

"cette espèce port sur nos planches le nom de *Pseudoptilctes,* parceque la gravure et l'impression étaient terminées avant que M. Poey eût publié les deux livraisons des centuries des Lépidoptères de l'île de Cuba; nous avons du par conséquent adopter le nom de *Filenus* pour ne pas compliquer une synonymie deja trop compliquée."

H. antibubastus Hb.

This species certainly is not a synonym of *hanno;* neither is it *bubastus* Cramer, Pl. 332 G. & H., to which Hübner refers in his *Verzeichniss,* p. 69, No. 676. I have referred to Cramer's beautiful original drawings, which are now in the possession of the British Museum at South Kensington. These are most carefully painted; the spots and markings of the under surface are delineated with the utmost care and delicacy; there is no cell spot at all, and the post-median line is not fractured, but is slightly angled in the primaries; neither has it any subterminal row of spots, there being merely a fine twin crenulate white line; in the secondaries the second costal spot is projected outwards, the post-median line is not fractured; at the anal angle there is a spot with an orange iris. On the upper surface the color is uniformly brown, with no markings except two anal spots with traces of two other marginal spots above them. All the spots of the under surface are small, round ones, finely encircled with white. The locality is the Cape of Good Hope. The whole pattern of Hübner's *antibubastus* is quite different from that of Cramer, and I have no hesitation in saying they represent two quite distinct species; the locality given by Hübner is Georgia, so that their habitats are widely separated. I am quite unable to identify this with *hanno,* as is done by Dyar. The black spots of the primaries, with their definite white encirclings, preclude its being *hanno;* it is very much nearer *isola,* but I should not be disposed to make *isola* a synonym of it. It is very unfortunate that Hübner's types are not known. He painted from specimens lent him by correspondents all over Europe and beyond, and as a consequence the collections where his types might be are unknown.

H. hamo Lucas in Sagra.

I identify this with *hanno* Hb. (nec. Stoll), which equals *ceraunus* Fab., and will be referred to later.

H. astenidia Bdv. ms. (recte *astenidas*), Lucas in Sagra.

Through the kindness of my good friend, M. Ch. Oberthür, I have the female type of this species before me, as I also had of *pseudoptilctes;* the ♀ type is without any question *Chilades trochilus*, a well-known Mediterranean and Eastern insect. That fact, however, does not affect the name of the male, as its description came first. I have been unable to trace Boisduval's description, and I understand that it was first described by Lucas in Sagra as follows: "♂ supra, cyaneo violaceis margine fuscente fimbriaque albicante. ♀ Supra fusconigricantibus, basi cyaneo virescente, etc." At the end of the account of this insect he goes on to say: "usually the female is without any blue." I think, therefore, that the female without any blue is probably the one M. Oberthür has kindly lent me, and has nothing to do with *astenidas* vera. The description suits *hanno* well, and I am quite prepared to accept Dyar's conclusion that the name *astenidas* should fall as a synonym of *hanno*.

H. ammon Lucas in Sagra.

This is a delicate little insect of a clear lavender blue with two dark anal spots, the upper one of which is edged above with red, the fringes are tessellated black and white. The wings are so delicate that the underside markings show through. The underside is whitish gray and all the markings are encircled with white. In the primaries there is a quadrilateral spot at the end of the cell followed rather closely by a continuous band of six confluent spots, making a band rather than a row of spots; below the sixth there is a smaller one that is discontinuous; a broad white area follows this and is succeeded by a broadish irregular, pale brown stripe, beyond this being the broad white margin in which is a series of pale brown internervular dots.

The secondaries have the usual three black basal spots below each other with another costal one (black) near the apex; the cell is closed by an angled pale brown mark, close to which is the transverse row of seven more or less isolated spots beginning below the black costal one, the second is projected right outwards, the third and fourth confluent inwards, the fifth further inwards, the sixth outwards, the seventh

right inwards on the inner margin; this series is followed by a broad irregular white area and the marginal series is like that in the primaries except that the inner brown line is fine and the brown internervular spots larger; there are two black anal spots beautifully iridescent with metallic pale blue, and the upper of the two spots has a broad red crescent on its inner edge.

♀. Blue of a purer or truer blue than the male and covering more than three-quarters of the primaries and four-fifths of the secondaries; the wings are of the same delicate texture as in the male, the pattern below being precisely that of the male.

I am indebted to M. Oberthür for the loan of this beautiful little species. Holland's figures on plates 30 and 31 in his *Butterfly Book* give a fairly correct representation of the species found on the mainland, but it is considerably different from the Cuban insect and is certainly distinct from it; it is, I have little doubt, *catilina* Fab.

H. catilina Fab.

This species was described by Fabricius in his Ent. Syst., Vol. III, p. 304 (1793). The description is probably taken from a female, the underside being described as "pallidiores fasciis plurimis albis, angulus ani ocellis duobus dimidio cæruleis atrisque." "Habitat in Americae meridionalis Insulis Dr. Pflug." In the British Museum (South Kensington) there are specimens from Haiti and St. Domingo which agree accurately with the descriptions of Fabricius and they also agree equally precisely with Holland's figure (l. c.), Plate 30, f. 45.

The differences between this and *ammon* are easily recognizable in the primaries on the underside. The transverse row is not a continuous band but is an irregular row of separate spots touching each other; in the secondaries the basal series of dark spots consists of four, there being an additional one just below the cell; in *ammon* there are only three spots, viz.: below the costal vein, in the cell and on the inner margin; in *catilina* the color is gray up to the transverse band in both wings, throwing up the white postmedian area strongly in contrast. *Ammon* has the underside much whiter all over. Again, the upperside has none of the delicate tone of *ammon*, but is, as Holland describes it, lilac blue; it is quite

solid in texture and shows none of the underside markings through. *Catilina* is also a larger and more robust species. The specimens of *ammon* before me measure 20-21 mm. against 26 mm. in *catilina*. I have a good series from Arizona and Florida in my collection which were sent me as *ammon*, but after comparing them with the Cuban insect and with the series in the National collection here, I have no doubt that they represent *catilina*.

H. zachaeina Butler & Druce.

I have already referred briefly to this species, the types of which are in the British Museum, there being a fair series there.

It appears to me to be quite distinct from *catilina*, though a close ally. It very probably replaces that insect in its own regions. Its color is violet blue, almost exactly like *hanno* above, but the underside is near to *catilina*, the differences being that the transverse band in the primaries is much nearer the termen, quite a different shape, being oblique, not more or less curved, and being very irregular; there is no white space between it and the submarginal rows of markings which it touches; the same characters apply to the secondaries except that there is a very slight white postmedian trace. There are two anal black spots with metallic blue, the upper and larger of which is edged internally with a red crescent.

We still have to consider two other insects, *Hesperia Rurales ceraunus* Fabricius (Ent. Syst. III, p. 303, No. 149) and *Rusticus adolescens hanno* Hübner (Samml. Exot. Schm. I, Plate 98, ff. 1-4). In Wytsman's reprint of the latter work, Kirby (vol. III, p. 72) refers Hübner's *hanno* to *ceraunus* F. and from Fabricius' careful description (l. c.), where he mentions the most important characters, I have no hesitation in accepting Kirby's allocation. I am glad to be able to confirm this from another source, and I have to thank M. Oberthür again for this opportunity. Among the specimens he was so good as to send me are two, one from Boisduval's collection and one from Guenée's; that from the former is labelled in,

I believe, Boisduval's writing: "Rusticus adolescens hanno Hübner (Samml. Exot. Schmetterl., pl. 117, figs. 1-4)." The reference here is a clerical error; it should be 98; plate 117 has only two figures on it of *Papilio crithonius*. The specimen is certainly the same as Hübner's figures and the example from Gueneé's collection is the same, both of which agree with the description of Fabricius. The species is the smallest of the genus, the color is dull violet blue, the markings and pattern of the underside being very small but fairly distinct. The color is dull dirty gray, with the spots of the same hue encircled finely with white; the transverse postmedian row of spots is very near the termen, and there is no white area at all; in the secondaries the same applies, but there are in addition the four black spots which are so marked a feature in this genus. There is only one anal spot and therefore its position should come next to *hanno* Stoll.

I would tabulate the genus thus:

Hemiargus Hübner.

Hübner Saml. Exot. Schm. Zuträge ff. 99-100, p. 16, No. 125, 1822 or 3. A monotypical genus, type *antibubastus*.

isola Reakirt. Proc. Acad. Nat. Science, Phil. 332. 1866.

antibubastus Hübner. Zuträge l. c. 1822 or 1823.

catilina Fabricius. Ent. Syst. III. p. 304. 1793.
Lycaena ammon. Holland Butt. Book p. 270, Pl. xxx f. 45, xxxi f. 31.

gyas Edwards. Trans. Am. Ent. Soc. III, 210. 1871.
Whether this and the following species are the same I am unable to determine.

zachaeina Butler & Druce (partim). Cist. Ent. I, p. 104. 1870.

ammon Lefebvre. Lucas in Sagra. Insectes p. 612. 1857.
This species does not, I believe, occur on the mainland. In the British Museum there are specimens from Cuba—Santiago and Bahamas.

ceraunus Fabricius. Ent. Syst. III. p. 303. 1793.
Syn. *Rusticus adolescens hanno* Hb. Saml. Exot. Schm. Taf. 98, ff. 1 to 4. *Lycaena hanno* Lucas in Sagra, Insectes p. 612.

hanno Stoll. Exot. Schm. Zuträge p. 170 Pl. xxxix. f. 2.2b. 1790. id. Holland. Butt. Book p. 269, Pl. 32, f. 3, 1905.
Syn. *Polyommatus filenus* Poey. Centur: des Lep. de Cuba,

1832. *Argus pseudoptiletes* Boisduval & Leconte. Hist. Gen. Lep. Am. Sept., p. 114, Plate 35, ff. 5 to 7. 1833. *Lycaena astenidas* (Bdv. MS.) Lucas in Sagra. Insectes. p. 613. 1857.

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cyna Edwards. Trans. Am. Ent. Soc. ix, p. 3. 1881.
This species should not be included in the genus. The pattern is different and the genitalia are so completely different that I think it should be excluded from *Hemiargus*.

Some new California Geometridae (Lepid.).

By W. S. Wright, San Diego, California.

Laurentia switzeraria n. sp.

Expanse 31 to 33 mm. General color dark smoky brown. Basal line about one-fifth out, nearly straight from costa to median vein, then a strong outward scallop to anal vein, thence straight to inner margin. Beyond is a broad light-colored band sprinkled with brown scales. The very broad mesial band is wider on the costa than on the inner margin, the center being the palest part. The inner edge is perpendicular to the inner margin of the wing; a strong outcurve occurs between vein one and the median. The outer line is scalloped throughout its entire course; a blunt tooth occurs on the subcostal; a rather prominent tooth on vein six, another between three and four, and a strong incurve to another small tooth just above vein one. From the tooth on vein six a wavy black line runs obliquely to the apex. The whole wing surface is covered with subparallel brown lines. These lines are most noticeable in the subterminal space where they are marked on the veins by dark brown scales.

Secondaries even smoky above with faint indications of cross lines at the anal angle. A faint line shows through from the under side near the middle of the wing.

Beneath, the primaries are smoky with whitish along the costa and indications of cross lines along the outer third, apex and margin. Secondaries somewhat lighter, heavily sprinkled with brown scales. There is a narrow whitish band just beyond the middle of the wing outlined on the inner edge by a row of brown dots on the veins. There are indications of faint brown lines beyond to the margin. Discal dots on both wings.

Type, one male, March 17, 1912, San Diego, California. *Paratypes,* eight males, February to March, 1912, San Diego; one male, March 12, 1912, San Diego, with L. W. Swett, two males with Geo. H. Field, San Diego, and two males in the American Museum of Natural History, New York.

The species shows a rather remarkable tendency to variation. In some specimens the defining lines are almost obsolete, the bands being defined simply by a varying depth of the ground color. In some the apical oblique line is indicated only by a few brown scales. In one specimen the defining lines are deep velvety black and extend only from the inner margin to the subcostal vein.

L. switzeraria n. var. **swettaria.**

A series of six males of the above species is remarkable in having a nearly white band running through the mesial brown band from costa to inner margin of the primaries. The variety is separated on the advice of Mr. L. W. Swett, to whom I dedicate it.

Type, one male, February 21, 1912. *Paratypes,* three males in the author's collection, two in Mr. Swett's collection, one in Mr. Field's collection and two in the American Museum of Natural History, New York.

This species has many of the characters of *Hydriomena,* and it was so placed until Mr. Swett called my attention to the fact that the antennal structure threw it out of that group. No genus could be found that seemed to fit, and we are not sufficiently acquainted with the European genera to make sure that none of them will fit, so we have decided to follow our European friends and place it in a genus that will serve for the present, or until a close study of related genera either finds the right one or makes necessary the erection of a new one. *Laurentia* seems to be the nearest genus to the *Hydriomena*-like group, so here it is placed tentatively.

Melanolophia unipunctaria n. sp.

Alar expanse 32 mm. Antennae of male with short blunt pectinations finely ciliated beneath. Head rufous gray. Thorax darker, speckled with black. Abdomen gray, speckled with black, showing dense patches of black scales on some of the joints dorsally.

Primaries white, evenly densely speckled with dark brown and blackish scales. Basal line dark brown, at inner quarter gently curving outward from costa to median, then straight to inner margin. A second line at the half subparallel to first line, evenly dentate and zigzag. A third line at about the two-thirds, starting from a heavy blackish

mark on the costa runs outward to subcostal then angles sharply backwards running nearly parallel with outer margin to inner edge. Just beyond this line in the costal area is a large red-brown patch before a fine black line and at the lower outer corner, about half-way between the third line and the outer margin is a small roundish white spot, quite conspicuous. Another subquadrate red-brown patch lies close to the third line near its middle in the sub-terminal area. A dark brown linear mark on costa near apex. In the submarginal space the speckles are a little thicker than elsewhere, simulating a broad marginal band. A row of blackish brown spots at base of fringe which is concolorous with the wings and faintly checkered.

Secondaries concolorous and evenly speckled. Two very faint brown lines cross the wings. Discal dot small but prominent. A narrow terminal brown line. Wings sharply angled or toothed near the center of outer margin.

Beneath, much as above except lighter with tinges of ochre. Second line showing through and continuous across both wings. Discal dots very distinct. Faint indications of a white spot near apex of primaries.

Type, one male, Glen Alpine Creek, Tahoe, California, June 25, 1915, by E. P. Van Duzee, in the author's collection. *Paratype*, one male, same data as type, in University of California collection.

I hesitated some time before giving this beautiful species a name, but have finally decided to do so at the risk of making a synonym. The venation and the peculiar formation of the hind tibia place it unquestionably in *Melanolophia*, and its size, together with other superficial characters, distinguish it from *M. canadaria*, to which it seems most nearly allied.

Hydriomena edenata Swett.

Some years ago Mr. George Field had from me a number of specimens of this species unknown to either of us at that time. He sent them to the late Mr. Frank Merrick for identification, and they came back labeled *H. autumnalis*. Thus they stood in our cabinets until recently, when I was led to give them some study. I found them to be *H. edenata* Swett, and also discovered that there were two perfectly good varieties in the series. I sent the entire series to Swett for examination and comparison with the types. Swett confirmed my judg-

ment as to the species being *edenata,* also as to the varieties, pointing out, however, that one of the varieties appeared to be a rediscovery of one of Packard's species, *H.* (*Cidaria*) *glaucata.* This variety I have called *olivata* n. var.

Packard says of *glaucata* "pale glaucus green," *olivata* is dark. In *glaucata* the extra discal space is quite wide on the inner margin and the black bar on this margin is absent; in *olivata* the extra discal space is very narrow and the black bar is evident on the inner margin. The fore wings are elongated in my variety, while in *glaucata,* as figured in Packard, the fore wings are more rounded, as in the European *ruberata,* of which it may be simply a green variety. In view of these differences I feel that the new name is justified.

Hydriomena edenata, n. var. **olivata.**

Olivata is separable from the typical *edenata* by the following differences; basal area concolorous, narrowly linear first line, which is also different in its course, running in long even sigmoidal curves from costa to the middle of the inner margin, there being no sign of an angle on the subcostal vein: bar on inner margin lacking or but faintly indicated; no contrasting colors but rather a dull mottled appearance brought about by the rather indistinct breaking up of the bands, none of which is distinctly traceable. The whole surface of the primaries is suffused with a distinct olive shade. The hind wings show a very definite brown extra discal line and a faint rather diffused line in the middle of the space beyond. In one specimen the mesial space is a little lighter and nearly immaculate.

Types, three males, San Diego, California, collected by the author, one of which is in the Swett collection.

Hydriomena edenata, n. var. **pallidata.**

The second group of specimens, under the name of *pallidata,* is separable on the course of the first line which is straight from costa to inner margin; the absence of the black bar and the fact that the "usual wide irregular bluish band" of *edenata* has become, with the corresponding bluish band in the subterminal space, a light watery gray and is the most prominent marking on the primaries. All the lines are broken up, and more or less linear. The whole aspect is as though the specimens were very much faded.

The *type* is in the author's collection, *paratypes* in the Swett and Marloff collections.

Some Carpenter Bees (Hym.).

By T. D. A. Cockerell, Boulder, Colorado.

The Xylocopine bees listed below were received from the Queensland Museum. Two prove to be undescribed; the types are in my collection. The others mostly represent new localities.

Xylocopa valga Gerst. Ras-el-Ma, Algeria, ♀. (Queensl. Mus. '39.). Alfken records *X. valga* from two localities in Algeria.

Xylocopa amedaei Lepel. Ras-el-Ma, Algeria, ♀. (Queensl. Mus. 40.). Originally described from Algeria.

Xylocopa brasilianorum (L.) "Guyane, Maroni." ♀. About 21 mm. long, wings not quite so dark as usual (Queensl. Mus. 13.)

Xylocopa medionitens sp. n.

♀. Length about 22.5 mm., anterior wing 17 mm., width of abdomen nearly 9.5 mm.; black, with black pubescence, but that on thorax above fox-red, leaving a shining median area extending to anterior margin of mesothorax, its anterior portion with black hair; head 7 mm. wide, tubercles of labrum ordinary; clypeus with large and coarse, not dense, punctures; upper part of clypeus bounded by a shining swollen rim, which has a small tubercular projection in middle; hair of head entirely black; extreme end of scape, and second antennal joint, largely red; third joint little longer than next two together; flagellum greyish-brown beneath except at base; pleura black-haired; tegulæ black; wings reddish-fuliginous, subtranslucent, the apical field darker, iridescence pale golden, the apical region coppery; venation normal; legs black-haired, hind tibiae with a smooth shining space on outer side; abdomen shining, black-haired, well punctured, with a rather indistinct median keel above and a distinct one below.

Hab.—"Guyane, Maroni" (Queensl. Mus. 7). From Enderlein's short description, this might be *X. rufidorsum* Enderl., from Peru; but the wings appear to be lighter and differently colored, and the very difficult locality would suggest a distinct form. Enderlein says that his insect, except for size, recalls the African *X. mixta;* but *X. medionitens* does not suggest *mixta*. Among the African species it resembles *X. carinata fulvopilosa* Friese. In Schrottky's table the new species falls nearest to *X. aurulenta* (Fab.), to which it is evidently allied, but the size is quite different, and Lepeletier says the sides of the thorax are red-haired in *aurulenta*.

From *X. similis* Sm. it is known by the absence of red hair on first abdominal segment.

Xylocopa frontalis (Olivier.) var. **morio** (Fabr.). "Guyane, Maroni." ♀ ♂. (Queensl. Mus. 1, 2). The female has the wings black, shining green. The *morio* form is perhaps a distinct species. *X. frontalis* proper, from Paraguay, has the wings shining purple.

Mesotrichia ceramensis sp. n.

♂. Length about 20 mm., anterior wing 18 mm.; robust, densely covered with short pale pubescence, which is whitish-ochreous (hoary) on head, thorax and first abdominal segment, warm ochreous on the rest of abdomen; eyes prominent; small spot at base of mandibles, large spots at extreme sides of clypeus (extended mesad more or less to form a submarginal band), and stripe down middle of clypeus, dull yellow; scape in front (except apically), and flagellum beneath (except at base) ferruginous; front, vertex and sides of face with some admixture of dark hair; no black hair at sides of abdomen; last ventral segment of abdomen with a median keel; femora with very scant hair, largely black; front and middle tibiae with pale hair, much like that of thorax; hind tibiæ with ochreous hair on outer side, in the midst of which is a bright rufous band, but beneath the hair of these tibiæ is partly black; anterior and middle tarsi with long hair, deep fox-red in front, paler behind; hind tarsi with rufous hair on outer side and black on inner; lower border of hind femora with a shallow broad median excavation; hind tibiæ with a large apical tubercle on inner side; wings yellowish-brown, first transverso-cubital nervure nearly obsolete.

Hab.—East Ceram, 1913 (*H. Elgner*). Queensland Museum, 15. A female of *Mesotrichia unicolor* (*Xylocopa unicolor*) comes with the same data (Queensl. Mus. 14), and I might have supposed the new form to be its male, but for the fact that the male of *M. unicolor* (already recorded from Ceram by Friese) is known and has a yellow clypeus. *M. ceramensis* is very close to *Xylocopa* or *Mesotrichia provida* (Smith), judging by Smith's description, but Bingham has examined males of *provida* in the British Museum, and cannot separate them from *M. bryorum* (L.). Our insect is quite distinct from *bryorum*, and is especially to be known by the pallid (not at all greenish) hair of the head and thorax.

Mesotrichia torrida Westwood. N. Djole, Gabon, ♂. (Queensl. Mus. 3.)

Mesotrichia calens malagassa (Saussure). Miarinarivo, Madagascar, ♀. (Queensl. Mus. 10.). Described by Saussure in 1891 as a variety of *Xylocopa olivacea*.

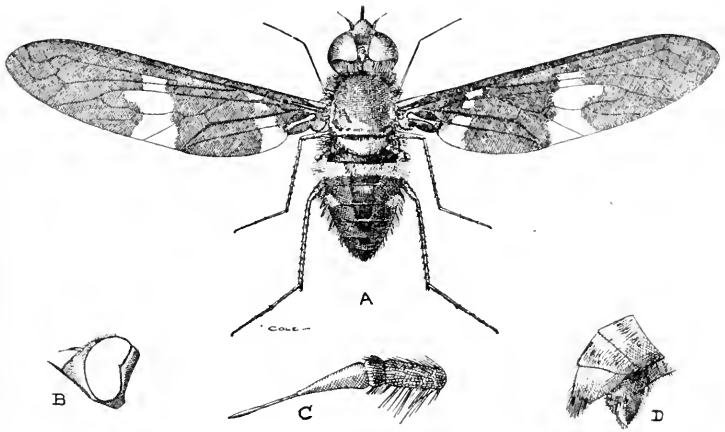
A new Species of Exoprosopa (Dip.).

By F. R. Cole, Bureau of Entomology, U. S. Department of Agriculture.*

Exoprosopa celer sp. nov.

♂. Length 9 mm. Wing 12.5 mm. Face yellowish brown, the color extending a short distance above antennae. Front blackish, with yellowish tomentum and short black pile. Short black pile on face. Occiput blackish with silvery white tomentum near orbits, thicker near emargination of eyes. First joint of antennae reddish brown, the second and third joints black. Arista as long as third joint.

Thorax blackish, semi-shining. Scutellum dull reddish brown, black at base.



A. *Exoprosopa celer* sp. nov. B. Lateral view of head. C. Antenna (much enlarged). D. Anal segments of male from side.

Abdomen light reddish brown, first segment black. Black stripe on dorsum of abdomen, gradually narrowing from base, and reaching only about half way on sixth segment. Black does not quite reach posterior margin of segments. Abdomen with black tomentum. White tomentose cross-band at base of second abdominal segment. White spot on each side of third segment near posterior margin.

Legs reddish. Front tarsi darkened and very slender.

Wings very long and narrow, and deep brownish black in color. Narrow hyaline cross-band near base of wing, clear only in anal and axillary cells. Hyaline band in center of wing reaches to marginal cell.

Type—United States National Museum, Cat. No. 20,295. One male.

Habitat—East Highlands, California, Sept. 17, 1914.

This handsome species appears to have no closely related forms among those so far described. Only one specimen was collected. It is a very swift flyer, alighting on rocks and sand in the hot sun.

*By permission of the Secretary of Agriculture.

Effects of a Spider Bite (Arach., Aran.).

[Really good spider-bite stories come in occasionally and are worth placing on record. Therefore, I am sending you one of the latest, most intelligent and circumstantial accounts which has come to me. The spider was, in all probability, *Latrodectus mactans*, as I have informed Corporal Hutcheon. If you think it would be worth while to publish it in the News, I trust that you will do so.—L. O. Howard.]

Richmond, Virginia, August 2, 1916.

Dr. L. O. Howard,
U. S. Department of Agriculture,
Washington, D. C.

Dear Doctor:

I am taking the liberty of addressing this note to you in the thought that the contents might be of interest to you. Last Tuesday I was sitting in a tent conversing with one of my friends when suddenly I felt something on the back of my neck and reaching back was horrified to find that in my fingers I had gathered a vicious looking black spider, and a sudden twinge in my neck made me realize that I had been bitten. The first thing I did, however, was to strike a match and put my foot on him. I immediately went to the squadron physician and stated the facts to him, whereupon it seems that he lanced the spot several times and gathered therefrom a quantity of the venom that this thing had injected. I went to my Captain and told him also, and was given a slug of liquor with the advice that I retire, which I did. I had not been in my cot more than fifteen minutes before the poison started working, and I will say right here, that for the following seventy-two hours I was in mortal agony. It affected every portion of my anatomy in a different way; the back of my head became absolutely numb; at the base of my spine it felt as though two healthy labors had been inserted and some one with a strong breath was inflating both at the same time and that my back would burst. It was then that two physicians were called and they worked on me for two solid hours; morphine twice was given me internally and hypodermics four times (which I understand now was nothing more than distilled water), but nothing seemed to ease the pain. When daylight came I had not closed my eyes, but lay groaning in the field hospital all night; my stomach became hard as steel and distorted, my feet swelled three times normal size and felt as though hot irons were being applied, my eyes swelled and felt as though they would burst. I lost absolute use of both tracts, and could neither stool nor urinate, had the greatest desire to double up into a bow knot, and for seventy-two hours in the base hospital I lay in a cold perspiration. After four days in the hospital I was released as being well. Am at my home in the country now, but am far from being recovered. I have not regained the full use of my lower limbs. Everyone to whom I relate this story seems to doubt the seriousness of the case, and if this has been of interest to you and will assist you in your studies I am sure a line from you to corroborate my story will be appreciated. I am,

Yours very truly,
(Signed) Corporal James Hutcheon,
Troop B, 1st Squadron, 1st Cavalry,
Va. National Guard.
Camp Henry C. Stuart, Richmond, Va.

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., DECEMBER, 1916.

The Convocation Week Meetings.

In this number of the NEWS we are publishing fairly full announcements of the annual meetings of various societies to be held in Convocation Week in New York City. These include not only entomological societies, but also those of wider scope in which many entomologists have an interest either direct, as members, or indirect by reason of related subject matter. It will be noted that the secretaries of these societies are looking forward to large attendances at their respective meetings. The population and the location of the largest city in the New World naturally arouses such expectations. It has therefore seemed to us desirable to give as full information as is available at the time this number goes to press in order that those of our readers likely to visit the metropolis in the Christmas season may be able to plan their days so as to be present at those meetings and gatherings of greatest personal interest to themselves. This will not always be easy, for it will be noted that the headquarters of the entomologists and of the zoologists are distant, nearly forty blocks from each other. It will be, no doubt, often necessary to make a choice between two, or even more than two, attractive programs. We also emphasize the advice of the secretaries to make early reservations in the hotels. In any event this great annual scientific congress is likely to be a great success and to repay attendance at its sessions.

Questions and Answers.

The NEWS invites those having any entomological questions which they wish answered to send such in for publication under this heading, and also invites answers from its readers or others to these questions. Questions and replies should be as brief as possible and the Editors reserve the right not to publish any of either class which seem to them objectionable or inappropriate. Those sending in contributions to this department will please indicate whether they wish their names or merely one or more initials to appear in connection with their communications, but all such must be accompanied by the full name and address of the writer for the information of the editors.

ANSWERS TO QUESTION NO. 2 (November, 1916, NEWS, p. 426).—In reply to H.'s query in the November number of Entomological News I would suggest he try the method used at the U. S. Entomological Station at Lafayette, Indiana, for wintering coleopterous grubs, cut-

worms and various dipterous and hymenopterous parasites in the larval and pupal stages and described by the writer in the February, 1915, number of the *Journal of Economic Entomology*, page 135.

For convenience we have galvanized iron trays about ¾ inch deep, made to hold 60 or 70 ounce tin salve boxes, and these trays are fitted in grooves, like the drawers of an insect cabinet, during the summer. As winter approaches, all of the tin boxes are carefully examined, all grain and vegetation removed and soil used which should be sterilized and properly moistened. The soil should be of about the same moisture content as is the earth beneath a good sod, or say soil 2 or 3 inches below the surface. For inactive forms, such as cocoons, a cell is made in the soil. After this is done and a few nail holes made in the large tin trays to prevent any possible accumulation of water, a cavity is made in one side of a compost heap or pile of earth previously prepared. A layer of straw is placed in the bottom of the cavity and the trays of tin boxes piled one on the other. After they have all been stacked, a sheet iron covering is placed over the top, the pile of trays surrounded with a layer of straw and the whole covered with soil to a depth of 12 to 18 inches, depending on the intensity of the winter in any particular locality. At Lafayette this is usually done early in November and the boxes are removed by the middle of April. —JOHN J. DAVIS, Entomological Assistant, U. S. Entom. Lab'y, W. Lafayette, Ind.

REGARDING question 2: I took a tin box about two feet long, solid on bottom and a few inches up the sides; but with wire sides above and wire top. A few tiny holes in the bottom carried off surplus water. I put in a layer of three inches of growing sphagnum moss, wetting it thoroughly, keeping all winter in a cold but not freezing place, and putting box in the sunlight only when hatching time was about to begin. During the final month I would wet the sphagnum perhaps twice. I laid the pupae in paper cornucopias pinned around the sides of the box, never on the wet moss. I never lost a specimen by mould. I do not believe that anyone had a better percentage of successful hatchings.

I never put cocoons in this box, only chrysalids and naked pupae, but those of every species obtainable.

I have had the best results with larvae by not allowing any earth into which to crawl. Dry sphagnum works better. *Citheronia regalis* is very apt to die if going underground to pupate in confinement. The Sphingidae also pupate better above ground, on the bare bottom of a box, hidden only by sphagnum.—R. P. D.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

A Swarm of the Monarch Butterfly in Iowa (Lep.).

On September 21, 1916, according to my informant, Mrs. S. K. Slemmons, a large swarm of Monarch butterflies, estimated to contain several thousand individuals, was seen by herself and family on their farm six miles southeast of Iowa City. The afternoon of that day was warm and rather misty, with a strong wind blowing from the northeast. The swarm came with the wind, from the northeast, about three o'clock, and alighted in a maple grove near the house, resting in great numbers on the twigs during the night and remaining until the next day. The butterflies were seen fluttering about in the maples during the morning and earlier hours of the afternoon, when they left, apparently not upon a single impulse but more or less in a straggling fashion. Mrs. Slemmons tells me that a friend of hers, living at West Branch, about ten miles to the northeast, reported seeing a large swarm near that village either on September 21 or the day before. Swarms of the Monarch used to be seen fairly often in the vicinity of Iowa City. As a boy I used to notice great assemblages of them in a little patch of woods near the public school which I attended. They would gather in thousands in the oak trees, arranging themselves in rows on the twigs, and their coming was the signal for a sort of hunt among the children who enjoyed the excitement of killing any butterflies venturing within reach. In later years I saw a smaller swarm in a little maple grove southeast of the town, but recently have not met with the phenomenon at all.—H. F. Wickham, Iowa City, Iowa.

Misapplied Effort (Odonata).

I was greatly interested and somewhat surprised to see a female *Anax junius* performing this morning on one of the crowded thoroughfares of Chicago. A sprinkling cart having recently passed, there was a diminutive puddle just outside the curbstone, the water not being to exceed an inch in depth, and therein was Mrs. Anax dipping the tip of her abdomen persistently and methodically as if the shallow receptacle were sufficient for the habitation and sustenance of an expected progeny. The brisk wind that was blowing and the crowd of pedestrians crossing the street interfered somewhat seriously with her efforts, but she nevertheless returned repeatedly to her task. I wonder if the unusually low temperature induced her to attend to her maternal duties, that up to this time she had carelessly if not wilfully, neglected.—O. S. Westcott, Oak Park, Illinois, October 18, 1916.

[Where in this puddle were the plants in which *Anax* oviposits? Did this female really discharge eggs?—P. P. C.]

Notes on South Carolina Ants (Hym., Hem.).

The latest additions* to the known species of South Carolina ants are as follows:

Formica truncicola, var. *integra*, *Tetramorium caespitum*,
Pheidole tysoni, *Monomorium minimum*.

The sexual or winged forms of the following species of ants were seen during the months of April and May.

April: *Prenolepis imparis*, male and female;
Camponotus americanus, male and female;
Dorymyrmex pyramicus, male and female;
Prenolepis parvula, female.

May: *Iridomyrmex pruinosus*, var. *analis*, male and female.

Lasius niger, var. *americana* was found in attendance upon the following aphid: *Chaitophorus negundinus* on box elder.

Cremastogaster lineolata was found in attendance upon the following aphids, scales and treehoppers: *Platycotis 4-vittata* and *Platycotis sagittata* on oak; *Eulecanium nigrofasciatum* and *Toumyella liriodendri* on poplar; *Schizoneura lanigera* on apple; *Aphis setariae* on wild plum; *Lachnus parvus* on pine; *Eulecanium tulipiferae* on poplar. These ants were found in a large oak gall, *Andricus cornigerus*.

Prenolepis imparis was found attending the following aphids, scales and treehoppers: *Aphis setariae* on wild plum; *Lachnus australis* on pine shoots; *Platycotis 4-vittata* and *Platycotis sagittata* on oak; *Chaitophorus negundinus* on box elder; *Myzus cerasi* on cherry; *Lachnus parvus* on pine.

Dorymyrmex pyramicus was observed attending the following aphid: *Aphis setariae* on wild plum.

D. pyramicus, var. *flavus* was found in attendance upon *Lachnus australis*.

Iridomyrmex pruinosus and *Dolichoderus mariae* were also found attending this aphid.

Formica pallide fulva was found in attendance upon *Lachnus australis* and *Aphis setariae*.

April 15, 1916, the writer noticed *Trachymyrmex septentrionalis* out for the first time since last fall. Each colony was busy constructing a nest. The peculiarity in the structure of their nests was very noticeable. Every nest had small odd-shaped pellets thrown out 3 to 5 inches in front of the nest in the shape of a crescent. Ants were noted carrying apple blossom petals into the nest evidently for the purpose of forming the fungus on which they are known to feed.

The identifications of the ants were made through the courtesy of Dr. W. M. Wheeler. Mr. H. F. Wilson kindly identified two species of aphids.—M. R. Smith, Entomological Laboratory, Clemson Agricultural College, South Carolina.

* See Ent. News, xxvii, pp. 279-280, June, 1916.

Insects of the Coronado Islands, Lower California.

I am greatly indebted to the entomologists at the U. S. National Museum for critically examining a number of insects collected by my wife and myself on the South Island of the Coronado group, August 21, 1915. They are all additions to the fauna of the islands, but, with one exception, are species previously known to be common on the adjacent Californian mainland. The exception is the Hemipteron *Trapezus*, which is not listed at all by Van Duzee in his recent catalog and is also absent from Uhler's list of the Hemiptera of lower California (Proc. Calif. Acad. Sci., IV).

Hemiptera (det. Heidemann). *Corizus hyalinus* Fabr.; *Trapezus trimaculatus* Distant.

Orthoptera (det. Caudell). *Melanoplus cyanipes* Scudd.

Hymenoptera (det. Rohwer). *Palmodes laeviventris* Cress.

Coleoptera (det. Schwarz). *Carpophilus pallipennis* Say (very abundant), *Ipochus fasciatus* Lec., *Microrhopala rubrolineata* Mannh., *Coniontis subpubescens* Lec., *Eulabis rufipes* Esch. Of these species only the first and the third are in Horn's list of the Coleoptera of Baja California (Proc. Calif. Ac. Sci., IV).

The Coronado Islands appear to represent the tops of a submerged mountain range, and are presumably of recent date, geologically speaking. An exhaustive study of their insect fauna would yield results of great interest. The indications are that most of the species (at least) are identical with those of the adjacent mainland, and in a number of cases it is not at all probable that they reached the islands by crossing the water or through human agency. It therefore follows that we have some indication of the antiquity of existing species, and if endemic forms exist it will be interesting to inquire why they have undergone change while the surrounding species have remained unmodified. Such endemic forms may, however, be of two very different types: those actually evolved on the islands, and very close to mainland species, and those which have survived on the islands, having become extinct on the adjacent mainland. The latter, if found, may even represent peculiar genera. Specimens of the species considered identical with those of the mainland should be collected in numbers and carefully compared with Californian examples, with the hope of detecting small or average differences, indicating the beginning of differentiation. Should such differences be found, however, it will remain possible that it is the mainland form, not the island one, which has changed from the ancestral type.

It is especially important that such intensive studies should be begun at once, as many people now visit the islands, and no doubt every year the fauna and flora are modified by the addition of aggressive species following the footsteps of man.—T. D. A. Cockerell, Boulder, Colorado, September 2, 1916.

A New Locality Record for Bombus terrestris moderatus Cr. (Hym.).

On July 3, 1915, I found a bumble-bee at Maligne Lake, near Jasper, Alberta, which I later identified as *Bombus terrestris moderatus* Cr. This identification was afterwards verified, November, 1915, by Prof. J. C. Bradley, of the Department of Entomology of Cornell University, and in December of the same year by Mr. Crawford, of the National Museum in Washington, D. C.

Franklin states that this species has only been found in Northern Alaska in North America, and that it probably occurs in Northern Yukon. The specimen I found is therefore far out of its known range. —E. L. Diven, Elmira, New York.

The New Museum Building of the California Academy of Sciences.

The new museum building of the California Academy of Sciences in Golden Gate Park, San Francisco, was dedicated and formally opened on September 22, 1916. Organized in 1853, the Academy was located for a time at California and Dupont Streets, then on Market Street between Fourth and Fifth Streets, when its building was destroyed by the great fire following the earthquake of April, 1906. It will be recalled that this destroyed building contained many important entomological collections which were thereby lost, especially those gathered by the Academy's expeditions to the peninsula of Lower California and the adjacent Mexican mainland and described in the Academy's *Proceedings* of the nineties. We hope that the new building will be spared the fate of its predecessor.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

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

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new species are all grouped at the end of each Order of which they treat. Unless mentioned in the title, the number of the new species occurring north of Mexico are given at end of title, within brackets.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

4—The Canadian Entomologist. **6**—Journal, New York Entomological Society. **8**—The Entomologist's Monthly Magazine, London. **10**—Nature, London. **11**—Annals and Magazine of Natural History, London. **16**—Bulletin, Societe Nationale d'Acclimatation de France, Paris. **50**—Proceedings, U. S. National Museum. **51**—Novitates Zoologicae, Tring, Herts, England. **68**—Science, New York. **75**—Annual Report of the Entomological Society of On-

tario, Toronto. **86**—Annales, Societe Entomologique de France, Paris. **153**—Bulletin, American Museum of Natural History, New York. **163**—American Journal of Science, New Haven, Conn. **169**—"Redia," R. Stazione di entomologia Agraria in Firenze. **179**—Journal of Economic Entomology. **180**—Annals, Entomological Society of America. **189**—Journal of Entomology and Zoology, Claremont, Calif. **195**—Bulletin, Museum of Comparative Zoology, Cambridge. **198**—Biological Bulletin, Marine Biological Laboratory, Woods Hole, Mass. **221**—New Hampshire Agricultural Experiment Station, Durham, N. H. **240**—Maine Agricultural Experiment Station, Orono. **272**—Memorias, Real Academia de Ciencias y Artes de Barcelona. **304**—Annals of the Carnegie Museum. **312**—American Journal of Pharmacy. **411**—Bulletin, The Brooklyn Entomological Society. **420**—Insecutor Inscitiae Menstruus: A monthly journal of entomology, Washington. **447**—Journal of Agricultural Research, Washington. **477**—The American Journal of Tropical Diseases and Preventive Medicine, New Orleans. **491**—Transactions, American Microscopical Society, Decatur, Illinois. **507**—Occasional Papers, Museum of Zoology, University of Michigan. **538**—Lorquinia, Los Angeles. **539**—University of Illinois Agricultural Experiment Station, Urbana.

GENERAL SUBJECT. **Berlese, A.**—Sul polimorfismo degli insetti, **169**, xi, 211-38. **Cockerell, T. D. A.**—Some American fossil insects, **50**, li, 89-106. **Cosens, A.**—The founding of the science of Cecidology, **75**, 1916, 88-93. **Hegner, R. W.**—Some methods of preparing insects for demonstration purpose, **491**, xxxv, 185-6. **Rau & Rau**—The sleep of insects; an ecological study, **180**, ix, 227-74. **Tillyard, R. J.**—Elasticity and entomology, **10**, xcviii, 128-9. **Tothill, J. D.**—The ancestry of insects with particular reference to Chilopods and Trilobites, **163**, xlii, 373-87.

PHYSIOLOGY AND EMBRYOLOGY. **Smith, E. A.**—Spermatogenesis of the dragon-fly Sympetrum semicinctum with remarks upon Libellula basalis, **198**, xxxi, 269-302.

MEDICAL. **Zetek, J.**—Reducing malaria by reducing the number of Anopheles within buildings, **180**, ix, 275-83.

ARACHNIDA, ETC. **Banks, N.**—Report on Arachnida collected ....in British Columbia, **50**, li, 67-72. **Moles, M. L.**—Crab spiders of the Claremont-Laguna region, **189**, viii, 112-18.

Chamberlin, R. V.—The lithobiid genera Oabius, Kiberbius, Paobius, Arebius, Nothembius, and Tigobius [many new], **195**, lvii, 115-201. **Dalmas, C.**—Revision du genre Orchestina [1 new], **86**, 1916, 203-258. **McGregor, E. A.**—The citrus mite named and described for the first time, **180**, ix, 284-89.

NEUROPTERA, ETC. **Ferris, G. F.**—Some generic groups in the mallophagan family Menoponidae, **4,** 1916, 301-11. **Hood, J. D.**—A new Plectothrips from Jamaica, **420,** iv, 78-80. **Kahl, H.**—A list of the Odonata collected on the Isle of Pines....in 1910, 1912-1913, now contained in the Carnegie Museum, **304,** x, 519-26. **Longinos-Navas, R. P.**—Notas sobre el orden de los Rafidopteros [2 new families], **272,** xii, 9 pp. **Walker, E. M.**—A curious trap for dragonflies, **4,** 1916, 314-15.

Cockerell, T. D. A.—(See under General.)

ORTHOPTERA. **Allard, H. A.**—Some musical O. at Clarendon, Virginia, **4,** 1916, 356-8. **Bruner, L.**—South American crickets, Gryllotalpoidea and Achetoidea, **304,** x, 344-428. **Chopard, L.**—Etude des Mantides Americains de la collection I. Bolivar, **86,** 1916, 161-87. **Foucher, G.**—Etudes biologiques sur quelques O., **16,** 1916, 329-42 (cont.). **Holland & Kahl**—A list of the O. collected in the Isle of Pines....1910, 1912-13, **304,** x, 541-45.

HEMIPTERA. **Bergroth, E.**—New or little known heteropterous Hemiptera in the U. S. Nat. Mus., **50,** li, 215-239. **Kraemer, H.**—The nature and structure of cochineal, **312,** lxxxv, 344-63. **Maxson, A. C.**—Some unpublished notes on Pemphigus betae, **179,** ix, 500-5.

Davis, W. T.—Two new Cicadas belonging to the genus Okanagana, **6,** xxiv, 233-6. **Knight, H. H.**—Remarks on Lygus invitus, with descriptions of a n. sp. and variety of Lygus, **4,** 1916, 345-9. **Olsen, C. E.**—A new pentatomid, **411,** xi, 82-3.

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CHECK LIST OF THE HEMIPTERA (EXCEPTING THE APHIDIDAE, ALEURODIDAE AND COCCIDAE) OF AMERICA, NORTH OF MEXICO, by EDWARD P. VAN DUZEE. New York Entomological Society. Price, $1.50.

In this work just published, Mr. E. P. Van Duzee puts all American hemipterists under a heavy burden of gratitude. He brings together and presents in orderly fashion the data which have accumulated in the last thirty years in this branch of entomology. None can adequately realize the debt we owe Mr. Van Duzee better than those who have themselves attempted the enormous labor of correlation of the scattered fragments that constitute entomological literature.

In this new Check List, Mr. Van Duzee has given American hemipterists an adequate point of departure for classifying and arranging their collections. Nothing similar and covering the whole ground in Hemiptera has been attempted since Uhler's Check List appeared thirty years ago. State and local lists have been published; a Catalogue saw the light of day, but Uhler, up to this time, has remained the sole comprehensive and orderly arrangement of the North American Heteroptera. Van Duzee has gone beyond his predecessors and has considered the Homoptera as well, except as indicated.

Did Science stand still, it would either perish of stagnation, or on the instant begin a retrograde motion. Hence it is that this work is obsolescent from the moment the last entry was made just before it went into the printer's hands. Current specialists' monographs modify certain of the data.

The principles guiding Mr. Van Duzee in his work are set forth in the Preface, and this Check List must be used and judged in their light. In nomenclature there is much room for dissent, and especially

so in the debated question of priority. A characteristic of the author is ingrained conservatism, whence many a name newly proposed is rejected in favor of another hallowed by time or usage. Another highly debatable point is his rejection of genera for which no type species can be fixed under the International Rules. The trouble is the type fetich is an entirely modern invention and the primitive authors did not work under it at all. We are endeavoring to submit their work to retroactive laws which in the end will lead to endless confusion. A policy of "thorough" in this would allow many a budding genius to go down to posterity as the author of untold genera. But this vast and wordy topic is best left here.

The one fault, if fault it be, of this Check List, is the manner of indicating distribution, which is to my mind too rough. Where there are few States, or where the habitat is in a definite limited region, it should be so stated. Instead of "Can.," "E.," etc., it would have been better, because more definite, to indicate distribution by the familiar geographical terms "Eastern States," "Atlantic States," etc., or, preferably, by the recognized zoogeographical regions.

A comparison with Oshanin's Catalogue of Palaearctic Hemiptera may not be out of place. For the entire Palaearctic Region, this work lists 1005 genera and 5476 species, 741 and 3564 respectively being Heteroptera and 264 and 1912 Homoptera. In our more restricted area, Van Duzee enumerates 698 genera and 2945 species, the Heteroptera being 465 and 1469 respectively and the Homoptera 233 and 1476. It might seem that much still remains to be discovered with us. Of the 3564 species of Heteroptera of the Palaearctic Fauna, 1078, a little over 30% are Miridae; Van Duzee lists only 398 out of 1469 species, or about 27% of the total. On this basis, some 60 species of Miridae alone still await discovery. Yet, compared with Uhler's old List, what an advance has been made! Uhler listed for the whole of North America only 1448 species. Thirty years later the number is greater North of Mexico alone! Banks lists only 1268 species of Heteroptera for the same region in 1910. By these figures we may appreciate the growth of Hemipterology in America, yet see how far we still have to go to make as adequate a survey of our own fauna as there is of the Old World forms.

But whatever is open to question from any angle, Van Duzee's work definitely fixes his position as the present day leader of American hemipterology and as a worthy successor to the father of the science in this country, Professor P. R. Uhler.

The New York Entomological Society merits the thanks of all working entomologists for bringing out this important piece of work, and it is to be congratulated on its enterprise and public spirit.—J. R. de la Torre Bueno.

Doings of Societies.

Annual Meeting of the Entomological Society of America.

The Annual Meeting of the Society will be held in New York City on Tuesday and Wednesday, December 26 and 27, 1916. On the first day an afternoon session only will be held; on the second there will be forenoon and afternoon sessions, and in the evening the Annual Address will be given by Prof. T. D. A. Cockerell, on the subject, "Fossil Insects."

Headquarters will be at the Hotel Endicott, Columbus Ave. and 81st St., near the American Museum of Natural History. Rates for room begin at one dollar (with bath $1.50), so it is hoped that every entomologist can find accommodations suited to his purse, and all can be together. Make reservations early, and plan to be at the first session.

The American Association of Economic Entomologists have chosen the same headquarters, and their sessions begin Thursday morning, occupying the rest of the week.

Members wishing to present papers will please fill out and return blanks [which have been sent to each member] as early as November 20. The program was not as full as it should have been last year; let us increase it this time.

Exhibits of interesting specimens, apparatus, etc., are very much desired. Members are requested to inform the Secretary in advance if they wish any special sort of installation. Last year several unusually good things were shown. This department should not be overlooked.

The indications are that the Association for the Advancement of Science, in affiliation with which we meet, will have a record-breaking attendance, and this will probably also be the case with the entomological meetings.

A communication is enclosed from the Thomas Say Foundation.

J. M. Aldrich, *Secretary-Treasurer.*

West La Fayette, Ind., Nov. 1, 1916.

Thomas Say Foundation.

The Thomas Say Foundation, a permanent publishing committee of the Entomological Society of America, charged with the function of publishing a series of memoirs on North American Entomology, announces that its first volume is in press, and will appear in December; it is by J. M. Aldrich, on "Sarcophaga and Allies in North America," and will make a volume of about 325 pages octavo, with 170 figures on 16 plates. It deals with a neglected group of common flies, some of which are important parasites, especially of grasshoppers, while others are scavengers and excrement feeders; one species has been definitely connected with human intestinal myiasis. Thus in several ways the group is of economic importance. Dr. Aldrich describes 145 species

and varieties, of which about 100 are new; he gives extensive analytical tables and figures the genitalia of the male for 138 species, greatly simplifying identification.

The volume will be bound in cloth, and the selling price is fixed at three dollars, postpaid to advance subscribers.

A new publishing medium capable of handling large works on North American entomology is a great desideratum. As is well known, several valuable manuscripts that have cost years of labor are at the present time awaiting a publisher. There is little inducement for entomologists to undertake the larger projects under these conditions, yet these larger projects are precisely the ones most needed. The only remedy in sight is in the coöperation of the entomological fraternity with the Say Foundation. The first volume of the Foundation is of modest size, but the successful sale of this will pave the way for something larger next year.

Beginning with no pecuniary resources except a grant of fifty dollars from the parent Society for preliminary expenses, the Foundation solicited ten-dollar advance subscriptions to its publications last year, which brought in seventeen contributions. Having now incurred obligations for which it is assuming responsibility (pending reimbursement from sales of its publication), the Foundation renews its appeal for support, and requests members to detach one of the blanks [which have been sent to each member] and forward with check for corresponding amount to the Treasurer. All who feel able to do so are solicited to make the ten-dollar subscription.

Twenty-ninth Annual Meeting of the American Association of Economic Entomologists.

The 29th annual meeting of the American Association of Economic Entomologists will be held in New York City, December 28th to December 30, 1916, under the presidency of Dr. C. Gordon Hewitt. The session will open on Thursday, December 28th, at 10 a. m., and will be continued during the afternoon of that day. At 8 p. m., the meeting of the Section on Apiary Inspection will be held. On Friday, December 29th, 10 a. m., the session of the general association will be held. The afternoon and evening of that day will be devoted to meetings of the section on Horticultural Inspection. On Saturday, December 30th, the final session of the Association will be held and the meeting will be adjourned at noon on that date unless a lengthy program necessitates holding an afternoon session.

The Entomological Society of America holds its meetings on Tuesday and Wednesday, December 26th and 27th, and the public address before that society will be given on Wednesday evening.

Hotel headquarters will be at the Endicott, Columbus Ave. and 81st St., where special rates of $1.50 per day have been secured. All mem-

bers are urged to make early hotel reservations in order that there may be no difficulty in securing satisfactory accommodations.

The meeting at New York promises to be well attended. Attention is called to a resolution passed by the Association several years ago providing that papers by non-members cannot be admitted to the program.

Blank applications for membership may be secured from the Secretary or from Prof. W. C. O'Kane, chairman of the membership committee, Durham, N. H. It will greatly facilitate the work of that Committee if applications are made as soon as possible, so that a large part of its work may be done before the time of the meeting.—A. F. BURGESS, *Secretary*, Melrose Highlands, Mass.

Fourteenth Annual Meeting, American Society of Zoologists.

The American Society of Zoologists, in conjunction with Section F of the American Association for the Advancement of Science and the American Society of Naturalists, will hold its fourteenth annual meeting, under the auspices of Columbia University, probably in the lecture room in Schermerhorn Hall, on Wednesday, Thursday and Friday, December 27-29, 1916.

Four half day sessions will be devoted to the reading of papers, one to the business of the Society and one, in accordance with by-law 4b, will be given to a meeting with the Naturalists.

Members are invited to send titles of papers for the program but a title will not be placed on the program unless it is accompanied by an abstract and reaches the Secretary by December 1.

Papers on Genetics will be scheduled for the session to be held on Thursday afternoon as directed by the Society at the Columbus meeting, otherwise the program will be arranged in accordance with by-law 5 and members are requested to indicate the general subject under which each paper should be listed.

In view of the prospect that the program for this meeting will be long, the Secretary is directed by the Executive Committee to suggest to members that they restrict themselves to one paper, and to announce that, if found to be necessary, those papers considered by the Executive Committee to be of least general interest will be read by title. Not more than fifteen minutes will be allowed for the presentation of any paper.

Abstracts of papers should be typewritten and put in the exact form desired in print. They should be limited to four pages and contain no illustrations. All abstracts will be printed by the Wistar Institute and mailed with the program to members of the Society about December 9. Reprints of abstracts, in case they are desired, may be secured by arrangement with the Director of the Wistar Institute. The printed

abstracts may be used as page proof and returned corrected for the January number of the *Anatomical Record*.

The Zoological Laboratory at Columbia University has been secured for exhibits and demonstrations and members are especially urged to contribute to this important part of the program. Titles of exhibits should be sent in not later than December 1 to be listed on the program.

Headquarters of the Society will be the Hotel Astor, 43rd Street and Broadway. Single rooms, without bath, for one person, $2.50; for two persons, $3.50. Single rooms, with bath, for one person, $3.50; for two persons, $4.50.

Rooms in the dormitories of Columbia University and Barnard College may be had at a cost of $1 per day by applying to Professor H. E. Crampton, Chairman, Columbia University Committee, American Museum of Natural History, New York City.—CASWELL GRAVE, Secretary, Johns Hopkins University, Baltimore, Maryland.

Thirty-fourth Annual Meeting, American Society of Naturalists.

The American Society of Naturalists, in affiliation with the American Association of Anatomists, the American Society of Zoologists, and the Botanical Society of America, will hold its thirty-fourth annual meeting at New York, under the auspices of Columbia University, on Friday, December 29, 1916, and, by invitation of the Carnegie Station for Experimental Evolution, at Cold Spring Harbor on Saturday, December 30th.

The Botanical Society of America will place the genetical papers of its program on Thursday morning, December 28th, and the American Society of Zoologists will group its genetical papers in a program for Thursday afternoon. By this arrangement there will be sessions of genetical interest on the day preceding the meetings of the Naturalists and continuing with the Naturalists' programs for Friday and Saturday.

The Friday morning session of the Naturalists will be open for papers on evolution, genetics and related subjects from members or invited guests, titles of which with estimated length of delivery must be in the hands of the Secretary by December 1st. Requests for microscopes or for space for demonstrations should also be sent to the Secretary.

The program of Friday afternoon will be a symposium on *Biology and National Existence*, with papers by Stewart Paton, W. J. Spillman, V. L. Kellogg, Jacques Loeb and E. G. Conklin.

The Naturalists' dinner, in which members of the affiliated societies are invited to participate, will be held in the evening of Friday. Hotel Manhattan. Price, $3.00.

There will be a joint smoker for members of the Naturalists and of the affiliated societies at Columbia University Commons, Wednesday evening, December 27th.

Members of the American Society of Naturalists are invited by the Carnegie Station for Experimental Evolution to spend Saturday, December 30th, at Cold Spring Harbor. A morning session from 10.30 to 1 will be held in Blackford Hall for the presentation of genetical papers. After a lunch there will be opportunity to inspect the equipment of the Station, the activities of which will be explained by the staff. Arrangements for trains will be announced in the final program.

Headquarters of the Naturalists will be at the Hotel Manhattan, Forty-second Street. Members are advised to make early reservations. Single rooms, $2.50; with bath, $3.50. Double rooms, $4.00 up; with bath, $5.00 up.—Bradley M. Davis, *Secretary*. University of Pennsylvania, Philadelphia.

The Ecological Society of America, Announcement.

New York Meeting.—A meeting of the Society will be held in New York on December 27 to 29, 1916, sessions being arranged as follows:

Wednesday, December 27. 9 a. m., business meeting; 10 a. m., Session for the reading of papers of general ecological interest.

Thursday, December 28. 10 a. m., Session for the reading of papers of zoological interest. 2 p. m., Session for the reading of papers of interest to foresters, agriculturists and climatologists.

Friday, December 29. 10 a. m., Joint session with the Botanical Society of America for the reading of papers of botanical interest. 2 p. m., Invited papers.

Further details regarding the meeting will be announced soon.

Climatological Committee.—The President of the Society has appointed a permanent committee on climatological conditions and the measurement of physical factors. It will be the function of this committee to stimulate the investigation of environmental conditions and the securing of climatological data which are of ecological significance. It will supervise all of the cooperative investigations undertaken by the Society in these fields.

The members of the committee are B. E. Livingston, Chairman; Lyman J. Briggs, A. E. Cameron, D. T. MacDougal, W. Dwight Pierce, E. C. Schneider, Forrest Shreve and Raphael Zon. Other members will be added as the work of the committee develops. At the invitation of the Weather Bureau the members of this committee will confer with a representative of the Bureau regarding desirable extensions in the scope of the data now secured by them.

Forrest Shreve, *Secretary-Treasurer.*

Tucson, Arizona, *November* 3, 1916.

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Wanted for cash or exchange—Neuroptera, especially Dobson, Stone and Caddice Flies; Hemiptera, larger species, *Belostoma*, Ambush Bugs, etc.; also *Papilio cresphontes*, *P. ajax*, *Act. luna*, *Cith. regalis*, *E. imperialis*, *Dalana ministra*, *Anisola senatoria* and other Noxious and Beneficial Insects with their Life Histories, etc.—The Kny-Scheerer Co., New York.

Wanted—Live pupae of *Argynnis diana*.—C. W. Allen, 812 N. 7th Ave., Maywood, Ill.

I will pay highest cash prices or give generous exchanges for good specimens of almost any of the Plusia group (from *Plusia* to *Autographa* and *Syngrapha* inclusive). Would also be glad to identify specimens as I am satisfied that the majority of the material in American collections is misnamed.—R. Ottolengui, 80 W. 40th St., New York City.

Wanted—Living pupae of *Papilio asterias*, *P. zolicaon*, *S. cynthia*, *S. cecropia*, *promethea*, *io*, *polyphemus*, *regalis*, *imperialis*, *augulifera*, *rubra* and other Saturnidae in exchange or for cash.—A. F. Porter, Decorah, Illinois.

Wanted—U. S. Bur. Ent. Bul. n. s. 39; Tech. Ser. 1, 4. Circ. 1, 22, 52. Insect Life, Vol. 5, No. 5; U. S. Ent. Comm. Repts. 1 and 5.—College of Hawaii, Honolulu, T. H.

Coleoptera—Records of species desired for the preparation of a Manitoba list. Will persons having specimens or records kindly communicate with N. Criddle, Entomological Branch, Ottawa, Can.

Wanted—*Cicindela patruela*, *hentzii*, *modesta*, *audubonii*, *ancocisconensis*, *imperfecta*, *reclilatera*, *abdominalis*, *formosa* and *unipuncta*. Fine North American and exotic specimens given in exchange.—Harry L. Johnson, South Meriden, Conn.

Send for my list of Coleoptera No. 1, January, 1916.—F. W. Nunenmacher, 1118 Oakland Ave., Piedmont, California.

For Exchange (specimen for specimen)—*Calocala titania* for *C. santa*, *C. jair*, *C. amestris*, *C. coelebs*, *C. olivia*, *C. canadensis*, *C. meskei*, from the east, *C. wernerii* and *C. beutenmuellerii*.—Ernst Schwarz, 6310 N. Newstead Ave., St. Louis, Mo.

Tremex columba (Hymenoptera)—Perfect specimens, male and female, offered in exchange for No. Am. Coleoptera and Lepidoptera.—Philip Laurent, 31 East Mt. Airy Ave., Phila., Pa.

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Wanted—Bibliog. Amer. Econ. Entom., I-IV; Tech. Ser. Bul., 2-7; Entom. Circ., 1, 10, 17, 27, 40, 41, 44, 46, 89; Insect Life, Vols. 4-6; Nomenclator Zool. Cash or exchange.—Philip Dowell, Port Richmond, New York.

Wanted—*Papilio pilumnus*, *palamedes*, *aliaska*, *nitra*, *brevicauda*, *bairdi*, *ajax*, in exchange for Lepidoptera from my vicinity.—Adolph Mares, 2524 S. Homan Ave., Chicago, Ill.

For Exchange—Illinois and Indiana Coleoptera for North American species new to my collection.—C. Selinger, 1338 South 50th Avenue, Cicero, Ill.

Photographs of Entomologists Desired.

The Entomological Section of the Philadelphia Academy of Natural Sciences desires for its entomological album the photograph of every entomological student. The collection contains over 300 at this date. A list was published in the NEWS 1902, pages 45-47, of those in the album at that time. We hope that those who can do so will write their names and date of birth and the date when the photograph was taken on the back of each photo, along with any other information concerning themselves they may wish to impart.

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Wanted—A person in the vicinity of New York City who can spread butterflies skilfully.—W. Tonnelé, 200 W. 72d St., New York City.

Carabidae of genera *Omophron, Nomaretus*, and especially *Elaphrus* wanted for cash. Specimens other than those from N. E. States more desired.—Alan S. Nicolay, 416a Grand Ave., Brooklyn, New York.

Liberal exchange given for Lepidoptera needed for the collection of the American Entomological Society, 1900 Race St., Phila., Pa.

For Exchange or Sale—Insect Life, Vol. I, Nos. 4, 5, 6; Vol. II, Nos. 7, 8, 9, 10; Vol. III, Nos. 4, 5, 9, 10; Vol. 7, bound; U. S. Bur. Ent. Bull. (N. S.). Nos. 31, 44. Wanted 5th Ill. Report, and Riley's 9th Mo. Report.—E. G. Kelly, Wellington, Kansas.

Lepidoptera—I have for exchange Eastern U. S. Noctuidae and Geometridae mounted on pins, including *Catocala elonympha, similis, praeclara, gracilis, coccinata, epione, relicta* and varieties. Also cocoons of *P. cynthia* and *C. angulifera*—John H. West, 2057 East York Street, Phila., Pa.

TO SOCIETIES AND MUSEUMS

An experienced collector, now residing in the tropics, who has made a special study of tropical work, is in a position to accept, on moderate terms, a collecting commission for any Museum or Society wishing to make the very interesting and highly requisite addition of a full series of all orders of Neotropical Insects to their existing collection. Special data with every specimen, all fresh taken and free from mould, acari, etc. Write first "Exotica" care ENTOMOLOGICAL NEWS, 1900 Race St., Philadelphia, Pa.

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Wanted—Bibliog. Amer. Econ. Entom., I–IV; Tech. Ser. Bul., 2–7; Entom. Circ., 1, 10, 17, 27, 40, 41, 44, 46, 89; Insect Life, Vols. 4–6; Nomenclator Zool. Cash or exchange.—Philip Dowell, Port Richmond, New York.

Wanted—*Papilio pilumnus*, *palamedes*, *aliaska*, *nitra*, *brevicauda*, *bairdi*, *ajax*, in exchange for Lepidoptera from my vicinity.—Adolph Mares, 2524 S. Homan Ave., Chicago, Ill.

For Exchange—Illinois and Indiana Coleoptera for North American species new to my collection.—C. Selinger, 1338 South 50th Avenue, Cicero, Ill.

Wanted—Living pupae of *Papilio asterias*, *P. zolicaon*, *S. cynthia*, *S. cecropia*, *promethea*, *io*, *polyphemus*, *regalis*, *imperialis*, *augulifera*, *rubra* and other Saturnidae in exchange or for cash.—A. F. Porter, Decorah, Iowa.

Wanted—A person in the vicinity of New York City who can spread butterflies skilfully.—W. Tonnclé, 200 W. 72d St., New York City.

Carabidae of genera *Omophron*, *Nomarelus*, and especially *Elaphrus* wanted for cash. Specimens other than those from N. E. States more desired.—Alan S. Nicolay, 416a Grand Ave., Brooklyn, New York.

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Wanted—12 pair of *Argynnis idalia*, 3 pair *Arg. diana*, 2 pair *Arg. edwardsii* for exchange or cash.—A. F. Porter, Decorah, Iowa.

Wanted—Will pay cash for fertile females of the genus *Eubaphe* or give other Lepidoptera in exchange. Specimens from west and northwest especially desired. Write for details.—Alex. Kwiat, 2445 Eastwood Ave., Chicago, Ill.

Orthoptera—Especially from the mid-west examined for collectors. Correspondence invited.—M. P. Somes, Box 226, Mountain Grove, Mo.

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FOR SALE A collection of about 2000 specimens, of about 750 different species and varieties of the smaller moths, Noctuidae, Thyatiridae, Notodontidae, Lasiocampidae, Geometridae, etc., collected in the interior of British Guiana, S. A. This is not a lot of trash, but consists of only perfect and selected specimens picked from a large lot. They are unspread but all on pins, as caught, with individual date and locality labels. These specimens came from a remote region, and the lot probably contains many new and unknown species. Museums or Specialists interested in Exotic material would do well to write for price and further information on this lot of specimens, as it contains many handsome and unique forms. Also good specimens of the giant beetle *Dynastes hercules*, from Dominica, W. I., $1.00 to $1.50 according to size.

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Wanted—*Catocala* from the Western and Southern States, and Cynipidae and their galls from all parts of North America. Will identify species in return for specimens.—William Beutenmuller, 879 Whitlock, Ave., Bronx, New York, N. Y.

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For exchange—Will have ova of *P. excaecatus*, *myops*, *A. myron*, *Attacus jorulla*, *Samia californica*, *P. cynthia* and *promethea* this spring.—S. C. Carpenter, 92 Baltimore St., Hartford, Conn.

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Wanted—*Neophasia terlootii* and *Eucheira socialis* (Lep.) in exchange for rare South American Lepidoptera, and identified North American Lepidoptera for Argentine Hymenoptera.—Dr. E. Giacomelli, Calle Rio Negro 84, La Rioja, Argentina.

Wanted—Rare Buprestidae. Have *B. connexa* to exchange for *B. sulcicollis* or other equally rare species.—W. J. Chamberlin, Ore. Exp. Sta , Corvallis, Ore.

Wanted—Kirby, Catalogue of Odonata; Literature on South African Odonata. African insects in exchange, or cash.—Stephen Rich, Amanzimtoti, Natal, South Africa.

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Wanted—All kinds of *Catocala* eggs and living pupae of *luna*, *cecropia polyphemus* and tiger moths. Cash or exchange.—Mrs. Robert Milde, Lewiston, Minn.

Rare California *Chrysobothris* and other California Buprestidae especially *Acmaeodera* to exchange for eastern or exotic Buprestidae.—Richard T. Garnett, 3600 Broadway, Oakland, Cal.

Will purchase for cash, rare Catocalae and unidentified Geometridae from the West and South.—Samuel E. Cassino, Little Folks Magazine, Salem, Mass.

Wanted: A few good specimens of the common katydid, *Phyllopiera camellifolia* Fab.; will give cash or insects of any order.—W. Marchand, 29 Vandeventer Ave., Princeton, N. J.

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