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NO. 1.

A Preliminary List of the Myriapoda of Arkansas with Descriptions of New Species.

BY CHARLES H. BOLLMAN.

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1. *Platydesmus Lecontei* (Wood).

One was found on the grounds of the Deaf Mute Asylum and others on the hills along the river, near Little Rock.

2. *Julus minutus* (Brandt).

I found a specimen in the swamp at south end of Main Street, Little Rock. Mr. Hutcherson also found one near Argenta.

3. *Spirobolus marginatus* (Say).

Abundant throughout the state.

4. *Parajulus cæsius* Bollman.

Julus cæsius Wood, Proc. Phila. Acad. Nat. Sci., 43, 1867 (Texas).

This species is not uncommon throughout the state.

5. *Cambala annulata* (Say).

I have received numerous specimens of this species, collected around Little Rock by Mr. Hutcherson.

6. *Lysiopetalum lactarium* (Say).

Common throughout the state.

7. *Campodes flavicornis* Koch.

Campodes flavicornis Koch, Syst. der Myr., 126, 1847 (Pa.).

Campodes fusicornis Koch, Syst. der Myr., 127, 1847 (Pa.).

Spirostrephon cæsiannulatus Wood, Trans. Amer. Philos. Soc., 194, 1865 (Alleghany Co., Pa.); Ryder, Proc. U. S. Nat. Mus., 526, 1880.

Pseudotremia rudii Cope, Proc. Amer. Philos. Soc., 180, 1869 (Montgomery Co., Va.); Ryder, Proc. U. S. Nat. Mus., 527, 1880.

Cryptotrichus cæsiannulatus Packard, Proc. Amer. Philos. Soc., 190, 1883 (Culmana, Ala., or Ocean Springs, Miss.).

A single specimen was obtained at Little Rock. As this species has a number of synonyms, I have thought it best to give its synonymy.

8. *Craspedosoma flavidum* sp. nov.

Yellowish brown, feet and antennæ lighter. Robust, segments not constricted, lateral carinæ small and body strongly resembling that of *Campodes*. Antennæ longer than width of body. Ocelli 12-14, distinct, arranged in a triangular patch and in 5 or 6 series. Dorsal plates rather smooth, setigerous granules small, setæ rather large. Male feet crassate, those of female slender.

Length of body 5.8 mm.; width .7 mm.

Hab.—Okolona.

This species strongly resembles a *Campodes*. In life the individuals are a dusky yellow. This description is based upon a male and female.

9. *Craspedosoma carniatum* Bollman.

Not common in the Fourche bottoms, south of Little Rock; also found on the grounds of the Deaf Mute Asylum.

10. *Leptodesmus hispidipes* (Wood).

Abundant everywhere.

Very common throughout the State. All specimens obtained were young, but the shells of many adults were found.

11. *Euryurus evides* Bollman.

Paradesmus evides, Bollman, Ent. Amer., II, 229, 1887 (Winona, Minn.).

Common over the State. Specimens agree with those from Minn.

12. *Chætaspis albus* Bollman.

Chætaspis albus, Bollman, Ent. Amer., III, 46, 1887 (Bloomington, Ind.).

One specimen obtained at Little Rock.

13. *Polydesmus minor* sp. nov.

Dark shining brown, lighter beneath. Moderately slender, depressed, slightly acuminate anteriorly and posteriorly, smooth, very sparsely pilose (setigerous). Antennæ equal to width of body, subclavate. First dorsal plate wide, angles not or but slightly produced; not toothed, tubercles not distinct, except lateral. Other dorsal

plates with posterior angles produced, especially posteriorly; lateral margins three or four toothed, indistinct posteriorly, tubercles distinct, arranged in two rows of four each, anterior border indistinctly divided into two, posteriorly, the last row of tubercles project beyond border of segments. Legs long, crassate in male.

Male: copulation foot very similar to *serratus*; ventral plates produced into a short, pilose lobe anteriorly.

Length of body 10—14 mm., width 1.5 1.8 mm.

Hab.—Little Rock.

This species is described from a number of specimens found in the low lands, south of Little Rock.

14. *Polydesmus pinetorum*, sp. nov.

Very similar to *P. serratus*, but the general color paler and size smaller. Tuberculation not so distinct, sides of first segment 1 toothed, other distinctly 3 or 4 toothed. Last row of scales on posterior segments composed of six or eight setae tipped scales, which project beyond border of segments. Ventral plate of ninth pair of legs not produced as in *serratus*, copulation foot very similar.

Length of body 15 to 18.5 mm.; width 2.2 to 2.8 mm.

Hab.—Little Rock, Arkadelphia, Okolona, Murfreesboro, and Ultima Thule.

As already indicated, this species is closely related to *serratus*. It is principally separated by its smaller size and form of the ventral of ninth pair of legs of male.

This species may only represent a geographical form of *serratus*. It is very abundant throughout the state, and all those collected during the summer were in the larva stages. I am indebted to Mr. Hutcherson for adult specimens.

15. *Fontaria virginiensis* (Drury).

Abundant at Donaldson, common at Okolona.

Specimens from Arkansas are similar to those from North Carolina, but those from northern parts of Mississippi valley represent geographical species.

At Donaldson the adults were found crawling on the surface of the ground in company with a large number of their young, probably one adult to five or eight hundred young, then (July 11, 1887) about half grown.

This species seems to be more confined to river bottoms, and low rich woodlands.

The odor of prussic acid is strongly emitted by this species through a series of pores on each side of the body.

16. *Sphæriodesmus pudicus* sp. nov.

General color pinkish, especially posteriorly, anterior half of segments darkest, a black median dorsal line, antennæ dark, legs pale. Body widest and highest anteriorly, tapering posteriorly, smooth, setæ absent. Vertex smooth, somewhat sulcate. Antennæ subclavate, about equalling width of body. Dorsal plates smooth, four preceding the last with an indistinct row of obtuse scales; lateral plates except

the first, antepenult and penult with their posterior margin serrate. Anal plate triangular with the angles rounded, sparsely pilose. Legs long and slender, extending beyond sides of body.

Male: ventral plate of second pair of legs produced into two short cones; coxæ of second and third pairs more pilose than others; copulation foot much twisted, end expanded and divided, pilose.

Length of body 7 mm.; width 2 mm.

Hab.—Little Rock and Okolona.

This is the first time that any species of this genus has been found in the United States. It is easily distinguished from *S. mexicanus* (Saussure), by having a few scales on posterior dorsal plates.

The collection contains two specimens of this species.

17. *Polyxenus fasciculatus* Say.

Common at Little Rock, five were obtained at Antoine and one at Ultima Thule.

18. *Pauropus lubbockii* Packard.

A few specimens were obtained at Little Rock.

19. *Linotænia bothriopa* (Wood).

I have received one specimen that was collected near Little Rock by Mr. Hutcherson.

20. *Linotænia robusta* (Meinert).

Scolioplanes robustus Meinert, Proc. Amer. Phil. Soc., 224, 1886 (N. A.).

Frontal plate present. Fulvous, head and antennæ dark. Not robust, attenuated anteriorly and posteriorly; moderately smooth, sparsely pilose. Prehensorial feet smooth, sparsely pilose; sternum subcordiform, length and width subequal; coxæ a little wider than long, unarmed; tooth strong, acute; claw small, a little curved. Cephalic plate somewhat wider than long, smooth, sparsely pilose, sides strongly rounded, slightly diverging, posterior margin only covering a small part of basal plate, basal plate two-thirds as long as cephalic, twice as wide as long. Antennæ moderately short, articles short, penult and antepenult not noticeably shortened.

Dorsal plates subsmooth, anterior prescuta short, median and posterior long. Spiracles round, very small. Ventral plates with an obsolete median foveola, pores on posterior margin. First pair of legs short, posterior longer than anterior. Posterior coxæ moderately inflated, pores about 12 to 18, small, in three series; last ventral plate triangular, small, sides moderately converging. Posterior pair of legs longer than penult, crassate in the male, slender in the female; claw large. Pairs of legs of male 51—55; of female 54—59.

Length of male 27—33 mm.; of female 34—52 mm.

Hab.—Little Rock, Okolona, Arkadelphia and Ultima Thule.

I refer this species provisionally to *L. robusta* (Meinert), although it differs from Meinert's description by rather unimportant characters. I have also seen specimens of this species from Tennessee.

21. *Linotænia branneri* sp. nov.

Frontal plate present. Fulvous, head and antennæ dark. Robust, strongly attenuated anteriorly, less posteriorly; moderately smooth, sparsely pilose. Prehensorial

feet smooth, sparsely pilose; sternum subcordiform, wider than long (5:3); coxæ wider than long, unarmed; tooth strong, acute; claw large, curved. Cephalic plate subquadrangular, sides rounded, slightly diverging posteriorly; basal plate about half as long as cephalic, twice as wide as long, anterior margin scarcely covered by cephalic plate. Antennæ long, joints moderate, penult and antepenult longer than wide. Dorsal plates moderately smooth; anterior and posterior prercuta moderate, median larger. Spiracles round, moderately large. Ventral plates with a distinct median sulcus; pores on posterior part. First pair of legs moderately short, anterior and posterior subequal. Posterior coxæ strongly inflated, pores large and small, about twelve. Anal legs of the female slender, claw large. Pairs of legs of female 43.

Length of female 37 mm.

Hab.—Little Rock.

This species is named in honor of Dr. J. C. Branner, State Geologist of Arkansas.

The collection contains one specimen of this species. It is related to *bothriopa*, but is distinguished by a smaller number of legs and its large posterior coxa and pores.

22. *Geophilus perforatus* (McNiell).

Schendila perforatus, McNiell, Proc. U. S. Nat. Mus., 325, 1887 (Pensacola, Fla.).

Abundant throughout the State.

23. *Geophilus okolonæ* sp. nov.

Frontal plate absent; anal pores absent. Fulvous, head and antennæ darkest. Rather slender, very slightly attenuated anteriorly and posteriorly, smooth, very sparsely pilose and punctate. Prehensorial feet smooth, punctate, sternum wider than long (4:3.5); coxa of about equal length and width, unarmed; claw moderately curved; teeth almost obsolete. Cephalic plate slightly longer than wide, suboval, posterior margin truncate, sparsely punctate and pilose; prebasal plate exposed; basal plate much wider than long (5:2). Antennæ short, penult and antepenult joints not noticeably shortened. Dorsal plates distinctly bisulcate. Anterior spiracle rather large, oval, oblique, median and posterior smaller. Ventral plate with an indistinct median sulcus; pores not manifest. First pair of legs short, anterior and posterior subequal. Posterior coxa scarcely inflated, pores absent; last ventral plate wide, side moderately converging, not densely pilose. Anal legs produced, armed, rather densely pilose beneath, crassate. Pairs of legs of male 61; of female 63.

Length of body 40 mm.

Hab.—Okolona.

There are two adults of this species in the collection. It is separated from other North American species by having no coxal pores and the prebasal plate exposed.

24. *Geophilus salemensis* Bollman.

I have seen one specimen that was collected near Little Rock by Mr. Hutcherson.

25. *Cryptops hyalinus* Say.

Cryptops hyalina Say, Journ. Phila. Acad. Nat. Sci., III, 1820

(E. Florida); Say, Oeuvres Ent., sp. 3, 1822; Newport, Trans. Linn. Soc., 409, 1844; Newport, Cat. Myr. Brit. Mus. Chil., 60, 1856; Wood, Trans. Amer. Philos. Soc., 168, 1865; Underwood, Ent. Amer., 65, 1887.

Cryptops hyalinus Koch, Syst. d. Myr., 175, 1847; Gervais, Aptères, IV, 293, 1847.

? *Cryptops milberti* Gervais, Aptères, IV, 592, 1847 (New Jersey).

? *Cryptops milbertii* Wood, Trans. Amer. Philos. Soc., 168, 1865; Underwood, Ent. Amer., 65, 1887.

Cryptops asperipes Wood, Proc. Phil. Acad. Nat. Sci., 129, 1867 (Montgomery Co., Virginia); McNiell, Proc. U. S. Nat. Museum, 326, 1887 (Pensacola, Fla.); Underwood, Ent. Amer., 65, 1887.

Cryptops sulcatus Meinert, Proc. Amer. Philos. Soc., 211, 1886 (Bee Spring, Ky.); Underwood, Ent. Amer., 65, 1887.

The study of a large series of specimens of the genus *Cryptops* has convinced me that all the species of *Cryptops* described from North America belong to a single species—*hyalinus* Say.

I have questioned the *Cryptops milberti* of Gervais, because the author states that the spines of the last pair of feet are absent. This character is contrary to the true definition of *Cryptops* and I am inclined to think that either Gervais had an abnormal specimen or that his observations were incorrect.

Asperipes Wood, has been separated from the other species by the number of antennal joints (19), which he assigned to his species, but as the number of joints has recently been found to be variable it is not a true character upon which species can be based.

In Ent. Amer., 65, 1887, Dr. Underwood says the last pair of legs of *sulcatus* Meinert, are unarmed, as in *milberti* Gervais, but in this he is mistaken, for, in his generic description Dr. Meinert states that the last pair of legs are armed with a definite number of spines.

Considering this state of characters, I believe that all the described species should be united under *C. hyalinus*. I have examined specimens of this species from the following States: Maryland, Pennsylvania, Indiana, Tennessee, North Carolina, Florida, Indian Territory, and Arkansas, where it is very common.

26. *Theatops spinicaudus* (Wood).

Abundant from Little Rock to Ultima Thule.

27. *Scolopendra heros* Girard.

Two adults were obtained at Little Rock, several young at Murfreesboro and Muddy Fork.

28. *Scolopendra woodii* Meinert.

A single specimen was caught at Donaldson.

29. *Scolopocryptops sexspinosus* (Say).

Common at all points; these specimens are of a darker shade than northern or eastern examples.

30. *Henicops fulvicornis* (Meinert).

A single specimen was obtained at Little Rock near the Deaf Mute Asylum. This is a European species, and the only other recorded North American locality is Mount Lebanon, New York.

31. *Lithobius branneri* Bollman.

A single specimen was obtained at Okolona and another at Little Rock.

32. *Lithobius proridens* Bollman.

A few were obtained at Little Rock. One individual is considerably larger than any specimen collected before.

33. *Lithobius pinguis* sp. nov.

Posterior angles of all the dorsal plates straight. Anal pair of legs armed with two claws. Coxal pores few, in a single series. Penultimate pair of legs armed with two claws. Coxæ of the posterior feet unarmed. Dark chestnut brown, head and antennæ dark, legs paler. Slender, not smooth, sparsely pilose; head wider than long (3.5:3), polished, not pilose. Antennæ short, 22- to 24-jointed, articles short. Ocelli 4 to 6, arranged in 2 or 3 series. Prosternal teeth 2 + 2. Coxal pores 3,3,3,2 to 4,4,4,4, round. Spines of the first pair of legs 0,0,1; penultimate pair 1,3,2,1 to 1,3,3,1; anal pair 1,3,2,0. Posterior legs short.

Female: claw of the genitalia entire, stout and much curved; spines strong, subequal.

Length of body 9-10 mm.

Hab.—Little Rock.

This description is based on three specimens. This is the smallest North American species with the claw of the female genitalia entire.

34. *Lithobius celer* sp. nov.

Posterior angles of the 9, 11, 13 dorsal plates produced. Anal pair of legs armed with one claw. Coxal pores few, in a single series. Penultimate pair of legs armed with two claws. Coxæ of the 13, 14, 15 pairs of feet laterally armed. Brown of various shades, head and legs more or less chestnut, antennæ dark. Moderately robust, smooth, sparsely pilose; head about as long as wide, pilose. Antennæ rather long, 30- to 34-jointed, articles small. Ocelli 18 to 40, arranged in 4 to 7 series. Prosternal teeth 5 + 5 to 7 + 7. Coxal pores 2,3,3,2 to 5,6,6,5, round. Spines of the first pair of legs 1,2,1 to 2,2,1; penultimate pair 1,3,3,1 to 1,3,3,2; anal pair 1,3,3,1 to 1,3,3,2. Posterior legs short.

Male: tibia of anal legs somewhat crassate, and furrowed beneath; but more furrowed in the female.

Female : claw of the genitalia short, tripartite, middle lobe much longer, others subequal ; spines moderately slender, inner shortest.

Length of body 15—25 mm.

Abundant or common throughout the State.

This species is not strongly related to any known North American locality, it should be placed near *forficatus*, which it seems to replace in Arkansas.

Dr. Wood has reported *forficatus* from Arkansas and he may have had the species which I have described.

35. *Lithobius œdipes*, sp. nov.

Posterior angles of the 9, 11, 13 dorsal plates produced. Anal pair of legs armed with two claws. Coxal pores few, in a single series. Penultimate pair of legs armed with two claws. Posterior coxae unarmed. Brown, head and antennae dark, legs and ventral plates paler. Robust, not smooth, sparsely pilose ; head smooth, of about equal length and breadth (3.2, 3.6). Antennae short, attenuate, 24- to 26-jointed (♂, 26, ♀ 24). Ocelli 9 to 11, arranged in 3 or 4 series. Prosternal teeth 2 + 2 or 3 + 3. Coxal pores 3,5,4,3 to 6,5,5,5 round. Spines of the first pair of legs 1,1,1 ; penultimate pair 1,3,3,2 ; anal pair 1,3,3,1. Posterior pair of legs short.

Male : femur of the last pair of legs somewhat bent inwardly and swollen ; tibia very strongly swollen, especially above and having a bunch of hairs on the posterior third ; first tarsal joint crassate. Penultimate pair of legs somewhat swollen, principally the tibia ; first tarsal joint produced into a short lobe on the inner side.

Female : posterior pair of legs scarcely swollen ; claw of the genitalia entire ; spines 2—2.

Length of male 15.4 mm. ; of female 20 mm.

Hab.—Little Rock.

I have three specimens of this species. This is the only known species with both the anal and penultimate pairs of feet swollen or produced into lobes.

36. *Lithobius transmarinus* Koch.

Abundant at Little Rock, common at other localities.

37. *Lithobius mordax* Koch.

Common from Little Rock to Ultima Thule.

38. *Lithobius vorax* Meinert.

Found at all points where collections were made, but was more common at Little Rock.

39. *Lithobius multidentatus* Newport.

In a vial of Myriapods that were collected near Little Rock by Mr. Hutcherson, there is a single specimen of this species.

40. *Scutigera forceps* (Rafinesque).

One adult was seen at Arkadelphia, and several young at Little Rock.

INDIANA UNIVERSITY. March 28, 1888.

An Introduction to a Classification of the North American Lepidoptera.

By JOHN B. SMITH.

(Continued from ENT. AM., vol. I, p. 87.)

In the last paper of this series the Sphingidæ were treated of and a synopsis of the genera was given. It has been usual to follow this family with the *Sesiidæ*, or *Ægeriidæ* as some authors prefer to call them, and, though recognizing no close relationship in any of its stages, with the *Sphingidæ*, I shall yet follow the general order here.

The family *Sesiidæ* is sharply defined, resembling somewhat in the imago state the Hymenoptera in the transparent wings and banded bright maculation.

In the early stages they resemble the *Castniidæ* and *Cossidæ* in so far that the larvæ are *Endophydes*, living in roots, stems or branches of plants, and the pupæ also have great resemblance to them.

The antennæ are longer than half the length of primaries, gradually variably thickened medially, more slender apically, the tip often with a brush of hair; rarely they are setaceous, in the ♂ usually with brushes of hair laterally, more rarely with lamellæ, or pectinations.

Palpi well developed, ascending, joints variably proportioned. Eyes naked. Ocelli present. Tongue variable, sometimes obsolete, often long and corneous. Thorax robust, closely scaled. Abdomen also closely scaled, long, usually slender, rarely somewhat flattened, often tapering to tip, usually with an anal tuft. In the ♂ there are seven, in the ♀ but six abdominal segments.

Legs strong, femora and tibiæ densely scaled or hairy—usually the anterior tibia much shorter than femora—middle tibiæ nearly equal to femora and hind tibiæ much longer than femora. Median tibiæ with terminal spurs, posterior with middle and terminal spurs.

Primaries narrow, elongate, with the internal vein wanting or forming the internal margin—vein 5 often wanting. Secondaries with two, rarely three internal veins, costal vein wanting or forming the costal margin. (See Bull. B'klyn Ent. Soc., vol. 7, pl. 3, f. 21.)

In habit the species are diurnal, flying about flowers during the hottest sunshine.

The European genera are few in number, and are separated by Herrich-Schäffer as follows:

Antennæ without a pencil of hair at tip; tongue short and weak.

Antennæ of ♂ with long ciliæ beneath, veins 2-4 of secondaries separate.

Paranthrene.

Antennæ of ♂ bipectinate, veins 3 and 4 from the same stem. **Bembecia.**

Antennae with a pencil of hair at tip.

Tongue short and weak ; antennae of ♂ with a single row of lamellae beneath...

Trochilium.

Tongue long and strong ; antennae of ♂ ciliate beneath **Sesia.**

The *Sesiidae* are contained in Hübner's classification in his *Phalanx secunda, Tribus secunda*. He divides them as follows :

Stirps 1, **Sesiæ**. Primaries narrow and long, secondaries short and broad, both with long fringes.

Familia A, Corpulentæ. Body rather stout and the wings are not very small.

Coitus 1, Sphecia. Collar yellow at the sides, primaries immaculate, abdomen partly yellow.

Familia B, Graciles. Abdomen rather slender, primaries very narrow.

Coitus 1, Paranthrena. Primaries densely clothed with scales, abdomen irregularly banded with yellow.

Coitus 2, Melittia. Primaries partly, secondaries entirely transparent, feet with very bushy vestiture.

Coitus 3, Bembecia. Both wings transparent ; abdomen with a fan like tuft.

Coitus 4, Synanthedon. Primaries marked with red centrally and reddish also along inner margin.

Coitus 5, Conopia. Abdomen with bright red bands.

Stirps 2, **Apyralides**. Wings rather broad and angulated or dentate.

Familia A, Vitratæ. Primaries with transparent spot, abdomen smooth.

Coitus 1, Thyris. Wings with but a single row of transparent spots, the abdomen white ringed.

Coitus 2, Phoebria. Primaries with two rows of somewhat opaque spots, abdomen uniform.

Walker still further subdivides the genera in the 8th volume of the Cat. Brit. Mus. Lep. Het., and finally Mr. Henry Edwards has created a number of genera for our American species.

As a rule our species are not very commonly found, and few collections have the family very largely represented. As Mr. Hy. Edwards is making a careful study of the family, looking to a monograph, I will here give only brief descriptions of the genera, premising that they are not based on any personal examination of the insects themselves, and following in the order of genera that is adopted in Grote's List of 1882.

Melittia contains usually large and robust forms, fore wings generally opaque, tongue moderate or rather short, antennæ subclavate, the posterior legs very densely clothed with long hair forming prominent tufts or brushes nearly to the end of the tarsi. The latter character is the most prominent and is distinctive of this and, to a less extent of the two following genera.

Larunda has the primaries opaque, secondaries with but a small vitreous spot at base. The palpi are short, with a broad spreading tuft of hairs. Tongue almost obsolete, caudal tuft large, flat, spreading. The antennæ are moderately pectinated in the ♂, almost simple in the ♀.

Euhagena has both pairs of wings opaque. The posterior tibiæ are clothed with hair similar to but not so long or dense as in *Melittia*. Antennæ twice the length of the thorax, very deeply pectinated except at the tip where the pectinations seem soldered together in a solid mass. The tongue is short and weak.

Alcalthoe has a much less marked tibial tufting, and is distinguished in the ♂ by a caudal appendage, as long as the abdomen. The forewings of the ♂ are partly transparent, in the ♀ they are opaque as in *Sciapteron*. The tongue is not mentioned, but is probably short, the antennæ lamellate beneath.

Phemonoe is distinguished by the anal appendages of the male, not half as long as the abdomen and 5 in number. The forewings are opaque. Nothing is said of the tongue or of the antennæ.

Trochilium contains large species as a rule, with transparent wings, obsolete tongue, sub-clavate antennæ with a brush of hair at tip, and rather densely clothed legs, not forming tuftings however as in some of the preceding genera.

Bembecia has short filiform antennæ, very shortly bipectinate, no brush at tip. The eyes are small, tongue strong and corneous. Abdomen with a broad somewhat truncate anal tuft.

Sciapteron has the antennæ very slightly thickened toward tip, which is furnished with a little brush of hair; in the male lamellate, the lamellæ with a double series of bristly tufts. Tongue strong, corneous. The primaries are opaque or have but a small transparent space at base.

Fatua is based on a single species—*denudatum*—in which the sexes differ remarkably. In the male the primaries are long, very much narrowed towards the base, not covered with scales. Secondaries very large, ample, rounded on anal margin. Legs long and slender. Antennæ with very deep pectinations, ceasing before the tip, which is a solid mass, and bears some fine bristles.—*Female* less robust. Primaries opaque except a space near the internal angle. Antennæ roughened but not serrated, much thickened towards the tips; abdomen very long,

pointed at the tips, ovipositor protruding, compressed on its lower side into a small groove.

Harmonia has an unusually large head, with very long palpi. Antennæ slightly thickened toward the apex, with a double row of very fine serrations. Abdomen long and narrow, the four posterior segments with lateral, broadly-spreading, fan-shaped scales. Caudal tuft unusually long and broad, divided in the centre and spreading. Fore tibiæ flattened. Primaries opaque. The structure of the tongue is not mentioned, nor whether or not there is a brush of hair at tip of antennæ.

Podosesia is principally distinguished by its unusually long hind legs. The antennæ of the ♂ with ciliate lamellæ, in the ♀ more slender than in *Sciapteron*. The primaries are opaque save for a small transparent space at base. The tongue is strong, corneous.

Albuna is closely allied to *Sesia* but differs as follows: the head is much narrower than the front of thorax, which is not so far produced beyond the base of the wings. The antennæ are comparatively shorter, stouter, and more thickened toward the tip. Legs proportionately shorter, the tibiæ more densely clothed with hair. Abdomen of the ♂ never constricted at base, stout, cylindrical, the caudal tuft small and not spreading. That of the ♀ is fusiform, quite as broad at base as the thorax, and tapering to a point. The genus contains rather large species.

Saunina has the tongue almost obsolete. Antennæ filiform, simple, rather slender, acuminate at the tip, nearly twice the length of the thorax. Legs slender, hind tibiæ long and stout, somewhat pilose. Wings narrow, opaque.

Sesia contains small or medium sized species, with antennæ slightly thickened externally and with a brush of hair at tip: in the male with lateral brushes of hair but no lamellæ, longer and more slender than the preceding genera. Tongue strong, corneous, anal brush more or less compacted, not spread fan-like. Primaries with two or three vitreous spaces, secondaries entirely vitreous. The greater number of our species are referred to this genus and in the European fauna it contains the larger proportion of the species.

Pyrrothenia has the antennæ brush-like, heavy, lengthily pilose. Eyes banded, black and golden. Ocelli large. Head narrow, prominent. Tongue moderate. Primaries narrow, widening terminally at outer third, opaque.

Carmenta has the fore wings quite opaque. Abdomen sessile and tapering toward anal extremity. Antennæ thickened toward extremity as in *Sesia* proper. In many respects this genus approaches *Paranthrene*, but in that genus, while the anterior wings are opaque, the antennæ are simple or ciliate.

Zenodoxus is readily distinguished by having both pairs of wings opaque. The antennæ are moderate, tapering to the tip, linear, biciliate. Thorax heavy, globose, widening posteriorly. Abdomen very short and wide, somewhat flattened; anal tuft short, broad and squarely cut.

As similar characters are not used by authors, it is not possible to give a synoptic table of the genera. There are some slight differences of venation, which in the European genera are carefully described, but these I have not mentioned, since our American genera are not so described as to allow of comparison.

The following letter has been received from Mr. A. G. Butler :

Dear Sir :—I think the following note may interest American Lepidopterists in the matter of *Bolina fasciolaris*.

The fact that *Bolina fasciolaris* was the male of *B. cunearis* was practically illustrated in the Museum by a mistake made by the late Mr. F. Walker. One of the specimens enumerated by him is *B. cunearis* (from 'Brazil') it differs in no respect from the other females separated under the latter name: our males are from St. Domingo and the Amazons, our females from St. Domingo, the Amazons, Venezuela, West Coast of America and Veragua. It is by no means certain that a species with so wide a range does not occur in North America and in Grote's collection there is a specimen (unfortunately not labelled with its locality) of typical male *B. fasciolaris*.

Assuming that the latter is the male of *B. cunearis*, which appears to me to be certain, it is highly probable that *B. ochreipennis* is also the male of *B. nigrescens*; our specimens of the former are all males, those of the latter females; the differences are equivalent to those between *B. fasciolaris* and *B. cunearis*.

Yours very truly,

A. G. BUTLER.

While picking apples, October 12, 1887, I found a thin oblong cocoon between two apples, with a leaf drawn over part of its upper side. November 1, there came out a fine ♀ *Eugonia alniaria*. The orchard consists of apple and pear trees, and the nearest pear tree is about twenty feet from this one. I am not aware that Apple has been as yet known as a food plant of this insect.

M. S. CRANE.

A Disclaimer.

Dear Mr. Editor :

IN ENT. AMER., vol. 3, p. 218, in a note on the American species of *Callimorpha*, Mr. Lyman's work on the subject, and my own are noticed. For myself I can but welcome criticism, and as in the very paper noticed I claim full liberty to disagree with everybody, I certainly do not dispute the right of others to disagree with me. But your reviewer speaks in the plural, of a "Galileo consciousness." Now of course it is known to all that Galileo made a discovery, which the conservative and prejudiced intellect of the period deemed incredible, and forced him to recant. It was Galileo *vs.* the mob. Now Mr. Lyman and myself have made, or claim to have made certain discoveries, which are not generally accepted, and it is hard that *we* should be placed in the position of the *mob*, forcing the enlightened rank and file to recant in spite of their better knowledge. I don't want to be Galileo—but I do object to being the mob!

Aggrievedly yours,

JOHN B. SMITH.

* * *

Note by Editor.—If Mr. Smith were one of the Priests he would know that one of the rules of Biblical interpretation is, that a parable is to be used to explain the object in view, and is not to be forced into having a correspondence and lessons in every particular. Galileo recanted because he was compelled to do so in view of certain "arguments" such as the thumb screw and stake. But he was unconvinced, and so expressed himself in a sort of a "sub rosa" way. Now our friends Messrs. Smith and Lyman have advanced arguments which force us to assent, as we can not with corresponding study and argument controvert; and we must logically confess they are right. Yet, notwithstanding my confession, we feel certain they are wrong. We are sorry we have not the time properly to study up *Callimorpha*, and either convince or be convinced. As it is, taking the pattern of ornamentation as the guide in the determination of species, and this is their guide, and taking Mr. Lyman's figures as representing typical forms, we can see no difference at all in pattern between the first 9 figures of his plate, representing two of the species. And, indeed, there is practical identity between figures 1 and 7, representing respectively *C. Lecontei* and *C. confusa*. But far be it from us to consider Messrs. Smith and Lyman the Priests of the Church (not the mob) or ourselves Galileo. Note the comparison was not even with the shake of Galileo's head, only a "sort of a Galileo shake," a sufficiently modest comparison!

Descriptions of New Florida CHALCIDS, belonging to the Subfamily Eucyrtinae.

By WILLIAM H. ASHMEAD.

The following new Chalcids, belonging to the Subfamily *Eucyrtinae*, were recently discovered by me, in arranging my collection.

APHYCUS, Mayr.

1. *Aphycus niger*, n. sp.

♂. Length .03 inch. Opaque black, finely pubescent; mandibles and palpi, brown. The antennae is hardly as long as the thorax; scape brown; flagellum brown-black, nearly twice the length of the scape, rather densely pubescent, the joints being wider than long. Thorax microscopically rugulose; tegulae honey-yellow. Abdomen very short, black, with bluish reflections in certain lights. Legs fuscous, trochanters and knees, honey-yellow; tarsi pale, almost white. Wings hyaline, iridescent, veins brown.

Described from one specimen.

2. *Aphycus chrysopæ*, n. sp.

♀. Length .08 inch. Yellow-ferruginous. Eyes large, oval, black. Each ocellus is surrounded by a black ring. The space between the eyes is very narrow and very finely punctate. The thorax is smooth and there is a dusky streak across the collar and on the fore part of the mesoscutum. Legs yellowish-white. Wings hyaline, pubescent, the pubescence short; veins pale brown, the stigmal vein long, stout.

Described from one specimen reared from a *Chrysopa* cocoon.

3. *Aphycus unicolor*, n. sp.

♀. Length .04 inch. A short, very robust form, its breadth being nearly equal to its length. The head, thorax and the legs are of a uniform reddish-brown; eyes dark brown; palpi black. The head is very large, broad, with some coarse punctures. The scape of antennae is dilated towards apex, it with the pedicel and the first three funicular joints concolorous with the body, the 4th, 5th and 6th funicular joints white, club black. The long tibial spur of middle legs is dusky at apex, while the tarsal joints are much dilated as in certain Eupelmids. Wings hyaline.

Described from one specimen.

EUCYRTUS, Dalman.

4. *Eucyrtus pyralidis*, n. sp.

♀. Length .03 inch. This pretty little species varies from a black to a blue black, with a metallic greenish lustre on the thorax and lower part of face. The scape of antennae is brown or black, except at tip, the first four funicular joints are white, while the pedicel, the two last funicular joints and the club are ferruginous. Legs, excepting trochanters, knees and tips of tibiae which are white, vary from a black to a ferruginous color. Wings hyaline, veins pale, the marginal vein punctiform, stigmal vein very delicate, short.

Described from four specimens reared from *Peach pyralid*.

LEPTOMASTIX, Förster.

5. *Leptomastix tineævora*, n. sp.

♀. Length .07 inch. The head, fore part of collar and the mesopleura, steel blue; thorax and abdomen brown; eyes dark brown. Antennae very long, slender, the pedicel extending considerably beyond the ocelli, it and the pedicel yellow, the flagellum brown, the joints of which are very long. The legs are pale brown, excepting the basal one-third of the tibiae, and the tarsi, which are white. Wings hyaline, pubescent, veins brown; the marginal vein nearly twice the length of the stigma and enclosed in a large dusky blotch which extends nearly across the wing.

Described from one specimen, reared from a Tineid larva.

PRIONOMASTIX, Mayr.

6. *Prionomastix americana*, n. sp.

♂. Length .07 inch. Head brownish-yellow; thorax and abdomen fuscous, sparsely pubescent. The space between the eyes wide, finely punctate; eyes and antennae, excepting scape, dark brown; the scape rather short, slender; pedicel very small; flagellar joints long, much flattened, and of nearly equal length, about two-thirds as long as the scape. Scutellum large, highly convex and finely grooved. Metathorax short, smooth. Abdomen small, sessile ovate, depressed above. Legs fuscous, excepting the tibiae at base, first four tarsal joints, and the large middle tibial spur, all of which are white. Wings hyaline.

Described from one specimen.

PSILOPHRYS, Mayr.

7. *Psilophrys armatus*, n. sp.

♂, ♀. Length .05 inch. Dark blue with greenish metallic reflections on the thorax and the upper part of the head. The antenna in the ♀ is very slender and entirely brown-black, excepting a pale pedicel; in the ♂ the scape is brownish-yellow, the joints of the flagellum very long and covered with long hairs. The mesopleura in the female are steel-blue, in the male bronzy-green. The legs are pale yellowish; the coxae metallic blue or green; the femora and tibiae, excepting at their tips and the terminal tarsal joint, brown. In the ♂, the middle tibiae are entirely pale yellow. The abdomen in the ♀ ends in an ovipositor half its length. Wings hyaline, veins brown, the marginal vein hardly as long as the stigmal vein.

Described from 2 ♀♀ and 2 ♂♂ specimens.

8. (?) *Psilophrys pulchripennis*, n. sp.

♀. Length .07 inch. Metallic blue green and cupreous. The head very large, the eyes abnormally large, occupying the greater part of the head, and leaving but a very narrow frontal space. The scape of the antennae is pale brown, the flagellum black and more than twice the length of the scape, subclavate, the joints being slightly longer than thick. The scutellum is cupreous. Abdomen blue. The legs are black or brown, the trochanters, knees, tips of tibiae and tarsi, excepting the terminal joint, pale or yellowish white. Wings fuliginous, excepting a clear space at base, two large wedge-shaped spots in middle of the wing extending to fore margin, a smaller wedge-shaped spot extending to hind margin, and the extreme apical margin of wing, all of which are white.

Described from four specimens. This most beautiful Eucyrtid certainly does not belong to this genus; it is placed here only temporarily on account of its long face; in some other respects it more closely resembles the genus *Blastothrix*.

COMYS, Förster.

9. *Comys cyanea*, n. sp.

♀. Length .04 inch. Dark blue, the thorax and abdomen with a metallic luster in certain lights. The antenna is variegated with red, yellow and brown. On the scutellum towards the tip, are two erect clumps of black hairs. Legs blue, all the tibiae annulated with white at base and tips, tarsi pale yellowish-white. Wings hyaline, the marginal vein rather thick, and a little longer than the delicate stigmal vein.

MIRA, Schellenberg.

10. *Mira longipennis*, n. sp.

♀. Length .06 inch. Robust, dark blue; abdomen black. The head is very thick, stout, transverse, broader than the thorax; cheeks red; face deeply emarginated for the reception of the antennae. The antennae as in genus *Cerapterocerus*, broadly dilated, æneous-black, the flagellum joined to the scape before the tip, the scape in consequence projecting as a sharp point off to one side. The anterior and middle legs are brown, thighs and tibiae, black, tarsi brown. Wings, except a narrow hyaline streak at tips, entirely smoky-black.

Described from one specimen. This is the first species in this genus to be described from our fauna; there is but a single other species known—*Mira macrocera*, Schell., peculiar to Europe.

PHÆNODISCUS, Förster.

11. *Phænodiscus armatus*, n. sp.

♀. Length .08 inch. A rather slender form. Head blue, the lower part of face and surrounding mouth parts, antennal scape, mesothorax, pleura, sternum, legs, coxæ, and venter, brownish yellow. The flagellum, the scutellum, the upper part of abdomen, the upper surface of posterior femora, and the apical two-thirds of posterior tibiae brown. The first funicle joint is a little longer than the pedicel, about three times as long as thick, the other joints becoming gradually shorter, but widened out toward the club, the latter stout, 3-jointed, obliquely truncate at apex. The abdomen is compressed and ends in an ovipositor more than half its length. The wings are hyaline, with a dusky blotch across the center, veins brown, the marginal vein about twice as long as the stigmal vein.

Described from one specimen.

DINOCARSIS, Förster.

12. *Dinocarsis pulcher*, n. sp.

♀. Length .05 inch. Head and thorax red, finely pubescent; abdomen black; legs pale yellowish, immaculate. Eyes dark brown. The antennae are black, excepting a white annulus at the apex of the abnormally broadly dilated scape and the white club. Wings hyaline, veins brown, the marginal vein about as long as the stigmal vein, postmarginal, shorter.

Described from one specimen.

CHOREIA, Westwood.

13. *Choreia flavicincta*, n. sp.

♀. Length .08 inch. Head brown; thorax and a band across the abdomen at base, brownish-yellow. The scutellum, metathorax, pleura and posterior legs, fuscous. Abdomen greenish-blue, Eyes large, black, the space between them broad and sparsely punctate. The antennae are slender, subclavate and not long. Wings rudimentary.

Described from one specimen.

Thoroughness in Entomological Tables.

By T. L. CASEY.

Analysis should invariably precede synthesis and generalization. Applying this truism to the science of Entomology, we readily perceive that it may be considered from two points of view—the purely scientific and the practical. Concerning the former it is intended to refer to the necessity for a minute knowledge of all the parts before the whole, or the mutual relationship of the different parts of the whole, can be properly understood. Regarding the latter, or the practical application of the principle, it is desirable to indicate the great inconvenience and loss of time inflicted upon our students by the present method of simplification or synthesis as exhibited in tabular statements of genera and species.

In order to illustrate our meaning more clearly it is only just to cite some one of the multitude of examples continually occurring. In this illustration it is necessary to refer to our only work on a systematic arrangement of the North American genera of Coleoptera, a work the inestimable value of which it is not intended in the least to overlook or underestimate; in other words it is not meant in the spirit of captious criticism, but simply as a random example of the practical efforts of this so-called simplification.

Let us assume that the student holds in his hands a specimen of *Badister*, which is entirely unknown to him and the generic identification of which he is desirous of obtaining. The tables given in this work carry him easily to the second part of the scheme given on page 21, or to those genera without elytral fold. Here he is at once met by a difficulty. The first character to be consulted is that of the front, whether short or normal, which being of no positive value unless he is familiar with the entire series, we will not consider, but pass to the next character which is that of labral structure. If this organ is impressed the insect is to be referred to the *Licinini*, if not, he should naturally search further. Examining the labrum of *Badister* it is found to be deeply and narrowly emarginate or cleft to the very base, leaving no space whatever for an impression, he therefore continues his quest for applicable characters, and it is only after reading the lengthy diagnoses of many other groups, that he arrives at the conclusion from purely negative evidence that his species must be included in the *Licinini*. If there had been less simplicity and concentration followed in the scheme, and if the group *Badisterini* had been there correctly indicated, it is true that the tables would have been longer and more complex, but much valuable time and vexation of spirit would have been

saved. In fact the selection of the labrum for the characterization of the *Licinini*, if this group is to be constituted as thus stated, is peculiarly unfortunate, because there are no two American genera in which it is at all similar, and the character given in the table will apply only to *Dicælus*. In *Diplochila* the anterior margin is more deeply emarginate than in *Dicælus*, but there is scarcely any trace whatever of impression. In both these genera the labrum is large and conspicuous, while in *Badister* it is very small, and, as before remarked, deeply cleft to base without trace of impression.

The difficulty in recognizing groups applies also to the subdivisions of genera, especially where such dissimilar elements are united as in the case of *Rhadine*, *Platinus* and *Anchus*, or *Dichirus*, *Anisodactylus* and *Anisotarsus* and many others. Descending to species the same embarrassing doubts and delays are engendered in seeking identification from tables wherein distinct but closely allied species are included under a single name, without indication of the known characters of the various elements which have been combined; such for instance as in the *extensicollis* group of *Platynus*, the *validus* group of *Pterostichus*, the *sericeus* group of *Chlænius*, or the amalgamation of two such valid species as *Promecognathus levissimus* and *crassus*.

We may conclude therefore with the hope that in our future tables the subdivisions of groups, genera and species will be more clearly indicated, at the expense perhaps of a little more time, ink and space, but to the greater satisfaction of our entomological students, and ultimately to the advance of our chosen science by enlisting the enthusiasm of those who find, after consulting them, that their conceptions are clear and the result of their investigation a positive advance in their knowledge of the subject, and not shrouded in doubt and obscurity as is too often the case at present. Call these subdivisions what we may, subgroups, subgenera and subspecies, varieties or races, they should in every instance be clearly outlined as far as known.

The motive of the synthesists is undoubtedly a philanthropic desire to simplify a nomenclature which is becoming involved, and which from the very conditions of the case must always be complicated if we are to follow Nature along her chosen lines of development. We cannot force her to be simple, and when we try to do so we make the matter much more obscure by covering up and suppressing the difficulties; in short we retrograde from an essentially necessary though scientific and therefore manageable complexity toward a non-scientific and unwarrantable ambiguity.

Society News.

Entomological Society of Washington, January 5, 1888, at the residence of Prof. Riley. The reports of officers were read and submitted. The following officers were elected for 1888: President, Mr. E. A. Schwarz; 1st Vice-Pres., Prof. C. V. Riley; 2nd Vice-Pres., Dr. Geo. Marx; Rec. Secretary, Mr. John B. Smith; Corr. Secretary, Mr. O. Lugger; Treasurer, Mr. B. Mann; Members of Executive Committee, Mr. L. O. Howard, Mr. Theo. Pergande, and Dr. W. H. Fox.

The retiring President, Mr. L. O. Howard, read his annual address entitled "a preliminary study of the parasites of Cosmopolitan Insects." This paper was discussed and commented on by Prof. Riley and Messrs. Smith and Schwarz.

February 2, 1888, at the residence of Dr. Fox. Dr. Fox read some remarks on the arachnid genus *Dolomedes*, giving the generic characters and notes on some of the species. This paper was discussed by Messrs. Smith, Howard and Schwarz. In response to questions Dr. Fox stated the geographical distribution of the species. Mr. Howard asked whether a well defined European genus, represented in America by species differing in some one particular might be enlarged to include these species. Mr. Schwarz said it might, and cited the various groups of *Pierostichus* as examples. Mr. Smith answered by stating that in Europe *Perigrapha* had pectinated antennae in the ♀. In America there were simple in that sex—the definition of the genus was enlarged to meet this case. Mr. Heidemann remarked on the Hemiptera collected by Mr. Schwarz in Dade Co., Florida, in the Spring of 1887. There appeared to be about 95 species and all belonged to the West Indian fauna. All except a few obscure species were described from that faunal region. Mr. Smith referring to this paper said he did not consider this fauna a part of the temperate American fauna and would not include it in our lists. It belongs to the West Indian and Central American fauna and not to that of North America as understood in our lists. Mr. Schwarz says this fauna extends much further North than is usually believed, and states that all the Coleoptera collected by him belong to the West Indian fauna. Mr. Smith says the same holds true of the Lepidoptera so far as determined.

Mr. Howard mentioned that he had received the variety of the chinch bug, collected by Mr. Schwarz, with short pointed wing covers, from other sources and now believes that this is sea coast form.

Mr. Schwarz exhibited specimens of an undescribed *Xyleborus*, allied to *pyri*, and of its galleries which he found in South-eastern Florida within the branches of the Cocoa Plum (*Chrysobalanus icaco*). These galleries represent a form hitherto unknown in any of the described North American Scolytids and resemble somewhat those of the European *X. saxesini*. From the entrance hole the gallery runs for some distance straight into the wood; then follows a rather abrupt elbow whereupon the gallery is gradually enlarged into a capacious but shallow chamber which reaches to the core of the branch. At the inner lower corner of this chamber is another, smaller and elongate chamber entirely within the core. On the bottom of this last chamber, a number of eggs and young larvae were found, all in a heap; while in the larger chamber there was a pair of the beetles. The two sexes of this new species differ in a remarkable degree. Referring to *Xyleborus pyri* Mr. Schwarz pointed out that Mr. Peck's account of the galleries, published in 1817 contains a number of the most glaring errors; but in spite of this, it has been copied and quoted up to the present time by all subsequent writers on this *Xyleborus*.

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NO. 2.

Preliminary Survey of the *CICADÆA* of the United States.

By P. R. UHLER.

In bringing together materials for a list of the Homoptera of North America it has become necessary to refer the species hitherto placed in the old genus *Cicada* to the genera lately defined by the labors of Dr. Stål, Mr. Distant, and others. These species are comparatively numerous and together form a fine assemblage, including representatives of groups which occur in the neotropical, nearctic, and palaearctic regions.

Tettigia, represented thus far in North America by only a single species, is an old world type which here is closely confined to the great coastal plain that stretches along the continent from the vicinity of New York city to Southern Texas. This neat species, first described by Say from Eastern Pennsylvania and New Jersey, spreads throughout the whole length of the Atlantic border, and passing along the Gulf coast across Texas enters the province of Tamaulipas, Mexico. It thus passes through several climatal areas, in all of which it preserves much the same size, proportions, and pattern of marking.

The genus **Fidicina**, distinguished by the large and strong neotropical species, such as *F. mannifera*, L., fails to appear within the limits of the United States, but in its stead are found several large and vigorous forms of the true genus *Cicada*, of which the most conspicuous example is the beautiful *C. dorsata*, Say. A multitude of smaller forms, many of which are built after a pattern similar to that of the Thirteen-year *Cicada*, find a home in most parts of the country extending from Southern Canada west to the Pacific coast, and thence to Lower California. This

part of the assemblage bears some resemblance to the prevailing type of European *Stridulantiæ*, and suggests the possibility that some of the forms of *Tibicina*, *Cicadrata*, and *Cicadetta* may hereafter prove to be climatal modifications of species common to both continents.

The species of Europe are much more numerous than those of the United States, but the former continent lacks the massive and strong forms which are common to our country east of the Rocky Mountains.

Our forms with the smaller drums and opercula are more feeble and sluggish than those with the larger sonorous apparatus, and while abundant along and in the Rocky Mountain belt, cross to the eastern side of the continent by way of the elevated plateau region north of the Ohio river.

A new genus *Platypedia* occurs in the Canons of the Rocky Mountains in Colorado, and again in different localities in the high lands of Montana, Nevada, California, and Oregon.

Below, we offer a list of the recognized species of the United States, with some references to the localities in which they have been found.

Family **CICADÆA**, Fieb.

Tettigia, Amyot & Serv.

T. hieroglyphica, Say, (*Cicada*). Jour. Acad. Phila., 1830, vol. VI, p. 235.

Cicada characteria, Germ. Thon. Entom. Archiv., 1830, vol. II, p. 4.

Cicada johannis, Walk. Brit. Mus. List Hom., v. I, p. 149, 87.

Cicada sex-guttata, Walk. " " v. I, p. 154, 93.

Inhabits the coast lands of Eastern North America from Northern New Jersey to Southern Florida, from thence it spreads along the coast of the Gulf of Mexico across Alabama, Mississippi, Louisiana, and Texas into the province of Tamaulipas, Mexico.

Carineta, Amyot & Serv.

C. parvula, Say. Jour. Acad. Phila., 1825, vol. 4, p. 333, 5.

Cicada pallescens, Germ. Thon. Entom. Archiv. 1830, v. II, p. 8, 93.

This neat little insect is of a pale green color when alive, sometimes marked with fuscous, but speedily becomes straw yellow after desiccation and exposure to the air.

It inhabits the plateau-lands of Georgia, Tennessee, Louisiana, Ar-

kansas, Illinois, Kansas and Texas ; but it has not thus far been reported from the coastal plain of any of the States in which it has been found.

Platypedia, new genus.

Elongate, acutely tapering posteriorly, with a sub-carinate ridge on the tergum, extending from near the base to beyond the middle ; wing-covers when at rest almost vertical. Head bluntly triangular, hirsute, the vertex gently sloping, almost as long as the pronotum, with the transverse sulcus deep and direct, not triangularly parted ; the anterior ocellus placed in a longitudinal groove, which latter is continued upon the turmid front ; front quite prominent, strongly convex ; exterior cheeks long and narrow ; supra-antennal plates narrow, thick, bounded each side by a notch. Pronotum short, moderately hirsute, with the dorsal surface feebly convex, not corrugated, but with two oblique grooves each side, the lateral margins almost straight, with the anterior angles feebly reflexed, and the posterior angles narrowly, but abruptly turned up ; epipleural flaps as long as the pronotum, broadly crescentiform, but a little triangularly produced obliquely backwards and downwards. Anterior femora short and stout, swollen in the middle, grooved on the outside near the tip. Wing-covers wide, strongly bowed on the costal margin, the areoles large and mostly wide, basal areole oblong, the radical areole occupying more than one-half the length of the wing-cover, the second ulnar areole short, wide, almost triangular ; the apical areoles narrow, and the third, fourth, and sixth of equal length, with their inner tip triangular, while the inner end of the second, fifth, and seventh is truncated ; wings narrow, not reaching as far as the tip of the discoidal areole of the hemelytra, with the anal-flaps broadly rounded, and separated by a deep emargination from the other member of the wing. Anal segment of both sexes narrow and compressed, acutely tapering, with the ovipositor of the female almost enclosed therein. Sonorous valves of the male rudimentary, inconspicuous.

1. *P. areolata*, Uhler, (*Cicada*). Proc. Acad. Phila., 1861, p. 285.

The roughness and granulation of the surface of pronotum, besides the broader proportions of the thorax, as well as the almost absence of markings will serve to separate this species from the following.

It has been captured in Utah, San Mateo, Cal., Nevada, and Washington Territory.

2. *P. putnami*, Uhler, (*Cicada*). Hayden, Bull. Geol. Surv. Territ., 1877, vol. II, p. 455, 3.

This species is generally of a bright steel-blue color, distinctly marked with brilliant orange.

It has been taken at Ogden, Utah, in Clear Creek Canon, Col., and in several parts of the mountainous region of Nevada.

Callida purpurea, Say.

By OTTOMAR DIETZ.

On an Entomological Expedition last Summer, in which Mr. G. Beyer and others participated, I was fortunate enough to take the above

named beautiful Carib. It was found July 3rd, at Greenwood Lake, N. J., in a little swampy meadow. It was found slowly crawling on flowers (*Berberidæ*) which were scattered in profusion over the ground.

In the face of the intense heat I made a complete examination of the surroundings with the sweeping net and had the satisfaction of obtaining 8 perfect specimens all of which, in spite of the name *purpurea*, were of a very bright green color.

About 4 weeks later Mr. Beyer at the same place took without any difficulty in search, a large number of this same beetle on Blackberry bushes.

The Excursion spoken of above and which lasted 3 days was, I am glad to say, a very successful one, not only in the quantity of material taken, but also in the numbers of specimens, especially *Cerambycidæ*, *Buprestidæ*, *Chrysomelidæ* and *Curculionidæ*.

Among other things I took a specimen of *Cryptorhynchus Lapathi*, Linn., showing that this species is probably already quite widely distributed.

Description of Mature Larva of *Gnophæla* *vermiculata*, G. & R.

By DAVID BRUCE.

Body black, with a row of diamond shaped spots on back, forming a yellow dorsal line; a row of yellow V-shaped marks along the spiracles; two small yellow dots on each segment just above spiracles; twelve small tufts of short white hairs on each segment, each springing from a blue tubercle. Head clear amber brown; underside of body clear yellow the whole length; feet black. Pupa, glossy black, with shield-shaped yellow spots; black spiracle in center of each spot, short spring tufts on each end of pupa. Cocoon, a single loose layer of white lacy web, appearing as if delicately punctured. Imago emerged in 2 weeks. These larvæ were plentiful in the upper part of Platte Canon, Col., in July, feeding on *Mertensia Virginica*. They are gregarious when young, but separate and wander as they approach maturity; when full grown the whole brood appears to make for the nearest large detached rock where they spin their cocoons in the angles and crevices, generally in clusters, and often covering each others cocoons so thickly that many of the moths are not able to make their way through but die crippled. The general appearance of the larva reminds one of some of the *Acronyctæ*.

Euproserpinus Euterpe, A New Species of Sphingidæ.

By HENRY EDWARDS.

Allied to, and very probably confounded in collections with *E. Phaeton*, G. & R., but certainly distinct. Many examples of *Phaeton* have at different times passed through my hands, though strangely enough, they have nearly all been ♀♀. Boisduval described *Macr. Erato* = *Phaeton* from a ♀, and Grote and Robinson's type also belonged to that sex. I have one specimen of the ♂ in which the antennæ are without serrations, and distinctly thickened towards the extremity exactly as in *Hemaris* and *Macroglossa*, thus showing in this respect a close relation to those genera. In the ♀ of this species (*Phaeton*) the antennæ are deeply and rather coarsely biserrate, and at the same time are gradually thickened towards the extremity. Another peculiarity of the species is the remarkably oblique exterior border of the lower wings, which carries a black marginal band of nearly equal width, not however reaching to the anal angle. In my collection is a form, which, though in its system of coloration exactly resembling *Phaeton*, must from other characters be a distinct species, if not representing another genus. It is this which I propose to call *E. Euterpe*. In it the antennæ are of equal size throughout, the tip being furnished with a sharply curved hook. The serrations are very deep and long, and when viewed through a lens, each joint appears to be furnished with a series of bristles, as in some genera of *Ægeridæ*. The thorax and abdomen are densely clothed with long hair, the latter being very robust, and much shorter than in *Phaeton*, extending very little beyond the wings. The wings are broader than in the more familiar species, the primaries being entirely more rounded, and not produced at the apex, while the secondaries instead of being oblique upon the margin, are very distinctly rounded, the apex being the opposite of acute. In color, there is great resemblance between the two forms, though in *Euterpe* the shading of the upper wings is brownish while in *Phaeton* it is black. In *Phaeton* the basal line is geminate and slightly oblique, the outer of the double lines turning slightly toward the base on the costa. In *Euterpe*, it is single, thick, slightly dentate on its outward edge, while behind it is a deep blackish brown shade reaching as far as the cell, and there touching an ovate discal spot. In *Phaeton* the space behind the basal line is grayish mottled with black to a space about 2 mm. from the margin, and the discal mark is linear and not ovate. Before reaching the rather broad black posterior margin there are 3 faint black lines from the internal margin which are obsolete before reaching the costa. The inner edge of the posterior margin is sinuate, and very

slightly irregular in its outline. In *Euterpe*, the space behind the broad blackish basal shade, is very distinctly gray, mottled with fawn color, and with a few scattered white scales. The inner edge of this gray space overreaches upon the broad black border in 3 very deep and distinct teeth, one on the internal angle, one in the middle and one reaching almost to the apex, thus differing in a remarkable manner from the form of the posterior border of *Phaeton*. The fringes are also distinctly longer, and bear more white in *Euterpe* than in the other species. The secondaries are, as I have said, more rounded on their margins, the black marginal band is broader than in *Phaeton*, and is swollen in the middle of its inner edge, while in *Phaeton* this edge is quite straight. The base of the lower wing in both species is black. In *Phaeton*, the disc is pale primrose yellow, this shade being nearly of the same width throughout. In *Euterpe*, the disc is clear white, very broad on the costa, but abruptly narrowing, so that at the anal margin, it is only one fourth of the width on the costa. In *Phaeton*, the thorax is clothed with long gray hairs, while the abdomen, which is black in both sexes, bears on the sides of the 4th and 5th segments bunches of pale yellow hairs, which are also visible beneath. In *Euterpe*, the clothing of thorax and abdomen is blackish gray throughout, and there is no trace whatever of the yellow lateral patches. On the lower side the markings are repeated in both species, but in *Phaeton* they are sharply and clearly defined, while in *Euterpe* they are confused and somewhat indistinct. The difference in shape of the discal mark of the primaries is very decidedly displayed on the lower side, and in *Euterpe* there is a distinct linear discal mark on the secondaries, absent in *Phaeton*. In *Euterpe*, the hairy covering of the legs and lower side of the abdomen is blackish gray throughout, while in *Phaeton* the clothing of the legs is yellowish white mixed with gray, and the abdomen is blue black, with 2 faint white bands, and a sparse covering of gray hairs. In *Phaeton*, the antennæ in both sexes are black throughout, but in *Euterpe* the shaft is clear white, with the serrations blackish brown.

I have no doubt whatever of the distinctness of this lovely species of which I have only seen the ♀ example, from which the present description is taken. I have been careful to give a comparison between the two forms, though there can be no possibility except at the first glance, of confounding them. In shape of wings, robust form of abdomen, and the structure of the antennæ, *Euterpe* approaches very closely to the little known *Arctonotus lucidus*.

The unique example was captured near San Diego, California, by the late H. K. Morrison.

An Introduction to a Classification of the North American Lepidoptera.

By JOHN B. SMITH.

(Continued from p. 81, vol. I.)

Somewhat allied to the *Sesiidae* in appearance and in habits are the *Thyrididae*, few in number both as to genera and species. Like the *Sesiidae* the imagoes are diurnal in habit. The larvæ are little known. The European species lives on *Clematis* in cone shaped cases and gives out an unpleasant *Hemiptera* like odor. It is short, stout, cylindric, with small tubercles and single hairs and has 16 feet.

The imagoes are small and stout with strong long tongue, large projecting and bristly palpi, and spindle formed antennæ, the basal joint considerably enlarged. In the male they are singly pectinated. The ocelli are wanting, eyes naked, distinct, though not prominent. The legs are stout, clothed with long stiff hair, the middle tibia with one pair, posterior with two pairs of spurs. Thorax robust, smoothly clothed. Abdomen smooth, with a long slender anal tuft. The median cell is simple, the primaries twelve veined, all the veins separate, dorsal or internal vein furcate at base. The secondaries have two internal veins, costal vein free from base—altogether 8 veins.

We have two genera—*Thyris* agrees with the family characters. *Platythyris* is unknown to me in nature, but according to Grote and Robinson's description it contradicts nearly every family character, and leaves only the superficial habitus to authorize its reference here. According to them, the antennæ are rather long, slender, filiform and naked. Head sunken, unprominent; palpi as in *Thyris*. Eyes globose, small, vertex narrow. Prothorax square, wide and short, not projected in front



Venation of *Thyris*.

of the wings as in *Thyris*, closely scaled. Abdomen stout, sessile, not exceeding secondaries. Wings white; primaries more than half as wide as long, apices obtusely rounded, external margin entire, slightly sinuate, being outwardly rounded before internal angle; antennal margin straight, equalling the costal margin in length. Secondaries wide and full nearly as large as the primaries, external margin very sinuate. Legs as in *Thyris*. The venation is not described and therefore its reference here may perhaps prove proper—if so, the definition of the family must be enlarged. I shall not be unprepared however to find that it does not belong to this family at all.

The anomolous family *Heterogynidae* has recently been added to our Lists by Mr. Hy. Edwards (Ento. Am., 3, 181, Jan, 1888). In habitus and appearance these insects resemble the *Psychidae* with which they have also the apterous females in common.

In the male the antennæ exceed half the length of the primaries and are pectinated. Palpi and tongue very small, the latter practically wanting. Face very broad. Eyes naked, small, globose. Ocelli wanting. Body slender, with sparse lengthy vestiture, abdomen scarcely exceeding secondaries. The legs are similar in length and vestiture, the median and posterior tarsi shorter and stouter than the anterior—middle tibia with one pair, posterior with two pairs of spurs. The posterior femora are densely clothed with fine woolly vestiture.



Primaries broad, with rounded apices and obliquely rounded outer margin. They have two internal veins, of which the lower is furcate basally—veins 8 and 10 are wanting and, except the costal vein, the others are all separate out of the cell at and near its end.

The secondaries have three internal veins—four veins from the narrow median cell, and two from the base above the subcostal—a most unusual character. The wings are semi-transparent; but sparsely clothed with fine hair like scales.

Venation of *Heterogynis*.

The female is apterous, eyes small, mouth parts rudimentary. The legs are more membranous than chitinous and end in a blunt point. The body is naked and inferiorly much dilated—the maculation is larviform. The larva is said Boisduval to be onisciform and to live openly on *Genista*.

Mr. Edwards refers to this family his genera *Penthetria* and *Thia* (Ento. Am., 3, 181). The latter is unknown to me but the generic description contradicts the family characters in several important particulars.

Penthetria, which I know in all stages through the kindness of Prof. Riley, who has made careful drawings of all structural details, differs in every respect—venation—head structure—the fully developed females and in larval history, and Mr. Edwards has allowed habitual peculiarities to mislead him. The family is an easily recognizable one and I have so fully characterized it that it may be recognized if met with by others.*

(TO BE CONTINUED.)

* The figures of venation are after Moeschler. They are incorrect in that the dorsal vein of primaries in each figure is simple instead of furcate at base. Otherwise they are accurate, and the descriptions mentions these characters correctly.

On North American Tineidæ.

By WM. BEUTENMÜLLER.

Acrolophus mexicanellus, n. sp.

Head and thorax covered with rather long stone drab and fuscous scales; labial palpi short, porrect, densely covered with stone drab and fuscous scales. Antennæ fuscous. Primaries, stone drab, with a number of very fine wavy transverse fuscous lines, which are almost absent on the middle third of the inner margin to nearly the median vein; at the end of the discal cell is an oblique fuscous dash running to the inner angle, which is somewhat suffused outwardly. On the fold at about the middle of the wing is a small fuscous patch. Cilia stone drab mixed with fuscous. Secondaries and cilia fuscous. Underside of primaries and secondaries wholly fuscous, the latter slightly paler.

This species has a superficial resemblance to *Acrolophus hulstellus*, Beut., but may be readily distinguished from it by being a much larger heavier insect, and also by the rounded apices of the wings.

Expanse of wings 30 mm. 1 ♀.

Taken by Mr. Julius Mohn in the City of Mexico.

Pseudanaphora arcanella, Clem.

The ♀ of this species, which has hitherto remained undescribed, differs from the male only in size, and short porrected labial palpi.

Expanse of wings 32 mm. Length of palpi 1.50 mm.

Ortholophus variabilis, Wlsm.

Three examples taken by Hy. Edwards at Havilah, Calif.; heretofore only recorded from Arizona.

Psecadia monticola, Wlsm.

A single specimen I received from Colorado, and one from N. W. British Columbia. Formerly known from California and Oregon only.

Psecadia subcærulea, Wlsm.

A number of specimens of this species from Arizona are in the collection of Hy. Edwards. Originally described from California.

Psecadia obscurella, n. sp.

♂. Head sooty brown with grayish white scales, and a black spot on the vertex; palpi sooty brown with grayish white scales. Thorax grayish white with three black spots on each side; antennæ black. Primaries wholly sooty brown, sparsely covered with grayish white scales along the costal and apical regions, while the dorsal half to the inner angle is very densely covered with scales, limited above by a narrow broken black basal streak, running to a little beyond the middle of the wing. On the basal third below the fold is a small black spot and another scaly grayish white one on the disc. The series of black terminal spots almost obsolete. The extreme edge of the costa, from before the basal third to a little beyond the apical third, pale ochreous. Secondaries and cilia fuscous, glossy, becoming ochreous toward the inner angle and base. The extreme edge of the costa is also ochreous. Underside of primaries fuscous. Secondaries same as above. Body above and below pale yellowish ochreous,

and at the side orange ochreous. Fore pairs of legs sooty brown, with grayish white scales. Hind legs ochreous, tarsi annulated with brown.

♀. Differs from the ♂ in having the markings a little more produced, especially the terminal series of black spots, and the secondaries much paler.

Expanse of wings 22 mm. 1 ♂, and 1 ♀.

Havilah, California, (Hy. Edwards), June, 1869.

Cryptolechia concolorella, n. sp.

Head, palpi, thorax and abdomen, wholly grayish fuscous. Primaries dirty cinereous, densely covered with fuscous, scales so as to nearly obscure the ground color; at the apical third the scales form a much rounded indistinct transverse band. Secondaries same color as the primaries. All the wings beneath are grayish fuscous, as are also the legs.

Expanse of wings 21 mm. 1 ♂.

Hab.—Nevada.

Gracilaria sanguinella, n. sp.

Head bright red with the face canary yellow. Palpi orange red, as is also the thorax above and below. Antennæ fuscous, and at the juncture whitish. Primaries bright orange red, with the costa narrowly margined with canary yellow, from nearly the base to the apex. Cilia fuscous, except at the apex orange red. Secondaries grayish fuscous, as are also the cilia. Underside of primaries fuscous, except the apex orange red. Secondaries same as above.

Expanse of wings 14 mm.

1 ♂, and 1 ♀, taken by Mr. Hy. Edwards in Santa Clara Co., California, June, 1869.

Gracilaria nigristrigella, n. sp.

Head and palpi pale straw yellow. Thorax dirty yellowish. Primaries purplish brown, mottled irregularly with straw yellow patches, and along the inner margin from the base to a little beyond the middle of the wing a rather broad black streak. Cilia, fuscous, except at apex straw yellow. Secondaries and their cilia, grayish fuscous. Underside of primaries fuscous, except the cilia at the apex straw yellow. Secondaries same as above.

Length 14 mm.

One specimen, taken by Mr. Hy. Edwards in Alameda Co., Calif., on the trunk of an Oak tree, June, 1869.

Gracilaria ruptistrigella, n. var.

Differs from the preceding form in having the black streak on the primaries broken, and forming three spots instead, one at the base, one on the basal third, and one a little beyond the middle of the wing. The markings otherwise are the same.

1 example. California, (Hy. Edwards).

Gracilaria shastella, n. sp.

Head, palpi and thorax, pale yellow; antennæ fuscous, annulated with white. Primaries pale sordid yellow with numerous black patches scattered over the wings, some being more conspicuous than others. Cilia fuscous, except the apex yellow. Secondaries, fuscous. Underside of wings, fuscous.

Expanse of wings 11 mm.

2 ♂♂. Hab.—California, (Hy. Edwards).

On the genus *Sympetrum*, Newman.

By DR. H. A. HAGEN.

Mr. E. Newman, 1833, in *Entomological Magazine*, vol. I, p. 511 to 514, in a paper named "Entomological Notes," after treating some other subjects, published a new genus *Sympetrum*, belonging to the genus *Libellula* of Dr. Leach. Of the British species, belonging to this genus, are described: *S. scotica*, Donovan; *S. rufostigma*, Newman (= *L. sanguinea*, Muell.); *S. vulgatum*, L. (= non, Linn.; *striolata*, Chp.); *S. basale*, Newm. (= *L. sanguinea*, Muell.); *S. flaviolata*, Newm. (= *L. flaveola*, L.). The remainder of *Libellula* he divided into three genera, as Mr. Newman states. In a foot note the characters are given as follows:

Sympetrum, abdomen laterally compressed—*Ex. vulgatum*, L.

Orthetrum, abdomen laterally parallel—*Ex. cærulescens*, F., *cancellatum*, L.

Platetrum, abdomen depressed and dilated—*Ex. depressum*, L., *consparcatum*, F.

Leptetrum, abdomen conical and pointed—*Ex. quadrimaculatum*, L., *prænubilum*, Newm.

"They will," the author adds, "in all probability resolve eventually into three distinct genera, and as such I had once prepared them for publication together with *Sympetrum* as below, but a dislike to name-giving induced me to relinquish them." I think by this statement it is evident, that the three last genera, which Mr. Newman has himself later, during 43 years, never used, not even mentioned, have certainly no right of priority. Indeed, *Ento. Mag.*, I, p. 416, he speaks of *Libellula prænubila* and *Lib. quadrimaculata*, and *ibid.*, vol. III, p. 151, prints in a paper of his friend Ed. Doubleday, *Lib. quadrimaculata*, *L. depressa*, *L. prænubila*. The characters given for the genus *Sympetrum* are: Caput metathorace latius (so it is in every species of *Odonata*); propodeon pòdeonque in commissura incrassata (common to every species of *Odonata*, but stronger in the males); segmenta sequentia lateribus compressa (among the species of *Sympetrum* only in the females, mostly cylindrical in the males); protelum ac adjacentia plus minusve incrassata (common to nearly every species of *Odonata*, because these parts contain the internal genitals); telum minutum (common to all *Odonata*); teli appendices notæ cæteris distinctæ vix præbent; alarum stigma utrinque convexum (without value).

Mr. Newman, as far as I am able to ascertain, mentions only twice more the name *Sympetrum*. In *Ento. Mag.*, V, 484, where he con-

cludes: "the species of *Sympetrum* are perfectly distinct; the remainder of the genera and species will, I believe, stand."

In *Zoologist*, 1845, vol. III, p. 1044, he mentions *Sympetrum rufostigma*. *Entomologist*, vol. I, 1841, p. 159 and p. 205, *S. rubicunde* is mentioned by Mr. Doubleday.

I find Mr. Newman's genera only twice quoted by British Scientists. Mr. J. F. Stephens, *Mandibulata*, vol. IV, 1836, gives *not* as genera but as subgenera or subgroups the four names with the short characters of Mr. Newman, and of the new species of the monograph of *Sympetrum* he quotes only one. Mr. J. O. Westwood, in "Synopsis of the Genera of British Insects," 1839, p. 48, after the genus *Libellula* puts in brackets the four names and one species to each of them. As he has counted for *Libellula* 15 specimens it is evident that he did not accept Newman's genera.

It is difficult to understand now why some of Mr. Newman's papers were not acknowledged or at least not mentioned by English Scientists; however it seems to me out of place to speak here about things happily forgotten fifty years ago.

Mr. W. E. Evans *British Libellulinae*, London, 1845, uses *Diplax* from the nomenclature of Charpentier, and mentions nowhere *Sympetrum*. It is impossible that this work was unknown to Mr. Newman. *Zoologist*, 1845, p. 1044, he speaks of the presence "of Mr. Selys in London, engaged in examining the cabinets of the London collectors, for the purpose of correctly ascertaining under what names the various species of *Libellula* have been described by British Entomologists."

Baron De Selys paper, published *Annals and Mag. of Nat. Hist.*, 1846, p. 217, is reprinted by Mr. Newman, *Zoologist*, 1846, p. 1522, but nothing is said in favor of his genera, which are not even mentioned in this paper.

Entomologists nowadays will scarcely be able to understand the difficulties, which impeded the working fifty years ago. There was no connection to speak of between Scientists of Great Britain and the continent. In 1843 I found Stephens' *Brit. Entom.* and Curtis wanting in the libraries of Berlin, Vienna, Paris and of the *Jardin des Plantes*. The only copy in Germany belonged to the Senator von Hayden in Frankfurt a. M., which Erichson was allowed to consult. There did not exist any yearly Record; the first was published 1834 in Wiegman's *Archiv* by Burmeister. The first Presidents Address of the Entomological Society by Mr. Children was published for distribution among the members; the first Address of the Secretary, Mr. Westwood, contains nothing on *Sympetrum*. The existence of the *Entomological Magazine* was nearly unknown on the continent. Percheron, *Bibliography*, p. 225, quotes it "*per Walker* the

first 8 numbers," and in the catalogue of the library of Victor Andouin, p. 55, we find the same statement. In the catalogues of the libraries of old prominent Scientists, Charpentier, Dejean, Guérin, Ménévillé, Klug, Lacordaire, Sturm, the Entomological Magazine is wanting. Burmeister, Handbuch, vol. II, p. 14, quotes the first volume and one number as seen by him, and this is the only copy mentioned for Germany. The first copy I saw myself, 1839, belonged to Mr. G. Marxlin in Upsala. As it was my custom, I copied for my own use all belonging to *Odonata*, but by a curious chance out of the copy still before me the part on *Sympetrum* must have been lost during my travels, and is therefore not quoted in my dissertation, 1840, and in my Review on the recent literature of Neuroptera, Stett. Ento. Zeit., 1849, p. 68, only as not seen by me.

When in 1857 I went to London by invitation of Mr. J. E. Gray to study the British Neuroptera in the collections, I applied to Mr. E. Newman for the permission to see his own collection and that of the Entomological Club. I will never forget the kindness with which I was received by him. He spent the larger part of a whole day in showing me the collections, and as in the meantime I had made myself thoroughly acquainted with his writings, we had a detailed conversation about them, and of course also on the nomenclature of the *Libellula*. Zoologist, 1857, p. 5879, he speaks about my visit and says: "the Neuroptera have been recently examined and the nomenclature rectified by Dr. Hagen."

He did not take any exception to the nomenclature used by De Selys and myself in the Revue, of which, contrary to his former intentions, he has never made a report. So I had the conviction he had relinquished *Sympetrum* as well as the other genera. I considered the names free and used three of them with a different character, converting them in a feminine combination, to avoid the tedious change of the species name to a neutrum.

After all, it was not the fate of English papers only to be overlooked in those times. Mr. E. Newman himself, when he published, 1852, his paper on the classification of Neuroptera, entirely overlooked the papers of Klug, Erichson, and Stein published twelve years before.

The names of Mr. E. Newman have not been used by any one of the many writers on *Libellula* during the long time since their publication, and Mr. E. Newman has never taken any exception to vindicate his rights, though all important works were well known to him. He has never objected to the use of his names modified and accompanied by a different character by myself in the Synopsis of the Neuroptera of North America, in 1860.

Mr. M'Lachlan introduced these names again in his List of British

Neuroptera, and Baron De Selys now in his *Odonates de l'Asie mineure*, 1887, has replaced *Diplax* by *Sympetrum*; "quelques facheux que soient actuellement les changements de nomenclature—per une application exagérée du droit de priorité, il me semble juste d'adopter le nom de *Sympetrum* au lieu de *Diplax*."

I have shown before that three of the genera were relinquished by the author directly, and that the names were never used by himself or anybody else, and that they could not be considered therefore to have the right of priority to supersede other names 37 years later. Concerning *Sympetrum* the analysis of its characters given shows that the character is entirely insufficient, and that Mr. Newman has never taken an exception against the non-acceptance of this genus by his own countrymen, Stephens, Westwood, Evans, and de Fonscolombe (1837) Baron De Selys, Hagen, and every writer upon *Odonata* since 1833. Further, that Hagen after conversing with Mr. Newman about this genus had the decided conviction, that it has been relinquished by the author also. It was at least in former years always considered that monographs in preparation, because the plates needed so much time, had a right to supersede names published during the time. The first plate of Charpentier is dated 1828, and in 1837 Westwood saw in Bonn the big volume of plates, and therefore the name *Diplax* was everywhere accepted. Probably Mr. Newman was of the same opinion as he did not object to Baron De Selys' papers in 1846 and 1850.

I think therefore the names of the genera given by Mr. Newman should not be accepted.

A More Wicked Worm!

EDITOR ENTOM. AMER.

Dear Sir:—Reading No. 10 of Vol. III, Ento. Am., I was much amused by the article "A wicked Worm." I can assure you no one in Germany knows of this terrible insect, nor have I read anything about it in any of the German newspapers. It seems to me this worm must have developed quite independently in the brain of some North American Journalist. Of course there can be no doubt of the truth of the story.

Mr. Smith is, in my opinion, right in his idea, that this worm and those that destroyed the Russian cannons during the Crimean War, are nearly allied. A third worm, belonging to the same family and perhaps genus, is the famous "Ice Worm" which fed on the ice in the cellar of a great brewery at Dresden once upon a time. Of course the March beer went to ruin, as did also the brewery and all the stockholders! Neither ice, beer, nor money was to be found!

Yours truly,

H. B. MÖSCHLER.

Phlæophagus spadix, *Herbst*.

By WILLIAM JÜLICH.

Collecting on Rockaway Beach, L. I., June 18th, last year, among the driftwood, I turned over board, half imbedded in the sand and thoroughly soaked with salt water. The board laid within the line of the high tide and must have been under water several hours every day for some time. Crawling on it were a few small, dark brownish Curculios which reminded me very much at the time of *Elassoptes marinus*, Horn, which I found under similar circumstances at the Pacific coast. Upon closer examination of the board—pine, about 2 inches thick, rotten and wormeaten—I succeeded in cutting out about 30 beetles, and a number of larvæ and pupæ; the larvæ as lively as crickets, 3 to 4 mm. long, of a yellowish white color, head considerably darker, and mandibles brown. On each side of the first three segments they had, on small wart-like projections, a very small leg. The beetle proved to be *Phlæophagus spadix*, Herbst, a European species, not before found in this country to my knowledge. This capture I consider especially interesting as it shows how some of these importations are landed.

A board infested and wormeaten is thrown over board as useless and washed ashore, where the involuntary passengers take to the wing to seek conditions to suit them, or accomodate themselves the best way they can, or perish, if not capable of doing so. The astonishing tenacity of life, peculiar to Curculios, enables them to outlive unfavorable conditions which would kill a great many other insects, especially in the larval state, and accounts for the great number of Rhynchophoridae “naturalized” to our fauna.

In order to indentify this species, if it comes under the observation of our collectors, I give the synopsis of Dr. Horn of the three species now known to belong to our fauna.

Elytra oval, humeri broadly rounded.

Thorax very densely and coarsely punctured, elytral striæ broad, coarsely and deeply punctured, 4 mm. **spadix.**

Elytra oblong, sides straight, humeri distinct.

Thorax densely punctured, elytral striæ deep, coarsely, serrately punctured, 3 mm. **apionides.**

Thorax sparsely punctured, elytral striæ broad, not deep, punctures coarse, not serrate, 2 mm. **minor.**

The two species described by Dr. Geo. H. Horn appear to be uncommon, and all the specimens I have found I cut out of dead Ash.

Early Stages of *Erebus odora*, L.

By H. T. FERNALD, B. S.

The egg and larvæ of *Erebus odora* have never been described in any scientific paper that has come under my observation, and it was with great pleasure that I recently received from her Excellency, Mrs. H. A. Blake, formerly of Nassau, N. P., a record of observations on these stages of this beautiful moth, which she has kindly given me permission to publish.

Toward the end of June, 1877, an adult moth of this species was captured and placed under a bell glass, when on June 27th, it deposited forty or fifty eggs. These were not attached to either the sides or bottom of the glass and seemed to possess no glutinous matter. They were spherical in form, flattened slightly at the poles, and under the microscope showed a series of ridges passing from pole to pole.

The eggs hatched during the forenoon of July 2nd, producing larvæ about a quarter of an inch in length and about the size of a bristle. They became very active when disturbed and if one fell it spun a thread to the end of which it remained attached. Each had but six pairs of feet. In color they were dirty white with six longitudinal reddish stripes, broken at intervals. Long hairs stood up here and there along the body.

Various food plants were tried, viz: Lettuce (*Lactuca sp. ?*), Sea Grape (*Cocoloba uvifera*), Poison Wood (*Rhus sp. ?*), Palmetto (*Sabal sp. ?*), Wild Almond (*Amygdalus sp. ?*); Silk Cotton (*Bombax ceiba*), Tamerind (*Tamerindus indica*), and Sapodilla (*Sapota Achras, M.*), but all were untouched. One or two, however, appeared to eat Whistling Bean leaves.

On July 5th, but one larva remained but it had apparently grown somewhat. Unfortunately, during its examination it was lost, a puff of wind carrying off the leaf on which it was resting.

In my note in vol. III, No. 4, of this magazine I alluded to a statement by the natives that the larva of *Erebus* feeds on the Wild Fig. Recently, the larva referred to has been proved to be that of a *Sphinx*, thus showing how little reliance can be placed on the observations of untrained persons.

Dr. HORN visits Europe again this season. The Doctor needs this recreation and we know he will bring back with him fresh energy that will enable him to continue his valuable work. His address will be: Care of Dr. D. Sharp, Shirley Warren, Southampton, England. The Doctor will leave May 9th, and will be gone all Summer.

North American PYRALIDÆ.

By PROF. C. H. FERNALD,

Amherst, Mass.

Botis plumbosignalis, n. sp.

Expanse of wing, 21 mm. Head and palpi yellowish white above, pure white beneath. Labial palpi fawn colored on the outside. Thorax and fore wings sulphur yellow, the former with a rust-colored stripe on the sides from the eyes to the wings and extending a short distance on the costa. The orbicular spot on the middle of the cell is small and round, of a dark rust red color and overlaid with lead colored scales. The reniform spot on the end of the cell is similarly colored and extends across more than the width of the cell. A stripe of the same width and color as the reniform but forming an obtuse angle with it, extends across to the hinder margin of the wing, and another extends from where this joins the reniform obliquely up to near the apex, the whole forming a Y-shaped mark. These stripes are somewhat diffuse on the outside, and the outer transverse line is distinct only between the upper parts of the Y. The inner transverse line extends obliquely out and down from the costa to the median vein, where it forms an angle, and then extends to the hinder margin, forming another angle on vein one. Another similar line runs parallel but outside of it, from the median vein to the hinder margin, forming a lunule between the veins and these two lines together give the appearance of the figure 8 beneath the orbicular spot. The fore wings are rather narrow and slightly falcate. The hind wings are white, slightly tinged with sulphur yellow on the outer margin, and there is a minute brown spot on the anal angle with traces of one or two more on the surface of the wing, an indication of a transverse line. The underside of the wings is whitish with the markings of the upperside reproduced in brown.

Described from three examples from Colorado.

Lipocosma fuliginosalis, n. sp.

Expanse of wings, from 13 to 15 mm. Head, thorax and fore wings, snow white; the latter overlaid, except on the base, at the apex and narrowly along the costa, with dark brown or soot color. The outer crossline which is darker than the wing starts from the outer fourth of the costa, makes an outward angle at first, then curves outwardly beyond the end of the cell, then makes another outward curve and ends at the outer fourth of the hinder margin. There is a faint trace of another line crossing the middle of the wing. The outer margin has a row of black dots. The fringe is sordid and cut with whitish. The hind wings are whitish on the costal half, and discolored more or less on the rest of the surface with soot-color which forms a line across this part of the wing beyond the middle. On the inside of this line above the anal angle there is a white spot and a tuft of black scales on the inner side of the spot. The basal joint of the abdomen is white and the rest sooty-brown. The markings of the upperside are repeated and there is a plain discal spot on each of the wings.

Described from four examples, from Maine, Ontario and Illinois.

Hydrocampa proprialis, n. sp.

Expanse of wings, 10 to 19 mm. Head, thorax and fore wings, dark brown. The reniform spot at the end of the cell of the fore wing is white, and there is a more or less prominent white spot on the costa above it. The inner transverse line is

arcuate and white. The outer line starts from a small white spot on the costa a little beyond the spot above the reniform, and extends inward so as to interfere more or less with the reniform spot causing it to be toothed on the outer side in some examples, then it extends inwardly on vein two, somewhat within the reniform when it turns and extends to the outer third of the hinder border. A white line toothed on the inside, crosses the wing close to the outer border. There is generally a shade of dull ochre yellow, in the subterminal space, on the outside of the basal line, and a spot on the inside of the discal spot. The hind wings are a shade lighter than the fore wings, and there is an indication of the two outer white lines, between which near the middle of the outer margin there is generally a dull yellow spot. The abdomen is concolorous with the hind wings and ringed with lighter brown on the posterior edge of each segment. The underside of the body and wings is much lighter than above, and there is a terminal row of whitish lunate or wedge-shaped spots between the veins. The hind wings also have an angulated white line outside of a discal spot, which is sometimes extended into a shade, and within which there is another white line. Some examples scarcely show these white markings.

Described from fourteen examples from Florida and Texas.

Book Notice.

“**Diagnoses of N. A. Phycitidæ and Galleridæ**, by E. L. Ragonot. Published by the author.” Paris, Dec. 1887.

The above is a pamphlet of 20 pages, in which the author gives very brief descriptions of 26 genera and 96 species of American Lepidoptera. Of the species 94 belong to the *Phycitidæ* and 2 to the *Galleridæ*; 79 belong to the U. S. or Canada, 2 to Mexico, 2 to the West Indies, and 23 are without indication of locality.

Besides those under the genera newly described, various of the species fall under previously described genera, so that the 96 species represent 53 genera.

The pamphlet is issued, according to the statement of the author, only to obtain priority. Whether a private publication, privately distributed, with what pretends to be a diagnosis only, not a description of species, will be accepted as giving priority in any case of disagreement, is doubtful. But, that there may be just as little cause as possible for any such doubt we call the attention of the public to Mr. Ragonot's work. We are glad to say that the diagnoses, though very brief, are generally explicit, and with the fact that there is generic difference between the most of the species, there need be no great difficulty in determining most of the species described.

Mr. Ragonot promises an early completion of his “Monograph of the *Phycitidæ* and *Galleridæ* of the World,” in which he proposes to give in colors many of the new and rarer species. We most earnestly hope his promise will be shortly fulfilled; for, from what work Mr. Ragonot

has done, we can be assured his Monograph will be above the average of such works in value. It will not be simple a collection of pictures, as so many are. Just here, we express a hope. It is, that Mr. Ragonot, as well as all other Europeans describing American Insects, will have the generosity and courtesy to place a set of types in some Museum in this country. We have the profoundest regard for Zeller, Lederer, and Guenée, but so far as our country is concerned, we are strongly of the opinion that they have greatly hindered the study and development of American Entomology. In case of all these, not to mention Walker, a large percentage of their species is, after from 25 to 40 years, entirely undetermined. Americans, who were not driven to other fields, have had to go on with their own work, simply ignoring the species described by all these.

We are glad to learn that Lord Walsingham has set a worthy example in this respect, as most if not all of his species are represented by types in America.

We hope this example will be followed by all European Entomologists hereafter.

Surely, if our brethren across the water feel the need of retaining their collections for their own study, there is no possible reason why all types of American species should not be left by will, to some American Institution instead of being buried in some European Museum, and thus made utterly useless.

In all cases where species are not so placed that those interested in them can obtain comparatively easy access to them, there is only one thing for Americans to do, viz : to entirely ignore them. To Mr. Grote Americans owe a vast debt of gratitude for following this course. Many of his species will likely fall before the as yet unknown ones of Zeller, Lederer, Guenée, and Walker, but those who realize what he did for American Entomology will never cease to give him the gratitude he has merited for daring to do and starting America forward in doing her own work.

It might be an excellent object lesson, for some enterprising American to purchase all types of European Lepidoptera yet possible, and deposit them in the Cambridge, Philadelphia or Washington Museums, that it may be seen by others how pleasant it is to deal with material from 3000 to 5000 miles away!

At all events we hope hereafter every American will furnish material to the workers across the sea, only on condition that a complete set of types be deposited with some Museum or specialist in America. This may be selfish, and may be called unscientific, but it is the right of the majority which we believe in, and is, we believe, for the best interests of Science.

GEO. D. HULST.

Society News.

Ento. Soc. Washington, March 1, 1888. Thirteen members present. Prof. Riley presented a paper entitled "A Contribution to the Literature of Fatal Spider Bites" giving details of a case in which death resulted from the bite of a spider, presumably *Latrodectes mactans*. Also details of another case in which the patient recovered from a bite of the same spider. Prof. Riley reviewed the literature of the subject at some length, and concludes that personal idiosyncrasy is a large factor in these cases and that the poisonous secretion of spiders affected different individuals in a very different manner, and hence the discrepancy in results. Mr. Lugger related an experience of his own with *Phydippus tripunctatus*, L., which bit one of his children. The result was convulsions, high fever, headache, swollen eyes and great pain in the pit of the bitten arm. In about three days all inflammation and untoward symptoms had disappeared. Dr. Marx states that the secretion in which *Latrodectes mactans* envelops its victims when taken internally had the effect of increasing the pulse from 72 to 120. He commented on the case but rather skeptically: he cannot see how *Latrodectes* with its minute, soft mandibles can possibly pierce the skin or contain poison enough to produce the violent affects recorded. The subject was discussed at considerable length by Messrs. Lugger, Dodge, Marx, Fox, Schwarz, Johnson and Smith.

Mr. Dodge exhibited some of Glover's early plates and commented on his work in this direction. This induced a discussion on the relative value of the various processes for illustrating Insects, in which Messrs. Marx, Schwarz and Smith took part.

Mr. Howard called attention to an undetermined external parasite on a spider, found by Dr. Fox in February.

A paper was read by Prof. P. R. Uhler, "Observations upon the *Heteroptera* collected in Southern Florida by Mr. E. A. Schwarz," in which he discusses the derivation of this fauna and describes a new species of *Achanthochila*, a genus heretofore unknown in our fauna. Mr. Smith made some remarks on the Lepidopterous family *Heterogynidae*, historical and critical. He does not believe the family occurs in our fauna, and that *Thia*, Edwards, cannot be referred here.

April 6, 1888.—Twelve members present. Dr. Horn made some remarks on *Pleocoma*, exhibited a preparation of the abdomen, showing the position of the stigmata, and that Leconte is right and Gerstaecker is wrong in the position assigned in the Lamellicorn series.* Dr. Horn also exhibited the larva of *Platyphylloides castoris*, mounted in balsam, and states that it fully proves that the Insect is Coleopterous. Prof. Riley states that he has had the larva for more than a year but has been prevented from working it up. However, he fully agrees with Dr. Horn concerning the Coleopterous nature of the larva. Mr. Schwarz read a paper on the semi-tropical Insect fauna of Southern Florida. This region mostly coral formation, and comparatively recent seems to have received its vegetation and its Insect fauna from the West Indies. He carefully marks the observed limits of the fauna and credits the Gulf stream with bringing a very large proportion of it. This paper was discussed at some length by Dr. Horn and Prof. Riley who agreed in the main with Mr. Schwarz. Dr. Horn doubts the propriety of receiving this fauna into our lists in its entirety. He also illustrated the distribution of Insects along the Pacific coast, and the natural boundaries between Mexico and the U. S. which rather sharply separates the Coleopterous fauna. Prof. Riley thinks the wind should be credited as an agent in distribution, and mentions the receipt of *Hornia minutipennis* from Thesus Co., California, as a remarkable fact in distribution.

J. B. SMITH, *Rec. Sec'y.*

* See Ento. Am., vol. III, p. 233.

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NO. 3.

A Revised Generic Table of the EURYTOMINÆ, with Descriptions of New Species.

By WILLIAM H. ASHMEAD.

(PART I.)

Prof. Westwood's group *Eurytomides*, in the family *Chalcididæ*, has always been an attractive one to students in the order Hymenoptera, on account of the dissimilarity in the habits of some of the species representing the group; for, while the major portion of them are true parasites, it is now a thoroughly established fact that a small portion of them are unquestionably *Phytophagous*, or pseudo gall-makers; and, if we exclude the *Blastophagæ*, or Fig-caprifigers from the family *Chalcididæ*, they are then the only ones in the whole family out of thousands of species that have this habit.

Up to the present day, the species composing the group, have been placed in but seven genera, viz:—*Eurytoma*, Illiger, 1807; *Decatoma*, Spinola, 1811; *Isosoma*, Walker, 1832; *Systole*, Walker, 1832; *Phylachyra*, Haliday, 1871; *Aiolomorphus*, Walker, 1871; and *Bephrata*, Cameron, 1884.

But recently, in working up my material in the group, the accumulation of several years, I have found it necessary to erect many additional genera and below I give a carefully prepared analytic table of all the known genera, with the essential characters of the new ones recognized, which will be followed by another paper with descriptions of the new species.

The table is as follows:

ANALYTICAL TABLE OF THE GENERA.

Females.

- Wingless 5
 Winged.
 Marginal vein linear 2
 Marginal vein thick, quadrate.
 Wings with a dusky submarginal blotch G. (1) *Decatoma*, Spinola.
 Wings without a dusky submarginal blotch G. (2) *Eudecatoma*, n. g.
 2. Metathorax much lengthened 4
 Metathorax not lengthened.
 Mesothorax umbilicate punctate 3
 Mesothorax not umbilicate punctate.
 *Marginal vein not longer than the stigmal, abdomen sub-globose
 G. (3) *Systole*, Walker.
 **Marginal vein one and a half times as long as stigmal, abdomen conic-ovate.
 G. (5) *Xanthosoma*, n. g.
 ***Marginal vein three times as long as the stigmal; abdomen sub-compressed
 G. (6) *Rileyia*, Ashmead.
 3. Postmarginal vein distinctly longer than stigmal.
 *Marginal vein always distinctly longer than the stigmal.
 Scape equal in length to the first funicle joint. G. (7) *Bephrata*, Cameron.
 Scape much longer than the first funicle joint.
 a Posterior tibiae with two spurs.
 Parapsidal furrows obliterated posteriorly G. (8) *Decatomidea*, n. g.
 Parapsidal furrows complete, distinct.
 b Pedicel much shorter than first funicle joint. G. (9) *Eurytoma*, Illiger.
 bb Pedicel longer or at least as long as the first funicle joint.
 G. (10) *Eurytomocharis*, n. g.
 G. (11) *Phylloxeroxenus*, n. g.
 aa Posterior tibiae with one spur
 **Marginal vein not longer than the stigmal.
 Abdomen ovate, pointed, compressed G. (12) *Bruchophagus*, n. g.
 Abdomen sub-globose, fourth segment longest, enclosing the following
 G. (4) *Systolodes*, n. g.
 Postmarginal vein twice as long as the stigmal.
 Abdomen much lengthened, conic-ovate, cylindric, fourth segment as long as all
 the others together G. (13) *Evoxysoma*, n. g.
 4. Marginal vein longer than the stigmal.
 Mesothorax more or less umbilicate punctate.
 Postmarginal vein about same length as stigmal, or slightly longer.
 Pedicel not longer than the first funicle joint.
 Metathorax sloping, rounded behind G. (14) *Isosoma*, Walker.
 Metathorax quadrate, abruptly truncate behind
 G. (15) *Isosomorpha*, n. g.
 Pedicel longer than the first funicle joint; mesothorax smooth, polished
 G. (16) *Isosomocharis*, n. g.
 Marginal vein not as long as the stigmal.
 Postmarginal much lengthened G. (17) *Isosomodes*, n. g.
 5. Mesothorax smooth, polished G. (18) *Philachyra*, Haliday.

Males.

- Marginal vein linear 2
 Marginal vein thick, quadrate.

- Antennæ simple, not verticillate pilose.
 Wings with a smoky submarginal blotch.....G. (1) *Decatoma*, Spinola.
 Wings without a smoky submarginal blotch... ..G. (2) *Eudecatoma*, n. g.
2. Metathorax much lengthened4
 Metathorax not lengthened.
 Mesothorax umbilicate punctate3
 Mesothorax not umbilicate punctate.
 *Marginal vein not longer than the stigmal; abdomen sub-globose; funicle joints with long hairs, but not pedunculated.....G. (3) *Systole*, Walker.
 **Marginal vein one and a half times as long as the stigmal.....
 G. (5) *Xanthosoma*, n. g.
 ***Marginal vein three times as long as the stigmal; abdomen long-oval, petiole short; funicle joints simple, without long hairs ... G. (6) *Rileya*, Ashmead.
3. Postmarginal vein distinctly longer than the stigmal.
 Marginal vein longer than the stigmal.
 Scape equal in length to the first funicle joint.... G. (7) *Bephrata*, Cameron.
 Scape much longer than the first funicle joint.
 Funicle joints simple, not pedunculate verticillate-pilose.
 Parapsidal furrows obliterated posteriorly; abdomen ovate, petiole short, thickG. (8) *Decatomidea*, n. g.
 Funicle joints pedunculate and verticillate-pilose.
 Posterior tibiae with two spurs; parapsidal grooves, complete, distinct.
 Abdomen trigonate, sub-compressed.G. (9) *Eurytoma*, Illiger.
 Abdomen ovate, sub-compressed.G. (10) *Eurytomæcharis*, n. g.
 Posterior tibiae with one spur.....G. (11) *Phylloxeroxenus*, n. g.
- Postmarginal vein twice as long as the stigmal.....G. (13) *Evoxysoma*, n. g.
 Marginal vein not longer than the stigmal.
 Postmarginal vein hardly as long as the stigmal; abdomen ovate, petiole shorter than posterior coxæ; funicle joints oval, with long hairs
 G. (12) *Bruchophagus*, n. g.
 Postmarginal vein longer than the stigmal; abdomen subglobose, petiole longer than posterior coxæ, funicle joints of antennæ oval, pilose
 G. (4) *Systolodes*, n. g.
4. Petiole of abdomen very short6
 Petiole of abdomen long.
 Marginal vein not as long as the stigmal.....5
 Marginal vein longer than the stigmal.
 Mesothorax, unless otherwise-stated, more or less umbilicate punctate.
 Postmarginal vein distinctly longer than the stigmal; funicle joints pedunculate and verticillate-pilose.
 Pedicel not longer than the first funicle joint.
 Metathorax sloping, rounded behindG. (14) *Isosoma*, Walker.
 Metathorax quadrate, abruptly truncate behind.....
 G. (15) *Isosomorpha*, n. g.
 Pedicel longer than the first funicle joint; mesothorax smooth, polished.....
 G. (16) *Isosomocharis*, n. g.
- Postmarginal vein longer than the stigmal; antennæ slender, filiform, pubescent; abdomen clavate, slightly compressed, a little longer than the thorax exclusive of the petiole.....G. (19) *Aiolomorphus*, Walker.
5. Funicle joints not pedunculated, long, cylindric, about five times as long as wide, pilose; mesothorax umbilicate punctate.....G. (17) *Isosomodes*, n. g.
6. Postmarginal vein shorter than the stigmal, one-third the length of the marginal; antennæ verticillate-pilose; head and prothorax shining and somewhat smooth...
 G. (18) *Philachyra*, Haliday.

Notes on the CRAMBIDÆ.

By PROF. C. H. FERNALD.
Amherst, Mass.

I have recently been making a critical study of the described species of North American *Crambidæ* preparatory to describing the unnamed species in my collection, and take this occasion to put some of the results on record.

In 1813, Germar began the publication of his "Magazin der Entomologie" which closed at the end of the fourth volume. In the second volume, published in 1817, Dr. Zincken began his Monograph of the genus *Chilo*, which included not only the species now placed under that genus, but also those under *Crambus*, *Prionopteryx*, *Ancylolomia* and *Schænobius*.

Germar's genus *Chilo* has been broken up by later writers, but the first species under it—*phragmitellus*—has been retained and regarded as the type of *Chilo*.

In the third volume, page 114 (1818), Zincken described a species under the name of *Chilo Leachellus*, but stated that the habitat was unknown. Zeller, who saw this type, found it to be identical with specimens in his collection from North America, and sent a specimen under this name to the Cambridge Museum with which I compared mine several years ago, and which I now find to agree perfectly with the original description. Zeller believed the species to be the same as *Crambus involutellus*, Clem., but in this he was mistaken, for I have studied the type of Clemens' species very critically and found it quite distinct from that of Zincken.

In the fourth volume of Germar's Magazine, published in 1821, Zincken published a Supplement to his Monograph of the genus *Chilo* in which he described seven North American species, viz:—*sordidellus*, *satrapellus*, *præfectellus*, *decorellus*, *Plejadellus*, *tetterellus* and *incertellus*, all of which I have been able to determine in my collection.

A carefully study of the literature and types gives the following synonymy of some of the species:

• *Chilo decorellus*, Zincken, Germ. Mag., IV, p. 250 (1821).

Crambus polyactinellus, Kollar in lit. (Zeller, Chil. et Cramb.), p. 25, (1863).

Crambus goodellianus, Grote, Can. Ent., XII, p. 17 (1880).

Crambus bonusculalis, Hulst, Tr. Am. Ent. Soc., XII, p. 167 (1886).

This species belongs to the genus *Crambus* as restricted by recent authors, and should be known by the name of ***Crambus decorellus***,

Zinck. By some slip, Prof. Grote, in his New Check-List, has put his *Crambus goodellianus* as a synonym of *C. Plejadellus*, to which it has no resemblance.

Chilo Plejadellus, Zincken, Germ. Mag. IV, p. 251 (1821).

Crambus Plejadellus, Zeller, Chil. et Cramb., p. 26 (1863).

Diphryx prolatella, Grote, Bull. U. S. Geo. Sur. VI, p. 273 (1881).

Chilo oryzæellus, Riley, Rept. Dept. Ag. for 1881-2, p. 135 (1882?).

This species belongs to the genus *Chilo* and should be known by the name of **Chilo plejadellus**, Zinck.

The genus *Diphryx* was established for an imperfect female of this species, but since more perfect examples do not differ structurally from the type of *Chilo*, the generic name *Diphryx* cannot be used. Prof. Riley was led into the error of redescribing this species, partly by my inability at the time to say positively that it was Grote's species, and partly because Grote expressed the opinion that it was not his species. Prof. Riley states concerning this insect: "It is in fact, as we have always felt, congeneric with the larger sugar-cane and corn-borers treated of in the last annual report of the Entomologist under the generic name *Diatræa*." In this, Prof. Riley is mistaken, since *D. saccharalis*, Fab., has no ocelli, and the venation of the wings is quite different from *C. oryzæellus*, Riley, which has ocelli. These differences have long been considered of generic value by every worker on the Microlepidoptera.

Zeller in his Monograph has made many errors on the synonymy of our *Crambidae*, and Grote was apparently led by him into some of the same errors. The difficulty was in not being able to determine the species of Clemens. *C. involutellus* and *pulchellus* are not synonyms of *leachellus*, but of *præfectellus*.

Miss EMILY L. MORTON, in collecting larvæ of Lepidoptera last year, put a mixed lot in a breeding box. Among others emerging afterwards in the imago form, was *Aletia argillacea*, Hb., the cotton worm. As beyond a peradventure none of the larvæ were taken from the cotton plant, it may be considered proved beyond question that the larvæ feed, in the North at least, upon one food plant other than cotton.

* * *

A novel exhibition has during the last month been given to the people of New York and vicinity. Mr. Neumoegen, of the Brooklyn Society, has, as is well known, an unrivalled collection of Native and Exotic Lepidoptera. This has been on exhibition at the Eden Musee and has excited a very great deal of interest in the city.

Biography of *Acontia delecta*, Walker.

By ARCHIBALD C. WEEKS.

The larvæ (four in number) were taken when nearly full grown, during the first week of September, 1884, feeding upon the *Hibiscus moscheutos*, L., (Rose Mallow), on the meadows bordering the interior of the Long Island beach.

Upon reaching home they were placed on mallow leaves, the stems of which were inserted in a glass ink-well filled with very moist earth. They fed voraciously and on the second day after capture spun in the earth at the base of the stems oval cocoons, two-fifths of an inch in length and firmly coated with clay.

These were exposed to the normal temperature and kept thoroughly moist, until July 5th, of the following year, when two of the imagines, ♂ and ♀, appeared, reproducing the brilliant coloration of the larva—the black, irregular, metallic L upon the white ground of the primaries, with angle at the inner margin, contrasting strongly with the pale saffron, margined with a darker shade, of the secondaries—the maculatron above being roughly and faintly pictured beneath.

The following is a description of the larva :

Length $1\frac{1}{4}$ inches.

Head and first segment smaller than remainder of body. Head rounded, somewhat flattened on the sides, broader at bottom than at top, strongly cleft at summit, ground color dirty white, mouth parts black; ground color enclosing a triangular black space in front; bottom, middle and summit of eyes with black spots, sometimes confluent; eyes with exceedingly minute sparse hairs.

Body cylindrical, considerably enlarged anteriorly on the 3rd and 4th segments. Ground color dark, purple. On all segments a subdorsal line of black spots, strongly edged with orange, especially on the middle segments. On the 3rd and 4th segments, directly below the 1st subdorsal line, appears a 2nd double line of black spots in pairs, each pair joined and included by an oval orange patch. On each of the other segments are two other spots directly behind the first subdorsal. These are edged with orange, especially in front, and more conspicuously on the middle segments. The black spots, especially at the middle segments, have a slightly tuberculous tendency, and from each of them a single short minute black hair projects, barely visible to the naked eye. There is also a row of sublateral patches, white anteriorly, orange posteriorly, broadest behind and narrowing towards the front, each patch containing from 3 to 7 irregularly located and varying velvety black dots. The 1st and 2nd pair of anal legs, are wanting. The larva is consequently geometriform, and has the geometriform mode of progression. The fore legs are black with whitish orange towards the base. Anal legs orange on the outside, their color being confluent with the lateral patch—except in last pair. Anal legs somewhat projecting behind. A cluster of 5 or 6 minute hairs projects horizontally and directly above and between the anal claws. The rows of subventral black dots nearly correspond as to position with the subdorsal but want color; from each dot hairs similar to subdorsal project.

The larva seems to have no fear of parasites, exposing itself freely in the centre of the upper side of a leaf in hot sunshine and in full view. It is not readily seen however, and its immunity is partially due perhaps to its resemblance to the twisted irregularly bent and withered petals of the mallow fallen after separation from the calyx, such resemblance being increased by the contorted posture assumed by the larva and the facility with which it rolls off the leaf when the plant is jarred.

The species would seem to be single brooded—the imago appearing in the latter part of June or early part of July, and shortly thereafter the fertile female ovipositing upon the mallow, the larvæ attaining full size and pupating during the latter part of August or first of September.

It appears to be of rather infrequent occurrence, inasmuch as many of our large local collections are without a specimen. Its rarity, aside from its single brood, is undoubtedly caused by the precarious situation of, so far is known, its solitary food plant, which exposes the insect in all stages of its existence to the destructive submergence and action of the tides.

Prof. FERNALD is appointed Entomologist to the Agr. Experiment Station of Mass. He will hold this office in addition to his Professorship at Amherst, and will have assistants to aid in the work of the Experiment Station. Massachusetts is to be congratulated in having so worthy a person in this position.

* * *

Mr. O. LUGGER of Baltimore, now one of Prof. Riley's assistants, has been called to the University of Minn. to take charge of the State Museum of Natural History. A better selection could not have been made, as Mr. Lugger has a wide knowledge in the general field of Natural History and in Coleoptera is a specialist.

* * *

Dr. PACKARD expects to publish in June a work entitled "Entomology for beginners." It will be illustrated, a work of from 300 to 400 pages, 12^{mo} size. It will contain full directions for collecting and preserving insects, for dissecting them and making microscopical preparations. Also lists of works on the general subject and special lists for each order.

It promises to be a work of very great usefulness as it must be of necessity of very great merit.

* * *

Mr. C. R. GILLETTE of Lansing, Mich., has been appointed Entomologist to the Iowa Agr. Experiment Station.

A Note on *Chanopterus*, Boh.

By GEORGE H. HORN, M. D.

This genus was founded by Boheman (Eugenies Resa Ins. p. 98) on the heteromerous coleopter collected at the Straits of Magellan. It is about .3 inch long, brown or piceo-testaceous in color, shining. My attention was called to it, more especially, by its resemblance in form to *Ægialites*, although larger and differently colored. Through the kindness of Mr. Chas. O. Waterhouse a specimen was given me from the collection of his father, in which it bore the name *Chitoniscus brevipennis*, probably unpublished.

In studying the species more closely, it was found that *Chanopterus* had comparatively little in common with *Ægialites*. The anterior coxal cavities are widely open behind, removing it from any relationship with the *Tenebrionidæ*. The head being rather broad behind the eyes and the thorax without distinct lateral margin the affinities are decidedly in the direction of the *Melandryidæ* and *Pythidæ*, to the latter more especially.

At this time it is not necessary to discuss the propriety of retaining the two cited families as distinct but I have already expressed the opinion that there is not that fundamental difference in structure which should separate families.

Chanopterus paradoxus was placed by Boheman in the Tenebrionide tribe *Helopini*. As the insect was unknown in nature to Lacordaire he merely mentions it in the supplement to the fifth volume and the Munich Catalogue adds no further opinion.

From the study at present given, it seems an undoubted Pythide, as the family now stands, and while not closely related to either of the tribes proposed by Lacordaire it seems most nearly allied to *Æalpingus* although forming a tribe apart.

Mr. J. B. SMITH's Monograph of the *Sphingidæ* is in press and will be ready for publication at no remote date. It will be published by the Am. Ent. Soc. It will be the most exhaustive and valuable work on the subject.

CLARENCE M. WEED has, we are informed, been appointed Entomologist for the State of Ohio with headquarters at Columbus, Ohio.

Mr. HY. EDWARDS is hard at work on a bibliography of the adolescent stages of Lepidoptera, and as we are informed expects to complete the same some time during the Summer.

Notes on Geometridæ. No. 4.

By GEO. D. HULST.

Antepione imitata, Hy. Edw., Papilio, vol. II, p. 48.

Dr. Packard has raised in Maine, on Alder, a specimen of this insect, and with the intergradations taken in various parts of the country, it must be regarded as variety of *A. sulphurata*, Pack.

Aplodes coniferaria, Pack., Am. Nat., vol. XVIII, p. 933.

By the kindness of Dr. Packard I have the type of this species. It is a small form of *A. mimosaria*, Guen.

Eugonia magnaria, Guen., Phal., I, 147.

Since publishing the note (Ento. Am., II, 49), stating that the American differs from the European species in venation, I have seen an article by Mr. P. C. S. Snellen of Rotterdam, Holland, calling attention to the fact that the American also differs from the European species, in that it has but one pair of spurs on the hind tibiæ, while the European has two pair of spurs. Mr. Moeschler, speaking of this fact, does not seem to think it gives a valid basis for specific distinction, inasmuch as some of the *Acidalie* vary thus in the same species. But I am inclined to think Mr. Moeschler's opinion is hardly to be allowed. I do not know, nor have I been able by correspondence to ascertain, that any Geometer, in the same sex, has from a single batch of eggs been bred, some specimens having a different number of spurs on the hind tibiæ from others. As far as I can learn, the determination of specific identity is made on the basis of the identity of the two forms in size, coloration, food plant and perhaps larval history. But, though in every other respect two insects were alike, and differed only in the number of spurs, I would not hesitate to consider them distinct species. The spur is an important structural character, and its presence or absence is marked by a very important modification of the tibia in all cases where I have made examination. If further observation verifies what has been stated concerning *E. autumnaria* and *E. magnaria*, these species will have to be considered generically as well as specifically distinct.

Acidalia hepaticaria, Guen., (*rubromarginata*, Pack.), Phal. I, 47.

Of this species *Cidaria erythrata*, Hulst, Brookl. Bull., III, 42, is a variety. The variety is the deep uniform reddish form in which the lines are very indistinct or not at all evident. It seems to be the prevailing, perhaps the only form in Colorado.

Lepiodes (Tornos) interruptaria, Grt., Can. Ent., XIV, 185.

I was quite a little suprised some time since on receiving some *Geometridæ* from Dr. Packard, to find that one labelled *Eupithecia Behrensata*, Packard, was the same as the above insect. Dr. Packard's name

has priority over Mr. Grote's, so the species, till some further light is shed on genera, may stand *Lepiodes Behrensata*, Pack.

Exelis pyrolaria, Guen., Phal., I, 324.

This insect has remained unidentified in American collections since the time it was described. After a study of the description of genus and species, I am convinced the insect is none other than *Lepiodes (Tornos) approximaria*, Pack. The species till the hoped for light on genera comes may be known as *Exelis pyrolaria*, Guen., and may be catalogued next to *Lepiodes*.

Mecoceras peninsularia, Grt., Pap., III, 79.

I am unable to see how this can be separated from the common tropical insect *Mecoceras Nitocritaria*, Cram.

Cleora pulchraria, Minot. (Proc. Bost. Soc. Nat. Hist., XIII, 170, 1869.)

Dr. Packard, in the 5th Report, Peab. Acad. Sci., p. 84, tells us after an examination of Walker's types in the British Museum that this insect is the same as *Endropia semiclusaria*, Walker, (C. B. M. Geom., p. 1506, 1862), and *Aspilates canosaria*, Walker, (C. B. M. Geom., p. 1675, 1862). Dr. Packard does not correct the synonymy in his Monograph but the name must be *Cleora semiclusaria*, Walker.

Boarmia.

The species of this genus are very difficult to determine. The typical forms are quite distinct, but the species are generally variable. I have carefully examined Mr. Grote's species, so far as I have the types, viz:—*pulmonaria*, *dataria*, *grisearia*, *separataria*, *obliquaria*, and *rufaria*. *Separataria* is possibly the male of *pulmonaria*; *grisearia* is very close to, yet distinct from, *crepuscularia*; *obliquaria* is very close indeed to *quinquelinearia*, Pack.; *rufaria* is only a color variety in my opinion of *obliquaria*; *dataria* is scarcely distinct specifically from *pampinaria*. I think, notwithstanding the closeness of some of the species, it is wise to let them stand as they are, till we have more light, as it is as yet impossible to tell how permanent slight differences may be.

✓ **Eubyia quernaria**, Ab. & Sm., Lep. Ga., II, 205, pl. 103.

Of this species *E. pænulataria*, Grt., is at best a variety. And *Synopsis phigaliaria*, Guen., although regarded by Guenée as belonging to a different genus, is undoubtedly entitled to no more than varietal standing. Mr. Bolter has a specimen, which is the counterpart of Guenée's figure, but it is only a form of *E. quernaria*.

What relation *E. cupidaria*, Grt., has to this species I am unable to say, but I am very decidedly of the opinion that it will prove to be the ♂. In the specimens before me, 5 ♂♂, 3 ♀♀, there is very much

variation in color, but in all the males the black median cross line of the hind wings is very much straighter than in the females. In one male it is exactly as in the figure of *cupidaria*,—that is, somewhat rounded inwardly. The females are in their lines quite uniformly after one pattern, the males quite uniformly after the other. *E. mexicanaria*, Grt., Trans. Kans. Acad. Sci., VIII, 51, I have very little doubt is a form of this same species. Indeed, Mr. Grote seemed in his description to be more than half convinced of this, and as well of the opinion expressed above that his *cupidaria* was the male of *quernaria*.

Phigalia olivacearia, Morr., Proc. Bost. Soc. N. H., XVI, 200.

With several specimens before me having labels in Mr. Morrison's handwriting, I am quite strongly of the opinion that this species is not a synonym of *strigataria*, Minot. The two are very easily separated and the differences seem to be constant. *Olivacearia* is more even and silky in vestiture and has an olivaceous shading. The hind wings are much lighter and show but one indistinct line, straighter than the corresponding line in *strigataria*, and are less angulated at the anterior angle, and as compared with the inner margin of the fore wings the hind wings are shorter. The lines of the fore wings are less distinct, the median line is at costa nearer the basal than the outer in *olivacearia*, but is nearer the outer in *strigataria*. In *olivacearia* the median line at costa turns out and forms an angle just below costa; in *strigataria* it is curved. In *olivacearia* the outer line at costa is curved with a black tooth at lower point; in *strigataria* it is nearly straight and at length angulated. In *olivacearia* the outer line near inner margin is generally confluent with the median line and is loosely straight, in *strigataria* it is rarely confluent, and just before the inner margin forms an even arc, concave outwardly. In *olivacearia* the female is much smaller, and the wings are not more than half as long being not quite as long as thorax, while in *strigataria* they reach to the second abdominal segment. *P. cinctaria*, French, is probably a synonym of *P. strigataria*, Minot. It was described from one ♀, and the description applies entirely to females of *strigataria*, which in color have quite a little variation.

Anisopteryx vernata, Peck, Mass. Mag., Oct. 1795, 323, 415.

Dr. Packard argues at some length that Harris made a mistake in describing *A. pometaria*, stating that he redescribed the insect originally described by Peck. Dr. Packard gives the name *autumnata* to the species that he thought undescribed. Mr. Mann, Proc. Bost. Soc. Nat. Hist., XV, 382, and Can. Ent., VIII, 164, shows that Harris did not redescribe Peck's *vernata*. It seems to me the two species stand *Anisopteryx vernata*, Peck, and *A. pometaria*, Harris, with *A. autumnata*, Pack., as a synonym of the latter.

Book Notices.

Revision of the Species of *Lachnosterna* of America North of Mexico, by
GEORGE H. HORN, M. D., Trans. Am. Ent. Soc., 1887, vol. 14, pp. 209—296,
1 plate.

This paper by Dr. Horn is a very timely one. The species of *Lachnosterna* had become hopelessly mixed in collections, and it was unsafe to rely upon determinations anywhere. The local abundance of some species—their variability in color and size, and the similarity of the species proved a fertile source of confusion. A few species are well marked, and recognizable under all circumstances—leaving these all guides were lost. Dr. Horn's paper makes it possible to move more safely. Still withal the group is not an easy one, and requires tact as well as fair series to make identification certain. As in so many cases, the male characters afford good bases for specific distinction while the females often closely resemble each other. Dr. Horn as usual gives very good synoptic tables and in all cases sufficiently minute descriptions. In *Lachnosterna* as here used, Dr. Horn includes *Trichestes* Erichs., *Ancylonycha* Blanch., *Tostegoptera* Blanch., *Eugastra* Lec., *Endrosa* Lec., and *Gymnis* Lec. The number of species is increased to 81, and for the benefit of those who may not have access to Dr. Horn's paper, and as a guide to an arrangement of the species, we give a copy of the list of species.

LACHNOSTERNA, Hope.

GROUP I.

1. lanceolata Say. Kansas to Texas.

GROUP II.

2. cribrosa Lec. Texas.
 ventricosa Lec.
3. æqualis Lec. Texas.
4. farcta Lec. Texas.

GROUP III.

5. torta Lec. Texas.
6. hamata Horn. Texas.

GROUP IV.

7. latifrons Lec. Fla.
8. generosa Horn. Texas.
9. prætermisssa Horn. La.
10. prununculina Burm. Ga., Fla.
 cerasina Lec.
11. glaberrima Blanch. Pa. to Fla.
12. ephilida Say. Can. to Fla., Tex.
 uniformis Blanch.
 burmeisteri Lec.

GROUP V.

13. *longitarsus* Say. Ills. to Kans., Mont., N. Mex.
frontalis Lec.
 14. *clemens* Horn. Fla., Tex.
dispar ‡ Lec.

GROUP VI.

15. *dispar* Burm. Fla.
debilis Lec.

GROUP VII.

16. *gracilis* Burm. Can. to Tex., N. C.
volvula Lec.
inana Lec.
 17. *gibbosa* Burm. Can. to Va., N. E. States to Kans.
futilis ♂ Lec.
serricornis ♀ Lec.
 18. *hirtiventris* Horn. Texas.
 19. *congrua* Lec. Mo., Kans., Tex., La.
 20. *postrema* Horn. Fla.
 21. *affinis* Lec. Kans., Col., Ind. T., Tex.
 22. *pruinosa* Lec. Ohio and Mich. to Kans., Tex., Ala.
pruinosa || Mels.
fraterna ‡ Burm.

GROUP VIII.

23. *calceata* Lec. Tex.

GROUP IX.

24. *crassissima* Blanch. Kans. to Tex.
obesa Lec.
robusta ♀ Lec.
 25. *subpruinosa* Casey. Fla.
 26. *errans* Lec. Or., Cal., Nev.
 27. *inversa* Horn. Ky., Ills., Kans., Neb., Tex.
 28. *bipartita* Horn. Kans., La., Tex.
 29. *micans* Knoch. Mass. to Mo. and to Ga. and La.
sorroria ♀ Lec.
 30. *diffinis* Blanch. Fla., Ky.
 31. *vehemens* Horn. Kans.
 32. *fusca* Fröhl. Huds. Bay to N. Ga., thence north-westerly to
 N. Cal.
quercina Knoch.
fervens Gyll.
fervida ‡ Oliv.
var. consimilis ♂ Lec.

- var. anxia* ♀ *Lec.*
brevicollis Blanch.
var. puncticollis Blanch.
var. drakii Kirby.
race cephalica *Lec.*
uninotata Walker.
33. *politula* *Horn.* (loc. ?)
 34. *barda* *Horn.* N. Car.
 35. *marginalis* *Lec.* N. Y. to Wisc. and Ills.
 36. *spretta*, *Horn.* Md., Ia.
 37. *fraterna* *Harr.* Me. to Ia. and N. Car.
 var. cognata *Burm.*
 var. forsteri *Burm.*
 lugubris *Lec.*
 lutescens *Lec.*
 var. semicibrata *Lec.*
38. *infidelis* *Horn.* Ga., Fla.
 39. *luctuosa* *Horn.* So. Car. to Fla. and Ia.
 40. *corrosa* *Lec.* Ills. and Tex.
 41. *scitula* *Horn.* Tex.
 42. *knocchi* *Gyll.* Mass. to Ga.
 43. *profunda* *Blanch.* Tex.
 44. *rugosa* *Mels.* Mass. to Col., to N. Car. and Texas.
- GROUP X.
45. *hirsuta* *Knoch.* Mich. to N. Car.
 46. *comans* *Burm.* Ga., So. Car., Fla.
 sorroria ♂ *Lec.*
 decidua *Lec.*
 rufiola ♀ *Lec.*
47. *implicita* *Horn.* Can. to Mo., Nebr., Ia.
 48. *balia* *Say.* M. States to Ills.
 comata *Burm.*
49. *villifrons* *Lec.* Can., Pa., Ills., Ia.
 hirticeps ♀ *Lec.*
50. *limula* *Horn.* H. B. Terr., Mont., Col., Utah, Ills.
 51. *nitida* *Lec.* Ga., Pa.
- GROUP XI.
52. *hirticula* *Knoch.* Atl. region to Nebr. and Texas.
 hirsuta ‡ *Say.*
53. *deleta* *Horn.* Ky.
 54. *ilicis* *Knoch.* N. Y., to Ga. and Ills.
 porcina *Hentz.*

fimbriata Burm.

sublonsa Lec.

var. ilicis Burm.

55. *ciliata* Lec. Wisc., Ills., Mo., Ga.

GROUP XII.

56. *æmula* Horn. Ga.

57. *arcta* Horn. Texas.

58. *crenulata* Fræhl. Mass. to So. Car., to Kans. and Ind. Terr.
georgicana Gyll.

59. *albina* Burm. Ind., Miss.

60. *vetula* Horn. Ariz., N. Mex.

61. *rubiginosa* Lec. Kans., Tex.

62. *parvidens* Lec. Ga., Fla., (Texas?).

GROUP XIII.

63. *submucida* Lec. Texas.

64. *glabricula* Lec. Kans., Texas.

65. *fucata* Horn. Ariz.

66. *exorata* Horn. Texas.

GROUP XIV.

67. *ignava* Horn. Tex., N. Mex.

68. *longicornis* Blanch. An sp. Am.?

GROUP XV.

69. *quercus* Knoch. Middle States to Ga.

fervida ‡ Schönh.

70. *inepta* Horn. Ohio.

71. *affabilis* Horn. Kansas.

72. *clypeata* Horn. Ga., Fla.

integra || Lec.

73. *boops* Horn. Ga.

74. *ecostata* Horn. Texas.

GROUP XVI.

75. *crinita* Burm. Texas.

glabripennis Lec.

76. *tristis* Fabr. U. S. generally.

pilosicollis Knoch.

crinita ‡ Lec.

77. *lenis* Horn. Ariz., So. Cal.

GROUP XVII.

78. *heterodoxa* Horn. So. Ariz.

GROUP XVIII.

79. *tusa* Horn. Tex.

80. *maculicollis* Lec. Lower Cal.

81. *nitidula* Lec. Lower Cal.

Finally, not as a fault, but as an unavoidable omission we call attention to the fact that dates of appearance are not given.

It is to be regretted that collectors generally do not date their captures, and of course a monographer of species so widely distributed can not know when his material was collected. But just in this genus the matter is of interest. As a rule the species are not uncommon, and sometimes very abundant. Observations made by several entomologists indicate that the species relieve each other—i. e. appear successively, though a few will have a long life and overlap. I have noted that *crenulata* appears later than *fusca* and *hirticula* and has but a short life. In one season all my captures were confined to one week. *Ilicis* is also short-lived in my experience, while *hirticula* extends over a considerable period of time, and is abundant.

It will be a valuable addition to knowledge if collectors would note dates of first appearance, of greatest abundance, and of last capture. It is not only of interest as bearing on life history, but as an aid to identification, as when dates of appearance do vary, the date of capture may indicate the probable species at once. Then too the food plants of the imago differ. Oaks are most commonly attacked, but I have never taken *crenulata* anywhere but on blackberry flowers.

If our readers would preserve these data and send them to Ento. Am. for publication it would be a positive advance of our knowledge.

The collection of the Nat'l Museum contains now much more than half of the described species, and we should be glad to get series from all localities, in return for which we will identify the form sent, if desired.

JOHN B. SMITH.

* * *

Twenty-two common Insects of Nebraska. By CONWAY McMILLEN, M. A. University of Nebraska, Bull. of the Agr. Experiment Station of Nebraska, Vol. I, No. 2, Article II, pp. 1—101. January, 1888.

This pamphlet, of recent issue, is so far as we are aware, the first Report made by any of the recent appointees as Entomologist to the State Agricultural Experiment Stations, aided by Congressional appropriations, and if the other gentlemen have the same idea of their office, it is to be devoutly hoped it is the last as well. The work is purely and simply a compilation principally from the Reports of the U. S. Entomologist, the Entomological Commission, and the Reports on the Ins. of Mo. Lintner, Packard and Thomas have all been laid under contribution to produce a superficial and imperfect history of the species treated of. By far the greater number of species have been very fully treated in the U. S. Gov't Reports and this brochure is simple a poor abstract paid for a second time out of the same pocket. The figures used in the work are

borrowed from Riley's Reports in almost every instance—certainly none are original. There is no evidence that any of the Insects are now, or are likely to be injurious in Nebraska, and the matter seems to have been produced merely to fill space. For an agricultural newspaper, in answer to complaints received the articles are good—as the publications of an *Experiment Station* they are entirely absurd.

As stated, Mr. McMillen does not record a single original observation, yet he states that all have been carefully verified, and the inference from the context is that he himself has verified them. It need only be mentioned that he records the result of the work of a number of careful and scientific observers for a long series of years to show that that is impossible. *Phylloxera* alone would require more time to *verify* than the Experiment Stations have been established and also would require a high grade of skill in a trained observer.

Of course, as a compilation from the best sources no criticism can be made of the matter so far as scientific accuracy is concerned. Mr. McMillen as an Entomologist is entirely unknown to us—so far as we are aware it is his first appearance; it is to be hoped his future work will be of a different class.

So far as we have been able to learn, a large proportion of the State Experiment Stations have now appointed Entomologists—in most instances men who as such are absolutely unknown; who have had no Entomological training whatever, and whose knowledge is measured by what they can find in Packard's Guide. Many of them may do excellent work nevertheless and we only hope that they will not, simply to print something, follow Mr. McMillen's example and reprint the work of others in such shape as to suggest it is at least partially their own, to those who know nothing of the sources drawn from.

NOTE BY THE EDITOR.

The above critique is not editorial nor do we entirely agree with its sentiment.

The Hatch Bill says it shall be the duty of the Experiment Stations "to conduct original researches or verify experiments." But the first and the all important object of the Hatch Bill is "to aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with Agriculture." And with this in view every source of knowledge is properly made use of. Every means of destroying insect enemies must be brought to the attention of the people. The government may have already paid for the knowledge, but the knowledge has never generally reached the people; and if the Experiment Stations accomplish this end, the money used for this purpose is not by any means wasted. Of course due credit must

always be given to the one from whom knowledge is obtained, but one can hardly think the new State Entomologists have no right for example to recommend the use of Paris Green for destroying the Potato Beetle, because another discovered that it would easily and cheaply accomplish that end, and this knowledge is therefore not the result of their original research.

Our understanding is that under the Hatch Bill Entomologists are to diffuse knowledge among the people—how to arrest and prevent insect ravages; and in connection with this verify experiments, and make original researches, that if possible the old may be bettered, and new methods of protection discovered.

* * *

Proceedings of the Entomological Society of Washington, D. C., Vol. I, No. 2.

We have received a copy of the above and are free to give it unstinted praise. It is a report of the minutes of the meetings of the Washington Society, but in this case the report is of very great value. In connection with the Department of Agriculture and the National Museum, a large number of excellent specialists, some of them among the best, have been brought together. They all have scientific ability, are all trained observers, and the reports of the meetings are a history in part of their investigations and opinions. By necessity the information is of very great value and every student will read these Proceedings with delight and profit.

G. D. H.

A New Species of Hyparpax.

BY ED. L. GRAEF.

Hyparpax aurostriata, n. sp.

Shape and size of *H. aurora*, Abb. & Sm. Anterior, thorax and abdomen dirty white yellow sprinkled uniformly with pink. The transverse anterior line runs parallel to outer margin to the middle of the wing, thence bifid, the inner one running to anterior margin forming almost a right angle, the anterior curving sharply toward the apex. Secondaries dull yellow white; traces of the pink scales especially along the outer margin. Beneath, all the wings same color as secondaries with scales of pink densest at the margins and toward the apex.

This species I have often found in collections labeled *H. aurora* and by many collectors supposed to be that species or a variety of it. I have received more than a dozen specimens from Texas and they are all of this form and constant. *H. aurora* is a totally different species. Abbot and Smith's figure agrees perfectly with the form found in the Atlantic States. In *H. aurora* the primaries are pale yellow, basal patch, costa and exterior margin bright pink.

From 11 ♂♂ and 2 ♀♀. Texas.

Notes on Life History of *Scopelosoma moffatiana*, Grote.

By R. F. PEARSALL.

Some larva of this species were taken early in June in the Catskill region; feeding, mostly at night, on the leaves of the Witch Hazel (*Hamelis virginica*). When not feeding, during the day they lie curled up on the under side of the leaf. None were taken previous to the first moult and no change was apparent in coloration, at any subsequent moult.

Description.—*Larva*.—Length full grown 1.45 in.; smooth. Head smooth, glassy semitransparent. Each segment above is chalky white, becoming translucent between the segments and traversed through the centre with a pale lemon-yellow band. Feet and underparts dirty white.

When full grown, which is after the fourth moult, it goes down in the ground and under some convenient piece of moss, generally a moist place, forms a small cell which is lined with a gummy secretion, spending the Summer in the larval state.

About September 1st my specimens changed to pupæ which were $\frac{1}{2}$ inch long, shining bright brown and quite active, the casing being very thin. Imagos appeared from Sept. 25th to Oct. 5th, and have been already described, presenting but little variation except in depth of coloring. From their late appearance I am inclined to think, that they hibernate in this state, laying their eggs in the Spring, presumably upon the leaves.

Books and Pamphlets received during April 1888.

Naturæ novitates, Nos. 6, 7 and 8, 1888.

Bulletin of the Entomological Society of Belgium, No. 97.

Proceedings of the California Academy of Science, Vol. II, No. 8.

Entomologisk Tidskrift, 1887, 4 parts.

Bulletin of the Natural History Society in Vienna, Parts 3 and 4.

Psyche, No. 144.

Canadian Entomologist, Vol. XX, No. 4.

Journal N. Y. Microscopical Society, Vol. IV, No. 2.

Journal of Microscopy, April, 1888.

Scientific Inquirer, Vol. III, No. 28.

Prairie Farmer for April, 1888.

Notes on the species of *Euerythra* and *Callimorpha*, by JOHN B. SMITH.
from the Author.

Society News.

The Brooklyn Entomological Society met in Sengerbund Hall, May 1st, 1888. Thirteen members present.

The Special Committee appointed to confer with the Brooklyn Institute concerning the terms upon which the Society might become a branch of the Institute re-

ported and presented a definite written offer on the part of the Brooklyn Institute. The offer was in summary as follows:

The Brooklyn Entomological Society shall become the Entomological Department of the Brooklyn Institute; its regular members becoming associate members of the Institute without payment of initiation fee; its honorary members becoming corresponding members of the Institute; its life members becoming life members of the Institute; its President becoming a member of the Council of the Institute. The Brooklyn Entomological Society shall retain its present form of organization and by-laws; have its own treasurer, retain for its own use all its present property and funds, or any specially donated to it in the future; have the use of the membership fees of all members of the Institute connected with its department, have from the Institute rooms, light and fuel free, have the right to continue the publication under its own name of its Journal of Entomology. This offer holds good if the Brooklyn Entomological Society surrender its charter, or if it choose to retain it, but in either case no rule or by-law of the Society shall conflict with those of the Institute.

On motion action upon this communication was laid over until the next regular meeting to be held June 5th and the Secretary was instructed to give notice of the matter to all the members.

Mr. Heinrich Ries was proposed for membership, and unanimously elected a member of the Society.

Mr. Henry Ulke of Washington was unanimously elected an honorary member.

There was a discussion of certain habits of ants, and also upon certain specimens of insects exhibited, illustrating in part their life history.

Entomological Society of Washington. May 3rd, 1888. Eleven members present. Mr. C. H. T. Townsend was elected Corresponding Secretary vice Mr. O. Lugger, resigned.

An abstract of Mr. Schwarz's paper, presented at the previous meeting, was read to open discussion.

Dr. Fox thinks the rules stated by Mr. Schwarz too strict for the spiders. They do not seem to be nearly so well limited in distribution as the Coleoptera.

Mr. Smith gave a brief review of some parts of the Lepidopterous fauna of this district, and stated the distribution of a number of species which with the same apparent origin have spread further north. He decidedly agrees with Mr. Schwarz in excluding all discordant material in this district from our lists.

Dr. Marx reviewed the spiders collected by Mr. Schwarz—26 species, but one of which is sub-tropical. The others are nearly all found in the Southern States generally. *Centrurus biaculeatus*, found by Mr. Schwarz, has a wide distribution, being found also in South America and in Africa.

Mr. Schwarz estimates his Coleoptera captured at 250—300 species, with few exceptions truly sub-tropical. Dr. Merriam has informed him that the distribution of the sub-tropical *avifauna* agrees perfectly with his experience in the Coleoptera.

Judge Johnson and Mr. Mann also spoke briefly on the same subject.

Mr. Smith gave the characters and affinities of *Cydosia*, which he finds to be a true *Arctiid* closely allied to *Cerathosia*. He also gave some notes on the habits of *Lachnosterna* as observed by him.

Dr. Marx showed the figure of an abnormal scorpion, and of a *Lycosa* in which the middle row of eyes had disappeared.

Mr. Howard exhibited some plates from Mr. Scudder's "Butterflies of New England," showing figures of the genitalia of some species.

Mr. Smith says there is no explanation to these plates—had some of the figures been presented to him without a statement where they belonged, he would have unhesitatingly have referred them to the *Sphingidae*. He knows nothing of the Butterfly structure on this point, but has examined nearly every family in the *Heterocera*, to none of which the *Sphingids* bear so marked a similarity as they do to the forms illustrated on this plate.

J. B. SMITH, Sec'y.

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Early Stages of some North American Moths.

By HENRY EDWARDS.

Sphinx Elsa, Strecker.

Full grown larva.—Pale apple green, each segment with numerous minute raised tubercles, yellowish, surrounded by a red ring, giving rather a roughened appearance to the insect. On the 6 posterior segments is an oblique stripe of reddish brown, edged posteriorly with pale yellow. The stripes on the last 2 segments become confluent at the base of the caudal horn, which is unfortunately wanting in the specimen before me. Mouth parts, feet and legs, purplish brown.

Length 70 mm. Width 10 mm.

From an inflated specimen prepared by Mr. J. Doll.

Saturnia Galbina, Clemens.

Egg.—Deposited in an irregular mass, cream color; slightly flattened at the sides, very glossy. Before the emergence of the young larva the largest circumference of the egg becomes bright chestnut brown, the larva eating a circular hole through which to escape.

Young larva.—Black, sparsely covered with long fawn colored hairs. Head very large, glossy. (Died 2 days after emergence.)

Cocoon.—Formed of fine network, white, the outer case also of net work, but the meshes much larger and coarser. The silk of which it is composed is stout and strong. The pupa is hardly visible through the cocoon. Length 45 mm. Width 20 mm.

Pupa.—Stout, short. Head case rounded in front, the color fawn-drab, with the edges of the wing cases and the posterior margins of the abdominal segments brown. The whole surface is rugosely punctate. Spiracles and cremaster brown. Length 25 mm. Width 12 mm.

Coloradia Pandora, Blake.

Egg.—Very large for the size of the imago, round, almost globular, brownish in color and mixed largely with the hairs from the abdomen of the parent. A gummy secretion is supposed to be deposited with the eggs, as they adhere very firmly together.

Clisiocampa fragilis, Stretch.

Cocoon.—The cocoon of this species is more delicate and finer in texture than any other of the genus. It is pure white, very closely spun, narrow, and is attached at the sides to two or three stems of grass or other plants which may be convenient, and being generally free from any impurities, it is quite a pretty object. I have never taken the species except upon the sides of Mt. Davidson, Nevada. I believe the larva feeds on a species of *Compositæ*, allied to *Bigelovia*. Length 25 mm. Width 12 mm.

Sphingicampa 4 lineata, G. & R.

Pupa.—In shape very like that of *Anisota*, but comparatively a little longer. It is pitchy black throughout, the junction of the abdominal segments a little paler. The entire surface is very rough, and covered with minute raised spines. On the posterior margin of the last 5 abdominal segments is a row of raised teeth, and a similar row on the anterior margin of *all* the segments. These extend entirely around the body. On the top of the first segment behind the head case are two raised shining large black tubercles. The cremaster is very long bifurcate, and extremely rough. Length, including cremaster, 54 mm. Width 16 mm.

Citheronia Mexicana, G. & R.

Pupa.—Scarcely distinguishable from that of *C. regalis*, except that it is much smoother, and the spiracles much larger in size. They are also raised considerably above the surface of the segments. The cremaster is also smooth at its tip.

Hyperchiria Pamina, Neumoegen.

LARVAL STAGES.—*After 3rd moult*.—Ground color of the dorsal region, pitchy black. On the dorsum are 4 slightly waved cream colored stripes, extending from the base of the head to the anal segment, and of equal width throughout. The lateral region bears a broad cream colored stripe uneven on its edges and enclosing some lengthened cuneiform patches of a reddish brown shade, faintly spotted with dull orange. Each segment bears a bunch of much branched tubercular spines, jet black, those of the anterior segments the longest. The ventral region is dull brown, with broad diffused central stripe of cream color. Head black, mouth parts tawny. Prolegs black, abdominal legs dull reddish. Length 35 mm. Width 6 mm.

After 4th moult.—The ground color has now become pale buff, each segment dorsally bearing 4 black waved streaks. The subdorsal region is broadly black, with a buff ovate patch on each segment. Laterally the color is now much brighter, having changed to a dull crimson shade below the spiracles. Sub-ventral region black, with red markings and a broad central stripe of dull buff. The bases of the bunches of spines are now cream color. Length 48 mm. Width 8 mm.

Full grown larva.—The whole of the dorsal and subdorsal regions are now bright buff, the black stripes on the upper surface reduced to mere lines, which are slightly waved, and inclined to be confluent. In front, and at the sides of the 5th, 6th, 7th, 8th, 9th and 10th segments is a broad, triangular red patch, followed by a black line. The spiracles are cream color, and the space below them, immediately above the base of the legs is broadly black, and a red patch on the anterior and posterior edge of each segment, and many yellowish irrorations scattered over the surface. Ventral region dull yellow, with a cream colored central stripe. Head olivaceous. Legs all black, with the tips red, the anal plates also of the latter color. The tips of the branched spines only are black, the rest being a bright buff. Length 75 mm. Width 10 mm.

NOTES ON LEPIDOPTERA.

BY HENRY EDWARDS.

Gluphisia Tearlei.

I find that I made a great mistake in placing this species under the genus *Gluphisia*, and I hasten to correct my error. The original specimen was taken by my friend Osmond Tearle, at Lake Tahoe, California, and was in very poor condition, having lost its antennæ, part of one forewing, the fore legs, and a portion of the abdomen. I saw at once however, that it was a new species, and so described it, placing it where I then thought it belonged. The receipt of some examples in excellent condition, both ♂ and ♀, from Mr. McGlashan, of Truckee, proves to me quite conclusively that it is a Noctuid, allied to *Thyatira* or more nearly to *Bombycia*, Hübner, in which latter genus it will for the present find its place. It must therefore be known as

Bombycia Tearlei, Hy. Edw.,
= *Gluphisia Tearlei*, Hy. Edw. (in error).

Calledapteryx dryopterata, Grote.

I took 6 examples of this beautiful little moth near Corona, L. I., last August. They were all at rest on the leaves of Poison Ivy (*Rhus toxicodendrum*) and were found within the area of a few yards, being probably all members of one brood. Their mode of sitting upon the leaf reminded me of the *Pterophoridae*—the peculiar cut of the wing aiding the illusion. I saw two other specimens, but they escaped me by feigning death and dropping among the grass. The day was very warm, and the sun shone with considerable power upon the shining leaves of the *Rhus*.

Calothysanis amaturaria, Packard.

I caught two specimens of this pretty species near Astoria in July, sitting on leaves of *Sagittaria*, in a swampy place. It is, I believe, rather rare in collections.

Seiractia Echo, Abb. & Sm.

Two very fine examples of this rare moth, ♂ and ♀, were taken in April, at Cold Harbor, Florida, by Mrs. A. T. Slosson.



THE following is not inapplicable to some of the American College collections, and even some private collectors might take the hint:

Professor:—How many legs has an Insect?

Student:—Usually one or two; more rarely three or four, and in exceptional cases even five.

Professor:—What an extraordinary answer! May I ask where you derived this information?

Student:—Yes, sir: by an examination of the specimens in our university collection.

—*Fliegende Blätter*.

Larva of a Large Species of *HEPIALIDÆ*, *Phassus triangularis*, *Hy. Edw.*, from Vera Cruz, Mex.

By WM. SCHAUS, JR.

Larva.—Length, 4 inches. Head large and very powerful, black, well withdrawn under the second segment, which is dark brown, very broad and hard, and has a lateral depression. Segments 3 and 4 are rather contracted and very hard in texture, the 3rd being dorsally and laterally like old ivory, and the 4th having one anterior and two posterior spots of the same character, the three spots being almost confluent. The rest of the body is a rich velvety brown, and on each segment to the 12th is a large dorsal ovate spot, placed transversely and of harder consistency than the rest of the skin—these spots also being ivory-yellow. On segments five and six each are two small ivory-yellow dorsal spots posterior to the larger ones. Between all the spots the skin has numerous transverse folds. Laterally, behind the stigma on each segment is a small round ivory spot, and below it an ivory line. Last segment entirely velvety brown. The prolegs are very powerful and thick, and ivory-yellow. Underneath on segments five and six are several spots of the same hard formation and color as those of the upper surface, and the abdominal legs which are very short and also ivory-yellow.

The larva bores a hole of great length (nearly 3 feet) and usually quite into the roots of the tree, so that in some instances which have come under my observation, nothing was left but the bark of the root between the larva and the earth. The outlet is generally very near the ground, and is covered over with all the matter thrown out from the gallery made by the larva combined with a silky substance, the two together forming a pulpy material, which hardens on exposure to the air, and becomes tough in its nature. Before changing to a pupa the larva spins a silky lid which exactly fits the opening of the gallery, and is firmly attached only at one point. By raising this lid, one can see at a glance whether or not a larva or pupa is to be found, for the creature remains close to the outlet, but if once disturbed, it rapidly descends to some safer portion of the gallery, only returning when the danger has passed away. The pupa is nearly as active in its movements as the larva.

I regret that I could not discover the scientific name of the food plant, which is a low tree extremely abundant in the “*Tierra templada*” of the State of Vera Cruz, and is known to the Mexicans as “*Guzanillo*” or Maggot tree, owing to the frequency with which the larvæ of the *Hepiali* are found in it. The moths emerge between 3 and 5 in the afternoon, but common as are the larvæ, I never took the imago on the wing, my specimens being all obtained by breeding.

Mr. SAMUEL HENSHAW is now engaged, under the direction of Prof. RILEY, on the Bibliography of Economic Entomology. The task is an herculean one, and not particularly interesting though undoubtedly valuable. Mr. Henshaw has our sympathy.

A Proposed Classification of the Hemiptera.

By WILLIAM H. ASHMEAD.

Jacksonville, Fla.

For nearly ten years, the writer has made the *Hemiptera* the object of special study, and below is submitted for the consideration of those interested in these pungent insects, a proposed arrangement of the Divisions and Families recognized, in accordance with what is conceived to be their natural affinity and natural sequence, based on evolutionary law.

Whether or not, the arrangement be accepted, it is believed that the student will find the analytical tables useful and valuable.

It will also be observed that the *Pediculidæ*, by some authorities classified with the mites *Acarina*, are included among the *Heteroptera*; although some systematists, while classifying them as hemipterous, considered them to rank as a suborder under the name *Parasitica*.

This arrangement, I have not followed, for the reason they seem to me, to be too closely related, in habits and structure, to the heteropterous families *Polyctenidæ* and *Cimicidæ*, to justify their separation.

In general appearance, too, they so closely resemble—in a remarkable degree—the immature forms in the homopterous family *Coccidæ*, that they very naturally bridge the chasm separating the *Homoptera* from the *Heteroptera*, and afford—by placing them at the head of the *Heteroptera*, as has been done—the presentation of a natural consecutive sequence of all the hemipterous families

Before giving the characters for separating the divisions and families of the *Hemiptera*, it may be advisable to show the position and rank it is believed that this order should occupy in any natural scheme of arrangement of the so-called orders of insects, based on evolutionary law.

I believe that the class *Insecta*, or those expressions of life classed by Zoologists as such—animals breathing through *tracheæ*—is represented to-day by two groups that came into existence in two distinct ways, being evolved, the one from the *Crustacea*, the other from the *Vermes*, which may be distinguished by the following very simple character:

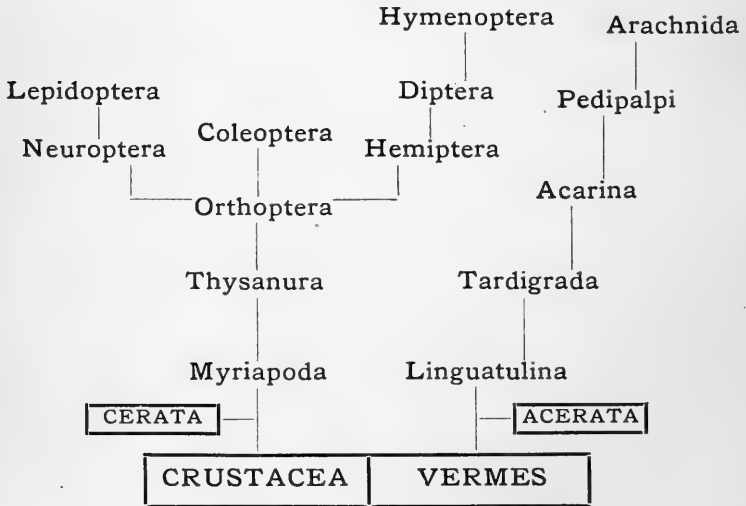
Insects with antennæ.....	Cerata <i>m</i>
Insects without antennæ	Acerata <i>m</i>

The first group, or *Cerata*, originated from a crustacean ancestor and is represented to-day by the *Myriapoda*, *Thysanura*, *Orthoptera*, *Neuroptera*, *Lepidoptera*, *Colcoptera*, *Hemiptera*, *Diptera*, and *Hymenoptera*; while, the second group or *Acerata*, evolved from an ancestral worm-like form, is represented by the *Linguatulina*, *Tardigrada*, *Acarina*, *Pedipalpi* and *Arachnida*.

The simple character given above—with or without antennæ—will enable any one to place at a glance any *insect* in its proper group. The groups *Pediculina*, *Mallophaga* and *Physopoda* (= *Thysanoptera*, Hal.), therefore belong naturally to the orders originally assigned them by Burmeister: the former, on account of their promuscidate mouth, go with the *Hemiptera*; and the two last, on account of their mandibulate mouth and active pupa, go with the *Orthoptera*.

The following diagram, will demonstrate the relative position, that it is believed the different orders should occupy in a natural scheme, and it may be well to compare it with a similar one, in the "Third Report of the U. S. Entomological Commission," page 295, to see how different is our conception of a natural arrangement, from that entertained by its learned author, Dr. A. S. Packard.

INSECTS GENEALOGICAL TREE.



A classification is at once demonstrated to be either good and natural, or false and artificial; and its merits are soon recognized.

The good and natural is accepted; the false and artificial eliminated or rejected.

It is not thought advisable, therefore, at this time, to enter into the merits or demerits of the many different classificatory schemes proposed for the arrangement of the *Hemiptera*; they are familiar to all students and nothing is ever accomplished by such discussions.

The following is our proposed arrangement of the Divisions and Families:

ORDER HEMIPTERA.

Mouth promuscitate ; metamorphosis incomplete.

SUBORDERS.

Wings uniformly membranous or horny..... Suborder I, **HOMOPTERA**.

Front wings basally horny, apically membranous ; hind wings membranous.....
Suborder II, **HETEROPTERA**.

SUBORDER I, **HOMOPTERA**.

TABLE OF DIVISIONS.

Beak issuing from the inferior part of the head
Div. I, **AUCHENORHYNCHA**, A. et S.

Beak apparently issuing from the sternum
Div. II, **STERNORHYNCHA**, A. et S.

Division I, **AUCHENORHYNCHA**, Amyot et Serville.

TABLE OF THE FAMILIES.

Front wings most frequently opaque or parchment-like ; hind wings membranous. . 2

All wings most frequently membranous or horny, strongly areolated.

*Ocelli 3 on the vertex ; antennæ setiform, placed between the eyes ; thorax normal ; fore femora thickened, toothed beneath ; males musical.....
Fam. I, **Cicadidæ**.

Ocelli most frequently 2, usually placed beneath the eyes or in hollow cavities in the cheeks, a 3rd ocellus sometimes on the front ; antennæ always placed beneath the eyes ; frons often produced, carinated.... Fam. II, **Fulgoridæ.

***Ocelli 2 on the crown ; antennæ between the eyes ; thorax abnormally developed, usually completely covering the scutellum ; legs foliaceous, prismatic or rounded Fam. III, **Membracidæ**.

2 Thorax normal ; ocelli 2, seldom absent ; antennæ setiform, placed between the eyes.

†Ocelli always placed somewhere on the vertex.. . . . Fam. IV, **Cercopidæ**.

††Ocelli always on the frons and below the superior margin.....
Fam. V, **Bythoscopidæ**.

†††Ocelli in front of the eyes on the rounded edge of the superior margin, but never on the vertex..... Fam. VI, **Jassidæ**.

Division II, **STERNORHYNCHA**, Amyot et Serville.

TABLE OF THE FAMILIES.

Tarsi 1-jointed..... 2

Tarsi 2-jointed.

Beak 3- or 4-jointed ; wings most frequently membranous.

Antennæ 10-jointed ; abdomen without honey tubes..... Fam. VII, **Psyllidæ**.

Antennæ 3- to 7-jointed ; abdomen frequently with honey tubes
Fam. VIII, **Aphididæ**.

Beak 2-jointed ; wings opaque, farinose Fam. IX, **Aleurodidæ**.

2 Males with only 2 wings, seldom apterous ; females always apterous, mite-like ; antennæ 6- to 11-jointed ; and all the species reach maturity under waxy secretions, filamentary down or in galls..... Fam. X, **Coccidæ**.

- Tibiae spinous; tarsi 3-jointedFam. XXI, **Corimalænidæ**.
 Tibiæ not spinous.
 Elytra folded; tarsi 2-jointedFam. XXII, **Arthropteridæ**.
 Elytra straight; tarsi 3-jointed.....Fam. XXIII, **Scutelleridæ**.
 ***Scutellum flattened, attenuated, usually rounded at tip, or long triangular, but not nearly covering the whole abdomen.
 Tibiæ not spined; tarsi 2- or 3-jointedFam. XXIV, **Pentatomidæ**.
 5 Beak curved at base; head cylindrical; prothorax with a transverse suture.....7
 Beak not curved at base; head not cylindrical.
 Antennæ inserted on a line below the eyes.....6
 Antennæ inserted on a line before the eyes.
 Membrane always with more than five nervures, often numerous.
 *Legs not especially slender, most frequently thickened, spined or foliaceous; forms variousFam. XXV, **Coreidæ**.
 Legs long and slender, femora clavate.....Fam. XXVI, **Berytidæ.
 6 Membrane with not more than five nervures.
 With ocelliFam. XXVII, **Lygæidæ**.
 Without ocelliFam. XXVIII, **Pyrrhocoridæ**.
 Membrane with one or two cells; no ocelli.....Fam. XXIX, **Capsidæ**.
 7 Head separated from the prothorax.
 †Anterior legs not raptorial; fore coxæ not greatly lengthened.
 Beak usually long, slender, 4-jointedFam. XXX, **Nabidæ**.
 Beak usually short, stout, 3-jointed.....Fam. XXXI, **Reduviidæ**.
 ††Anterior legs raptorial; fore coxæ greatly lengthened
 Fam. XXXII, **Emesidæ**.
 Head not separated from the prothorax.
 Abdomen ending in long, respiratory caudal setæ; antennæ very small, 3-jointedFam. XXXIII, **Nepidæ**.
 Subdivision II, **HYDRODROMICA**, Ashmead.
 Head inserted in prothorax.
 Head abnormally lengthenedFam. XXXIV, **Hydrometridæ**.
 Head not greatly lengthened.
 *Ocelli and scutellum presentFam. XXXV, **Gerridæ**.
 Ocelli and scutellum wantingFam. XXXVI, **Velliidæ.
 Division II, **PAGIOPODA**, Schiödte.
 Subdivision I, **GYMNOCERATA**, Ashmead.
 Elytra areolated.....Fam. XXXVII, **Saldidæ**.
 Subdivision II, **CRYPTOCERATA**, Ashmead.
 Body boat-shaped, supinate.....2
 Body depressed, prone.
 Legs not natatorial; ocelli present.
 Eyes pedunculate.....Fam. XXXVIII, **Galgulidæ**.
 Legs natatorial; ocelli wanting.
 Scutellum large.
 Abdomen without strap-like caudal setæ.....Fam. XXXIX, **Naucoridæ**.
 Abdomen with strap-like caudal setæFam. XL, **Belostomidæ**.
 Scutellum invisible or minute.
 Head overlaps prothorax.....Fam. XLI, **Corisidæ**.
 2 Head inserted in prothorax; legs natatorialFam. XLII, **Notonectidæ**.

The Faunal Limits of the United States.

By GEO. D. HULST.

As the result of the collections and observations of Mr. E. A. Schwarz in Southern Florida last year, there has been, if we judge from the reports of their meetings, considerable discussion among our Washington Entomologists on the above subject. The opinion seems to have almost unanimously prevailed that the Fauna of Southern Florida ought to be credited to the West Indies, rather than the United States.

There is little probability however that this course will ever be carried out in the making up of our Faunal Lists. 1st, from a sort of patriotism people regard their country as a unit and cherish all that is of their own country; and as a consequence, notwithstanding the vast reach of our country, very few Americans there are, who are, even in the sense of taking the great divisions of the country, local collectors. Southern Florida will have its place as American in our collections and must go in our lists. 2nd, Faunal boundaries are so artificial and irregular that natural limitations ought to be taken even though they do not wholly correspond with the facts of the case. Thus the White Mountains of New Hampshire and the high Rockies and Sierras ought to have their insects credited to our Fauna and so put in our lists, though they are essentially Arctic. And thus in the future as in the past, the Florida Straits will probably remain to be the Southern boundary line of our Fauna. 3rd, It may be questioned whether Southern Florida is essentially tropical. It may be a fact that the majority of the species are connected with the Tropics, but it may be properly inquired, is this *comparatively* the truth. It is possible that it may have half the species found in New England, and while a majority of its species are found in the West Indies it may not have perhaps one quarter of those found in Cuba. It thus may be *comparatively* more like New England than the West Indies. 4th, Southern Florida is essentially situated much as Mt. Washington is in New Hampshire, that is it is cut off from its faunal connections. It is by the Everglades almost entirely separated from the country which otherwise would probably give it the majority of its species, and it may not be unfair to locate it with the accident of real separation taken into account. The Everglades probably form a greater barrier than the Straits. 5th, If Southern Florida is thrown out of our Faunal Lists, so must we throw out South Western Texas, Southern New Mexico, Arizona, and California. And on the other hand a long reach of the Mountain Region of Mexico must be taken in with our Fauna. It seems that though the line of National Boundaries in this case is not the line which would be selected by Naturalists as the true boundary line of our Fauna, it comes pretty near the truth; if Naturalists were to map out the line perhaps no two would agree as to where the faunal line should be drawn. And it probably would have to resolve itself into a case of "letting well enough alone."

Lycæna Sonorensis, Feld.

By W. G. WRIGHT,

San Bernardino, Cal.

This most exquisite of all North American diurnals has for its habitat the Pacific Coast from latitude 37° to 27° and possibly to 25° North, a range of 600 or 700 miles, the Southern limit not being yet determined. From the coast line it penetrates into the interior probably less than 100 miles, 60 miles being its limit of actual observation at present. While it is thus somewhat widely spread in comparison with some coast butterflies, it is always extremely rare and difficult to get. In ordinary years three or four examples are a fair catch. Only twice, during several years of active work, have I seen this insect flying in anything like numbers. The first time was in February, 1883, near Todos Santos Bay in Lower California, when I found it, as I thought breeding, and flying in plentiful numbers, but so old and worn that they were worthless. The second time was this past Spring of 1888, 30 miles from this place, and ovipositing on *Cotyledon laxa*. By most persistent and laborious work I succeeded in getting a fine case full of the insects, and in securing eggs and larvæ sufficient to establish all the stages, for publication. Nearly the whole of my material was obtained from a little bit of land two or three yards wide and twenty yards long. It is a little secluded pocket in the mountains, and so hidden and inconspicuous that I first passed by it on one side, seeing none flying, when really there must have been half a dozen flying within fifteen yards of me; but on returning, my chance let me across the pocket, and all at once I saw them in numbers. You may believe that a lively time followed. I got about a dozen that first day. But before I had caught half a dozen I had observed the queer flight of the females, close to the ground, or along the face of a damp rock, evidently plant-hunting. Presently one alighted on the thick succulent leaf of a *Cotyledon*, left an egg, and flew away. Catching her as she flew, I dropped upon that plant, and found the egg. Then I had the whole secret, and, having the secret, it was but a matter of time, patience and work, to get the rest.

I account it of more use and value to get the plant and the preparatory stages established than to get many butterflies, for while any one can catch a butterfly, not many can or will work it up. So, in this case, I tramped many a mile, and waded an icy stream more than five hundred times, to get a few little eggs and caterpillars that altogether weigh but a

few grains. But it is done, and it will stand as long as books are printed.

Cotyledon was once considered a *Sedum*, but was separated because of material and technical variations. The leaves, which are the part eaten by the larvæ, are thick and juicy with an insipid watery juice, and so soft that they may be mashed in the fingers into pulp that drips with water. The "house-leek" of the Eastern States is an approximate and familiar plant, in size and manner of growth, but the *Cotyledon* leaves are fewer, larger, thicker and more juicy. The larvæ eat into the leaf, and burrow about under its skin, remaining hidden most of the time; but an aperture is always open, and through it the ants follow the larva, persistently petting it, and living off its juices. Some of the larvæ that I have bred have been attended all through their captivity by some ants which would not leave them. Doubtless these ants have subsisted entirely upon the nutriment afforded by the larvæ. Whether the larvæ are pleased or vexed by the ants I cannot determine. At any rate they show no positive sign of either, while on the other hand, the larvæ of *L. Amyntula*, which feed entirely hidden and shut in, shrink in dislike or fear from the touch of ants, and the ants never caress them to beg for food.

It is a great pity that this lovely *Lycæna* should be obliged to carry the handicapping of such a misnomer of a name as *Sonorensis*. I doubt if it ever flies in Sonora at all. I know the best collectors who of late years have worked there, and none of them have ever seen it there. In the early days of this coast, in the sixties, the collecting of plants and animals and the labelling of them were very carelessly and loosely done. Even a collector like Fremont was often grossly lax in his names and localities; and especially in Botany this laxity has caused immense vexation and worry. So it must have been in the case of this *Lycæna*, credited to Sonora doubtless through carelessness or error. Or it may have been collected from some little ranch or Mexican settlement called Sonora in what is now the State of California. Several such "Sonoras" still exist.

But it cannot now be helped. We may at any rate console ourselves with the knowledge that this butterfly is rare and beautiful enough to be able to stand up under its dead-weight, careless of the misnomer; that its silvery luster and carmine cheeks are so gem-like and delicious that it will always be sought after, so that after all the name is of little moment, for the insect itself is so incomparable and matchless that it shall live to fly and reign—a *queen*—forever.

Note on the Genus *Platythyris*.

By A. R. GROTE, A. M.

In an article, Ento. Am., Vol. IV, p. 27, speaking of the above genus, Mr. J. B. Smith, the author, says, that this genus contradicts nearly every family character of the *Thyridæ*, to which Grote and Robinson referred it. Boisduval, I believe, figured a species of this genus as *Thyris vitrina*. Dr. Clemens described the genus as belonging to the *Tortricidæ*. Since we figured the more common species I have stated in print several times that the genus possibly belongs to the *Noctuidæ* and I found allied Asiatic forms in the British Museum (as far as I recollect Felder figures one), recorded under the generic title *Varnia*. Consult our paper in Trans. Am. Ento. Society upon Mr. Walker's types. Dr. Clemens describes the singular larva of *Platythyris* (*Dysodea* is, I believe, preoccupied), and his description (Proc. Acad. N. S. Phil., 1860, p. 350) says that the larva is quite as peculiar as the perfect insect. The larva has a disagreeable odor and makes a cone on *Eupatorium ageratoides*. This accords with *Thyris* larva in a very striking manner, as cited by Mr. Smith in the article referred to above. We made a tribal or subfamily division of the *Thyridæ* on account of the contradictory characters, viz: *Platythyriini* or *Platythyrinæ* according as we rank the division. In my opinion (I have no specimens at the moment) the moth may remain as we placed it, until its full characters be compared with the *Noctuidæ*. It is not a *Tortrix*, as Clemens described it. In a letter to me Dr. Clemens stated that he could not remember his grounds for putting the moth in the *Tortricidæ*. He recognized the moth from our figure in the Annals of the N. Y. Lyceum and wrote that, with our different estimate of its structure, we were pardonable in not recognizing his description of it previously under the *Tortricidæ*. I judged from his letter, that he was satisfied he was wrong in his classification of the moth, and that the insect belonged, if not to the *Thyridæ*, at least to the Macrolepidoptera. We afterwards made the synonymical reference and, on account of *Dysodea* being used, retained for our *P. fasciata* the name *Platythyris oculatana*, Clem. Staudinger credits Boisduval's species, described from Spain, to North America. I think this is surmise, perhaps an erroneous surmise. There is no reason why *Platythyris* should not be found in Southern Europe. As far as I recollect, Boisduval's figure does not correspond with our North American *Platythyris oculatana*. In any event we have to do with a singular form but there is no reason, I think, for separating it as a family. It agrees well enough as a subfamily of the *Thyridæ*, until we have more information, to which family we were the more disposed to refer it since Boisduval preceded us.

The description of the larva of *Platythyris* by Clemens reveals unexpected resemblances to *Thyris*, both in form, quality and habit. When the immature stages present so many points of agreement it is incorrect to say that the genus contradicts nearly every family character. The points wherein the moth contradicts *Thyris* have been comparatively given by us. We lay stress upon the thoracic and antennal characters as being very different from *Thyris*—so much so that we consider it to belong to a distinct tribe. Mr. Smith uses the characters we give. He emphasizes the fact that we do not describe the venation. Of our type we could not well denude the wings, but Dr. Clemens describes the venation fully (l. c. p. 349 seq.) and it would seem that putting what Dr. Clemens says and what we say, originally and subsequently, a pretty full statement could be compiled as to the structure of *Platythyris*. Joined to this we figure the moth, from both sides, and Boisduval, as Say, very probably figures a second species of *Platythyris* as a *Thyris*. Subsequent descriptions of North American *Platythyridæ* are also extant; the species except *oculatus* (= *fasciata*) are unknown to me in nature.

Collecting Notes.

BY CHAS. LIEBECK.

I have noticed, while looking over my last volume of Ento. Am. lately, an article by Mr. A. M. Weeks entitled "Capturing *Carabus serratus*." In this locality as well as in the neighborhood of New York City, it is infrequently met with, an occasional specimen during hibernating season, and must be collected methodically. The idea of collecting them by sugaring is a very good one, but we have never tried it. Our method of collecting them will be explained by the following account of one of our trips. On the 10th of April Mr. Wenzel and myself made a trip to Franklinville, situated on the outskirts of the upper end of Philadelphia, on the banks of the Wingohocking Creek. At the point of our operations the creek runs between two lines of hills with moderately sloping sides. Here we commenced our search by scraping among the loose earth, dead leaves, and general debris left over from the fall season. From about half way up, to the top of the hills, after a diligent search, we found about 16 specimens of *Cychrus stenostomus* and a number of species of *Pterostichus*. While near the waters edge at the foot we found about 25 specimens of *Carabus serratus*, a like number of *limbatus* and the common *vinctus*. *C. sylvosus*, the only other species of *Carabus* found in this vicinity, has also been taken here in the same way, but not on this occasion. We also found besides the above species *Olisthopus parmatius*, *Atraneus pubescens*, *Platynus octopunctatus*, *Dicælus ovalis*, and numbers of species of the commoner Carabidæ.

Food - Plants of Lepidoptera.

By WM. BEUTENMÜLLER.

[No. 8.]

APATELA AMERICANA, Harr.

Tiliaceæ.

- | | | |
|--------------------------------------|--|------------------------------------|
| Tilia Americana, L. (Basswood.) | | Tilia alba, Michx. (White Linden.) |
| Tilia Europæa, L. (European Linden.) | | |

Sapindaceæ.

- | | | |
|---|--|--|
| Acer pseudo-platanus, L. (Mock Plane Tree.) | | Acer rubrum, L. (Red Maple.) |
| Acer dasycarpum, Chr. (Silver Maple.) | | Æsculus hippocastania, L. (Common Horse Chestnut.) |

Rosaceæ.

- | | | |
|--|--|--|
| Prunus serotina, Ehr. (Wild Black Cherry.) | | Amelanchier canadensis, Torr. & Gray. (Service-berry.) |
| Prunus virginiana, L. (Choke Cherry.) | | |

Ericaceæ.

- | | | |
|--|--|---|
| Vaccinium corymbosum, L. (Common Blueberry.) | | Vaccinium pennsylvanicum, L. (Dwarf Blueberry.) |
|--|--|---|

Urticaceæ.

- | | | |
|-------------------------------------|--|-------------------------------------|
| Ulmus americana, L. (Am. Elm.) | | Ulmus campestris, L. (English Elm.) |
| Ulmus fulva, Michx. (Slippery Elm.) | | |

Juglandaceæ.

- | | | |
|---|--|---|
| Carya alba, Nutt. (Shell-bark Hickory.) | | Carya amara, Nutt. (Bitter-nut.) |
| Carya tomentosa, Nutt. (Mocker-nut.) | | Carya porcina, Nutt. (Pig-nut Hickory.) |

Cupuliferæ.

- | | | |
|--|--|---------------------------------------|
| Quercus alba, L. (White Oak.) | | Quercus palustris, Du Roi. (Pin Oak.) |
| Quercus macrocarpa, Michx. (Bur Oak.) | | Castania vesca, L. (Chestnut.) |
| Quercus rubra, L. (Red Oak.) | | Fagus ferruginea, Ait. (Beech.) |
| Quercus coccinea, Wang. (Scarlet Oak.) | | Fagus sylvatica, L. (European Beech.) |
| Quercus tinctoria, Bart. (Black Oak.) | | Carpinus americana, Walt. (Hornbeam.) |

Betulaceæ.

- | | | |
|--------------------------------|--|---|
| Betula alba, L. (White Birch.) | | Betula v. populifolia, Spach. (American White Birch.) |
|--------------------------------|--|---|

[No. 9.]

EMPRETIA STIMULEA, Clem.

Anacardiaceæ.

- Rhus glabra, L. (Sumac.)

Rosaceæ.

- | | | |
|--|--|--|
| Prunus serotina, Ehr. (Wild Bl'k Cherry) | | Pyrus coronaria, L. (Crab-apple.) |
| Prunus virginiana, L. (Choke Cherry.) | | Pyrus malus, L. (Apple.) |
| Rubus villosus, Ait. (Blackberry.) | | Cratægus coccinea, L. (Thorn.) |
| Rosa carolina, L. (Swamp Rose.) | | Amelanchier canadensis, L. (June-berry.) |
| Rosa blanda, Ait. (Wild Rose.) | | |

Hamamelaceæ.

Liquidambar styraciflua, L. (Sweet-gum.)

Cornaceæ.

Cornus florida, L. (Dogwood.)

Cornus stolonifera, Michx. (Osier Dog-wood.)

Caprifoliaceæ.

Viburnum dentatum, L. (Arrow-wood.)

Viburnum lentago, L. (Sheep-berry.)

Compositæ.

Aster corymbosus, Ait.

Vacciniaceæ.

Vaccinium corymbosum, L. (Huckle-
berry.)

Vaccinium pennsylvanicum, L. (Huckle-
berry.)

Myricaceæ.

Myrica cerifera, L. (Bayberry.)

Cupuliferæ.

Betula alba, L. (Birch.)

Corylus americana, Walt. (Hazel.)

Corylus rostrata, Ait. (Europ. Hazel.)

Quercus alba, L. (White Oak.)

Quercus coccinea, Wang. (Scarlet Oak.)

Quercus macrocarpa, Michx. (Bur Oak.)

Quercus palustris, Du Roi. (Pin Oak.)

Quercus prinus, L. (Chestnut Oak.)

Quercus rubra, L. (Red Oak.)

Quercus tinctoria, Bart. (Black Oak.)

Castania vulgaris, v. Americana, Michx.
(Chestnut.)

[No. 10.]

HALESIDOTA TESSELLATA, A. & S.

Tiliaceæ.

Tilia americana, L. (Basswood.)

Tilia Europæa, L. (European Linden.)

Tilia alba. (White Basswood.)

Leguminosæ.

Robinia hispida, L. (Rose Acacia.)

Robinia viscosa, Vent. (Clammy Locust)

Robinia pseudacacia, L. (Common
Locust.)

Hamamelaceæ.

Hamamelis Virginiana, L. (Witch Hazel.)

Sapindaceæ.

Acer dasycarpum, Ehr. (Silver Maple.)

Acer pseudo-platanus, L. (Mock Plane
Tree.)

Acer rubrum, L. (Red Maple.)

Negundo aceroides, Moench. (Box-
wood.)

Rosaceæ.

Amelanchier canadensis, L. (June-berry.)

Ericaceæ.

Vaccinium corymbosum, L. (Huckle-
berry.)

Vaccinium pennsylvanicum, Lam.
(Huckleberry.)

Urticaceæ.

Ulmus americana, L. (Am. Elm.)

Ulmus fulva, Michx. (Slippery Elm.)

Platanaceæ.

Platanus occidentalis, L. (Sycamore.)

Juglandaceæ.

<i>Carya alba</i> , L. (Shell-bark Hickory.)		<i>Juglans cinerea</i> , L. (Butternut.)
<i>Carya microcarpa</i> , Nutt. (Small Fruited Hickory.)		<i>Juglans nigra</i> , L. (Black Walnut.)

Cupuliferæ.

<i>Betula alba</i> , L. (White Birch.)		<i>Quercus coccinea</i> , Wang. (Scarlet Oak.)
<i>Carpinus Americana</i> , Michx. (Horn-beam.)		<i>Quercus macrocarpa</i> , Michx. (Bur Oak.)
<i>Corylus Americana</i> , Walt. (Hazel.)		<i>Quercus palustris</i> , Du Roi. (Pin Oak.)
<i>Corylus rostrata</i> , Ait. (Hazel.)		<i>Quercus tinctoria</i> , Bart. (Black Oak.)
<i>Quercus alba</i> , L. (White Oak.)		<i>Fagus ferruginea</i> , Ait. (Beech.)

[No. 11.]

PYROPHILA PYRAMIDOIDES, Guen.

Vitaceæ.

<i>Vitis cordifolia</i> , Michx. (Winter Grape.)		<i>Vitis labrusca</i> , L. Northern Fox Grape.)
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Leguminosæ.

Cercis canadensis, L. (Judas Tree.)

Rosaceæ.

<i>Prunus virginiana</i> , L. (Choke Cherry.)		<i>Rubus villosus</i> , Ait. (Blackberry.)
<i>Prunus serotina</i> , Ehr. (Wild Black Cherry.)		<i>Pyrus malus</i> , L. (Apple.)
		<i>Pyrus communis</i> . (Pear.)

Hamamelaceæ.

Liquidambar styraciflua, L. (Sweet Gum.)

Caprifoliaceæ.

Viburnum dentatum, L. (Arrow-wood.)

Juglandaceæ.

<i>Carya alba</i> , L. (Shell-bark Hickory.)		<i>Carya sulcata</i> , Willd.
<i>Carya amara</i> , Nutt. (Bitter-nut.)		

Cupuliferæ.

<i>Quercus alba</i> , L. (White Oak.)		<i>Quercus rubra</i> , L. (Red Oak.)
<i>Quercus macrocarpa</i> , Michx. (Bur Oak.)		<i>Quercus coccinea</i> , Wang. (Scarlet Oak.)
<i>Quercus palustris</i> , Du Roi. (Pin Oak.)		<i>Quercus tinctoria</i> , Bart. (Black Oak.)

Salicaceæ.

<i>Populus balsamifera</i> , L. (Balsam Poplar.)		<i>Populus grandidentata</i> , Michx. (Large-toothed Aspen.)
<i>Populus dilatata</i> , L. (Lombardy Poplar.)		<i>Populus tremuloides</i> , Michx. (American Aspen.)
<i>Populus monilifera</i> , Ait. (Cotton-wood.)		

ALLEGHENY, PA., May 31st, 1888.

EDITOR ENTOMOLOGICA AMERICANA.

DEAR SIR:—Permit me to make a few remarks on a paper in the April number of Ento. Am., "Thoroughness in Entomological Tables," which I read with some amazement. The writer, as I interpreted it, exhibits the Classification of the Coleoptera of North America, the various tables of genera, synopses, &c., as examples of synthetic work, not very perfect however; and classes their several authors as "Synthesists with a philanthropic desire," etc.

A greater misconception can scarcely be imagined and how it occurred is outside of my apprehension, but there it is in printers' ink.

The state of Coleopterological Science in this or any other country, as is well known, does not permit more than the feeblest attempts at synthetic work; Dr. Leconte tried a single genus—*Nebria*, Lec., U. S. Geol. Surv. Bul. 4, No. 2, p. 473.

In Europe, the learned Dr. D. Sharp, after giving an exhaustive analysis of the *Dytiscidæ* of the world, tried his hand at a synthetic exhibition. Any one desirous of seeing Analysis and Synthesis in one view would do well to consult this scholarly memoir.

Again, the author has trouble with a hypothetical *Badister* which he can not trace to the proper genus by the tables in the Classification, page 21, without resorting to a lengthy empirical process. How he expected to gain the desired end from what he declares a synthetic composition by an analytical method is not very evident, but he states the scheme would work well enough, if the tables were "longer and more complex" and if every thing else was right. In school pupils are reprimanded for offering a criticism without the proper correction. Were the author to present a sample of some coleopterological work as he conceives it should be done for comparison with that done by others, the value of the two systems or plans could be better estimated. If, as he says, "the present method of tabular statements of genera and species inflicts such great inconvenience and loss of time upon our students," and the author knows of a better as he intimates, by giving Science the benefit of his discovery all would cordially recognize in him a benefactor, and especially the writer. A single genus would do as a sample, as *Brachynus*; or a small family might be exhibited, say the *Heteroceridæ* or the *Cioidæ*, all of which are as yet virgin soil as it were—unoccupied territory. The above is not written in the spirit of captious criticism but as a candid expression of the opinion of the writer on the points treated of.

Yours &c.,

JOHN HAMILTON.

Meeting of the American Association for the Advancement of Science.

The Annual meeting of the above Association will be held in the city of Cleveland, Ohio, August, 1888.

The entomological section will hold its first meeting in the High School Building, 9 A. M., August 15th.

It is very much desired that the meeting of the section be as successful as possible. And we therefore urge not only the attendance of Entomologists but as well specific preparation against the meetings that there may be a presentation of papers and a taking part in discussion which will make the meetings a profit and an inspiration. Dr. A. J. Cook of Agricultural College, Mich. is the Secretary of the section and we are earnestly requested by him to ask entomologists to send to him as soon as possible the subjects of intended papers and before the meeting, as well abstracts of the same

The American Museum of Natural History at Central Park, New York, has secured the services of Mr. William Beutenmüller as Curator of the Entomological Department. Mr. Beutenmüller has for several years made a general study of Entomology and more lately has made a specialty of the Tineidæ. The Central Park collection which formerly contained many types of Grote and Robinson as well as those of Robinson's Tortricidæ has been almost totally destroyed by *Anthrenus*—and what is left is practically valueless. The officials have taken now the right step for a collection, in securing for what is obtained in the future, the care of a very promising and active Entomologist.

Book Notices.

We have received Bulletin No. 2 of the Experiment Station of Florida.

In this Mr. Wm. H. Ashmead of Jacksonville who has been appointed Entomologist publishes notes on various insect pests.

We wish however to call attention to the fact that in this report he describes two new species of Diptera, *Aphidius flavicoxa* and *Pachyneuron maidaphidis*.

We have no objection whatever that descriptions of new species should be given in these bulletins and corresponding publications and reports. But we do claim that thereby the author is doing work which will entail no end of trouble and vexation on posterity. We have now or soon will have some 40 or more Experiment Stations each under law publishing a Bulletin at least every three months. If original descriptions made in these are to be recognized, one can see what a library—almost entirely waste paper to him—the Entomologist must have, if, indeed, he can obtain these reports. It is an easy matter for every describer of new species to have the species as well published in some regular Entomological journal and in the interest of future Scientists we beg that this may always be done.

This is said only as the report before us gives us the occasion. Some of our best Entomologists not recognizing the evil have described in State or United States Bulletins and Reports only, and so have unwittingly

set a very bad example. We hope such of our Entomologists as may indulge in species building hereafter will see that their descriptions are published where students have a right to look for them and can without waste of time and labor find them.

Society News.

The Brooklyn Entomological Society met June 5th. 17 members present.

The Treasurer reported all bills paid—cash in hand \$26.48, and outstanding credits of nearly \$100.

The special order of the evening—the question of uniting with the Brooklyn Institute and becoming its entomological section—was taken up and it was unanimously resolved that the Brooklyn Entomological Society accept the invitation of the Brooklyn Institute to unite with it upon the terms offered, with the understanding it would be on the basis that the Brooklyn Entomological Society will not surrender its corporate existence. A committee was appointed, consisting of Messrs. Graef, Roberts, Pearsall and Hulst, to meet with the authorities of the Brooklyn Institute and make final arrangements for the completion of the proposed co-operative union.

A paper by Dr. John Hamilton of Allegheny, Penn., was read on the subject "Thoroughness in Entomological Tables"* being a brief review of an article in Ento. Am. by Lieut. Casey on the same subject. The paper elicited considerable discussion.

A paper by Mr. W. G. Wright of San Bernardino, Cal.,** giving a very interesting account of the life history of the most elegant of American butterflies—*Lycana sonorensis*—was also read. The meeting closed with exhibition and identification of specimens.

Ento. Soc. Washington, June 7th, 1888. Nine members present. Prof. Riley read some notes on *Promba* and *Yucca* pollination, in refutation of Mr. Hulst's conclusion in Ento. Am., vol. II, p. 184. He explained why, in his opinion pollination by bees is almost impossible, and gave in some detail the results of experiments in artificial pollination. Finally he is more than ever confirmed in his published views on this subject. Some discussion on this paper was had between Prof. Riley, Messrs. Schwarz, Howard and Smith, largely in reference to habits of bees.

Prof. Riley exhibited some new and interesting Micro-Lepidoptera, among them types of a new genus which he will describe as *Walsinghamia* and of a new *Simethis* which he will describe as *S. fernaldi*. He also made some remarks on the Hessian-fly showing that all references to the occurrence of the species prior to the Revolution said to be found in the minutes of the Philosophical Soc. were based on an error, and Dr. Hagen's arguments based on this point, fail.

Mr. Howard showed drawings of a new and remarkable *Chalcid* from California which he proposes to call *Rileya splendens*. The genus is compared with *Cerapterocerus*, Westwood, differing as follows: Face not elbowed in the middle so as to give a triangular profile to the head, but is gently rounded and has a strong glistening transverse clean-cut ridge just above the insertion of the antennæ, which are stouter, and with a more concave scape than with *Cerapterocerus*. The mesoscutellum has a strong tuft of erect black hairs as in *Chiloncurus*, but which is lacking in *Cerapterocerus*. The stigmal vein is given off immediately at the juncture of the submarginal with the costa, and is a trifle longer than the postmarginal. The submarginal is $3\frac{1}{2}$ times as long as the stigmal. The postmarginal, the distal third of the submarginal, and the wing disc just below this last, heavily clothed with short, stout bristles. The body is highly polished and the wings are not hyaline. The metanotal spiracles are large, long-oval and oblique, and the abdominal spiracles are very prominently tufted. Ovipositor protruded only in specimens killed in the act of oviposition.

Messrs. Howard, Riley and Schwarz discussed the methods of oviposition in some Parasites, and the uses of the often strangely modified antennæ of the ♀.

Mr. Schwarz read a list of *Termetophilus* Coleoptera found in the U. S. with notes on the species. The probable habits of the species and connection with their hosts was discussed by Messrs. Schwarz, Howard and Riley.

JOHN B. SMITH, *Rec. Secretary.*

* Published in the present number, p. 78.

** Published in the present number, pp. 71 and 72.

ENTOMOLOGICA AMERICANA

VOL. IV.

BROOKLYN, AUGUST, 1888.

NO. 5.

Preliminary Survey of the CICADÆA of the United States, Antilles, and Mexico.

By P. R. UHLER

(Continued from page 23, Vol. IV.)

3. *P. minor*, new sp.

Form nearly that of *P. putnami*; color a bronze black, more highly polished upon the tergum than elsewhere; the surface, excepting the tergum and notum invested with long gray, or yellowish hairs and with white hairs around the mesothoracic cross. Head and thorax minutely rough and wrinkled, overspread with minute appressed bronze thread-scales. Vertex transversely scooped out anteriorly, and broadly sinuated between the eyes and posterior margin; middle of the base longitudinally excavated, and having a nearly complete impressed line each side; antennæ stout, black, the basal joint tipped with yellow, the apical joint testaceous, supra-antennal plate orange yellow; front having the sulcus distinct from the base to below the middle, and thence expanding and becoming effaced, with the margins distinctly carinated, and the transverse grooves distinct; face and epistoma with long blackish and white hairs; outer margin of the cheeks and a faint dot at the base of vertex in the groove yellow. Pronotum sub-quadrangular, wrinkled, the middle line obsoletely impressed anteriorly, convex and polished posteriorly; the lateral margins moderately curved, sinuated before the humeral angles, which latter are blunt triangular and turned up, posterior margin feebly concave with the edge yellow; pleural pieces, flaps and acetabulæ margined more or less broadly with yellow; the whole underside bronze-black, minutely scabrous, densely coated with silvery scales and long white hairs. Legs flavo-piceous, clothed with long remote white hairs and bristles, the coxæ, knees, and tarsi dark piceous. Wing-covers hyaline, somewhat tinged with fulvous at base, the nervures of the apical cells, as well as the one forming the inner margin, piceous black, the radial nervure paler piceous; posterior limbs of the mesothoracic cross and surface each side thereof white; membrane of base of wings and basal portion of nervures white.

Length to tip of anal prolongation 16–17 mm.; to tip of closed wings 22–23 mm.; width of base of pronotum $5\frac{3}{4}$ –6 mm.

Only males of this neat little species have been brought to my notice. The cell opened by the separation of the postcostal ulnar nervure from the postcostal one is longer in this than in the other species. Three specimens examined from Southern California.

Mr. Morrison secured for me, in Nevada, several very small specimens belonging to this genus *Platypedia*, which measure only 17–18 mm. to the tip of the closed wing-covers; but they appear to be only dwarfed specimens of *P. putnami*. They are not nearly as hairy as the new species here described, and chiefly display in miniature the characteristics of *P. putnami*, as we find it in the same section of our country.

By counting the postcostal areole as the first ulnar, we have six areoles across the wing-cover, instead of the usual five. The commonly cited second ulnar (third of our method) is longer and more nearly triangular in the new than in the other species previously described.

Platypedia putnami is figured in Proceedings of the Davenport Academy of Natural Sciences, Vol. II, 1880, pl. IV, fig. 2, 3.

CALYRIA, Stael.

C. occidentis, Walk. (*Cephaloxys*.) British Mus. List. Homopt. Suppl. p. 36.

Calyria virginea, Stæl. Stettin Ent. Zeit., Vol. XXV, 1864, p. 56, 379. Distant, Biol. Cent. Amer. Homopt., p. 19, 1.

Hitherto found only near Vera Cruz, Mexico; unless narrow specimens of *Melampsalta parvula*, Say, which lack one of the apical areoles of the wings, should prove to be the same as the Mexican form given as the type. Several specimens of *M. parvula* have been examined by myself, in which six apical areoles were present in the one wing and five in the opposite one.

PRUNASIS, Stael.

P. venosa, new sp.

Pale green, or faded straw yellow, feebly pubescent; form nearly the same as that of *Melampsalta parvula*, but with the abdomen less contracted at tip. Vertex with a belt of large dusky spots extending from eye to eye, but sometimes obsolete, so as to leave only one large spot on the centre and enclosing the ocelli; supra-antennal plates more or less dusky; front banded with fuscous between the transverse ridges, the middle line infuscated wider above and interrupted there by a dagger-shaped yellow mark; antennæ yellow, piceous at tip of second joint and base of third; rostrum reaching to near the tip of posterior coxæ, with the apex more or less infuscated. Pronotum transverse, smooth on the middle line with the oblique impressed lines each side well defined, and the surface curvedly wrinkled between them; the lateral margins feebly sinuated, very narrow, but abruptly expanded, reflexed and impressed at the humeri; meso-notum moderately convex, a little sinuated each side, with four ob-deltoid obscure fuscous spots, of which the two inner are very

short, or even obsolete; the tip scale-like, arched, and feebly sinuated at tip with the inner bars of the cross terminated with black; mesosternal process acute, deeply sulcated, and with the edge strongly reflexed. Wing-covers milky-hyaline, with the costa, basal, and ulnar veins green, but with the veins of the discoidal areoles (except at base), and those of the apical areoles piceous-black, sometimes with the latter bordered also with piceous. Opercula confined to the basal segment, narrow, placed obliquely, subreniform; the metasternum very wide between them, triangularly produced over the following segment, scale-like, subtruncate at tip, tymbals delicate, small, subovate, separated by a wide, pubescent segment, which has a broad triangular emargination behind. Superior genital flaps acuminate and recurved at tip.

Length to tip of abdomen 11—13 mm. Expanded wing covers 31—32 mm. Width of pronotum across the middle $3\frac{1}{2}$ —4 mm.

From Middle and Southern Texas, not on the coast. Only males have thus far been examined; three specimens of which are at present in my collection. The venation is coarser than in any of the small *Cicadas* which I have had the opportunity to examine.

PROARNA, Stael.

1. *P. pulverea*, Oliv. (*Cicada*,) Enc. Meth., V, p. 759. No. 61, Germar, Thon. Ent. Archiv, II, p. 43, 82.

Proarna pulverea, Stæl. Stettin Ent. Zeit., Vol. XXV, 1864, p. 61.

Vera Cruz, Cordova and other parts of Mexico. I have examined in all fifteen specimens of this insect from various localities and find it to be fully as variable as *P. albida*, Oliv. from Costa Rica. As the absence or presence of the vittæ upon the vertex, marking of the scutellum and intensity of color of the spots on the wing-covers vary according to the condition of the specimen and its preparation after capture. I see no reason to separate it from the typical *P. grisea*, Fabr., as described by Dr. Stæl. The prominence of the front &c. depends in part upon the degree of shrinkage to which a specimen has been subjected after death. Only well matured specimens of the Hemiptera should be used in drawing up descriptions; as all others will give only 'unsatisfactory and deceptive inferences. Besides, if the head is shrunk a little into the thorax, so as to raise the fore part of the vertex to a somewhat higher level, the front will appear correspondingly more prominent. The mode of curing and drying specimens of the *Cicadæa* makes an important difference in their value for classification, as I have had occasion to know, full well in the tropics, and more abundantly in handling hundreds of specimens of *T. septendecim* and other species in various parts of North America. Both sexes, too, are almost indispensable in correctly organizing species, as the one supplements the other in yielding distinctive characters.

2. *P. albida*, Oliv. (*Cicada*,) Enc. Meth. V, p. 755, No. 39.

Proarna albida, Stæl. Stettin Ent. Zeit., Vol. XXV, 1864, p. 61.

One specimen from Southern Mexico. This seems to be a very

common species in Costa Rica and near Panama. I have seen, also, specimens from Demerara, and from the region of the lower Amazon, beyond Para.

It is a much narrower form than the *P. pulverea*, Oliv., and has the curved vein of the costal anastomosis more slender, and not black as in that species.

Forms which partly connect the two foregoing species occur at Santarem, also in Peru near the headwaters of the Amazon, also others in the province of Rio de Janeiro, and near Montevideo. The males in this section of the genus usually have a spur at the apex of the tegulæ.

3. *P. sallei*, Stael. (*Proarna*,) Stettin Ent. Zeit., Vol. XXV, 1864, p. 61.

Inhabits the vicinity of Vera Cruz, Mexico.

4. *P. championi*, Dist. Biol. Cent. Amer. Hemipt. Homopt. 1881, p. 12, No. 4.

It has been taken in the province of Tamaulipas, and other parts of Mexico, and has been reported by Mr. Distant as having been found in Guatemala and Costa Rica.

5. *P. signifera*, Walk. (*Cicada*,) British Mus. List Homopt. Suppl., p. 22.

Proarna signifera, Dist. Biol. Cent. Amer. Homopt., 1881, p. 13, No. 5.

This appears to be a common species in Northern Mexico; but Mr. Distant cites other localities for it, as Orizaba, Valladolid in Yucatan, and Torola, Guatemala.

6. *P. maura*, Dist. Biol. Cent. Amer. Homopt., 1881, p. 13, pl. II, fig. 5.

This is a common species in Mexico and is very variable in size. It is reported also from Yucatan by Mr. Distant.

7. *P. longirostris*, Dist. Biol. Cent. Amer. Homopt., 1881, p. 13, pl. II, fig. 4.

Inhabits Mexico. It resembles the preceding species in form, but has a much longer rostrum, and lacks the broad tract at the base of the wings.

8. *P. valvata*, new sp.

Robust, form nearly that of *P. maura*, Dist., piceous-black. Head including the eyes scarcely wider than the fore part of the pronotum; vertex depressed, transversely impressed, and excavated at each end of the impression; three longitudinal deeply impressed lines, of which the middle one is interrupted by the central ocellus, and the lateral ones start above in a concavity and unite below with the boundary incisures of the front; an oval ochreous spot occupies a sunken spot before the central ocellus, a similar spot is placed at the upper end of each lateral incised line, the anterior margin of the supra-antennal plate is also ochreous, and there is a long ovate spot of the same color on the summit of the front; face tawny or testaceous, sericeous pubescent, front having the middle impressed line obsolete, the costate lines sharply defined each side; rostrum reaching to behind the middle coxæ; antennæ tawny

testaceous. Pronotum piceous, minutely pubescent, convex, much narrowed anteriorly, the fore-margin moderately arcuated, with the edge reflexed, an interrupted hooked ochreous vitta runs from near the inner corner next the eye to the transverse impressed line dividing the lobes, a spot of the same color near the anterior angle, and a diagonal vitta near the humeral angle; the two exterior areas of the disk marked with curved coarse wrinkles, posterior lobe depressed, transversely wrinkled, having the posterior angles produced, long, wide, with the outer corners a little rounded; mesonotum convex, minutely pubescent densely and finely shagreened, marked with a twice-looped ochreous line which runs back to behind the middle of the disk, limbs of the mesothoracic cross yellow, connected anteriorly with a short curved streak of the same color, reflexed posterior and lateral margins also ochreous, the latter covered with silvery pubescence when fresh; cavities each side and before the cross also silvery pubescent. Exposed part of the metanotum, and adjoining margin of the abdominal segment ochreous. Wings hyaline, tinged with dull ochreous at base, veins of the wing covers testaceous (green when fresh?) more or less interrupted with fuscous, the costal nervure fuscous, margined and interrupted with testaceous, excepting the apical portion, the two transverse veins which are marked with the brand a little curved,—the brand is either present or absent, or sometimes forms only a faint vestige; apical series of nervures fuscous in old specimens; nervures of the wings greenish-testaceous, those of the forward portion and bases of all the coarser nervures fuscous. Beneath testaceous or pale green, pruinose, minutely pubescent. Legs fringed with close white hair, the anterior and middle tibiae, the anterior femora and tarsi, tips of the tarsi, nails and spines piceous. Opercula pale, long and wide, overlapping along their inner margin, broadly rounded behind, extending far back, so as to leave only five ventral segments fully exposed. Abdomen blunt conical, tergum piceous, but with the base, last segment, excepting the black patch at tip, and a large sub-quadrate spot on the segments next behind the tymbals, ochreous. Areoles of the wing-covers generally wider than in *P. maura*. Last segment of venter and also the inferior genital segment of the male triangular emarginate; superior genital cover acuminate.

Length to tip of abdomen 28—30 mm.; to tip of closed wing-covers 42—45 mm. Width across base of pronotum $12\frac{1}{2}$ —13 mm.

Several specimens of this species have passed through my hands, but at present only three males remain in my collection. One of these is from the vicinity of the Pecos river in Texas, and the others were captured in Arizona. A male specimen from Camp Grant, Arizona, had a much longer rostrum than the types, and it was also destitute of the brown brand of the wing-covers.

To the Food Plants of *Empretia stimulea* given by Mr. Beutenmüller we can add from personal observation *Prunus cerasus* (Common Cherry) and *Smilax rotundifolia* (Catbrier). Indeed, we have it found more commonly upon the latter than upon any other food plant. Mr. Hubbard reports it feeding upon the Orange in Florida.

To the food plants of *Apatela americana* we can add *Rubus villosus* (Blackberry) and *Robinia pseudacacia* (Locust). G. D. H.

HANDLING WASPS WITHOUT HARM.

(*W. L. Wilder in Science.*)

"It is a fact not generally known that if one holds his breath wasps, bees, and hornets can be handled with impunity. The skin becomes sting-proof, and, holding the insect by the feet and giving her full liberty of action, you can see her drive her weapon against the impenetrable surface with a force that lifts her body with every stroke; but let the smallest quantity of air escape from the lungs and the sting will penetrate at once. I have never seen an exception to this in 25 years' observation. I have taught young ladies with very delicate hands to astonish their friends by the performance of this feat, and I saw one so severely stung as to require the services of a physician through laughing at a witty remark of her sister, forgetting that laughing required breath. For a theory in explanation I am led to believe that holding the breath partially closes the pores of the skin. My experiments in that direction have not been exact enough to be of any scientific value, but I am satisfied that it very sensibly affects the amount of insensible perspiration."

The above is sent us by Mr. J. B. Smith, who adds:—"I tried it with a ♀ *Polistes* and got stung just as I expected."

We think it very probable (if the whole matter be not intended as a practical joke to lead credulous people to suffer from their credulity,) that the author of the above has happened to have experience only with male specimens of the Hymenoptera. In these parts and in Washington also, as we should judge from Mr. Smith's experience, it takes more than a holding of the breath to cause the aggressive activity of the business end of a ♀ wasp or hornet to drop into "innocuous desuetude." We will however keep the matter in mind, and when next time we find the irrepressible "small boy" daring the wrath of Bumblebees for the sake of a few cells of honey, will tell him of this "easy method," and will at a safe distance from boy and bee watch how it works. If we were given to betting, we would give odds that after the experiment there would be no holding of the "small boy's" breath.

G. D. H.

IN the Stettiner Entomologische Zeitung, 1887, Vol. 48, p. 314, the following "self-acting" apparatus for separating the Insects from siftings is described:—"Into a wide-mouthed bottle place a cork through which the stem of a wide glass funnel is fitted. Place the siftings into a round pasteboard box which fits snugly to the mouth of the funnel and punch into the bottom a series of small holes. The Insects will make for the gleams of light, get out through the holes and eventually drop into the bottle below."—All extremely ingenious, whether practical or not is another question!

J. B. SMITH.

7 Scutellum with a short, thick projection behind.

*Petiole short.

Metathorax with two teeth on each side ; posterior femora armed with 7 or 8 teeth (G. 14) **Pseudochalcis**, Kirby.

Scutellum ending in a raised bidentate plate ; posterior femora regularly denticulate ; antennæ 12-jointed (G. 15) **Megalocolus**, Kirby.

**Petiole long.

Scutellum bidentate.

Metathorax unarmed.

Hind coxæ with leaf-like projections ; antennæ 14-jointed ; posterior femora armed with one large tooth and several smaller ones

(G. 16) **Epinæus**, Kirby.

Metathorax with two teeth on each side.

Posterior femora armed with one large tooth and 5 or 6 smaller ones ; antennæ 13-jointed..... (G. 17) **Stypiura**, Kirby.

Posterior femora with numerous depressed punctures and with large teeth ; antennæ 13-jointed..... (G. 18) **Epitelia**, Kirby.

8 Petiole short.

Ovipositor exerted as long as the abdomen . . (G. 19) **Acanthochalcis**, Cameron.

Ovipositor short, usually hidden ; posterior tibiæ 2-spurred.

Posterior femora toothed 9

Posterior femora not toothed.

Metathorax without spines.

Scutellum usually bidentate, seldom simple.

Antennæ 11-jointed (G. 20) **Stomatocera**, Kirby.

Antennæ 12-jointed (G. 21) **Antrocephalus**, Kirby.

Antennæ 13-jointed (G. 22) **Haltichella**, Spinola.

Scutellum produced into a long spine..... (G. 23) **Aspirhina**, Kirby.

Metathorax with a spine on each side.

Antennæ 12-jointed ; wings variegated..... (G. 24) **Trichoxenia**, Kirby.

9 Metathorax with a projection on each side..... 10

Metathorax without projections at sides.

Posterior femora with a single large tooth ; antennæ 12-jointed.....

(G. 25) **Notaspis**, Walker.

Posterior femora with a prominent projection in the middle ; antennæ 11-jointed

(G. 26) **Euchalcis**, Dufour.

Antennæ 13-jointed (G. 27) **Neochalcis**, Kirby.

Posterior femora with two obtuse teeth and minutely denticulate.....

(G. 28) **Hockeria**, Walker.

Posterior femora armed with one large tooth and finely serrated ; petiole long..

(G. 29) **Anacryptus**, Kirby.

Posterior femora with 7 large teeth..... (G. 30) **Chalcitella**, Westwood.

Posterior femora with many small teeth..... (G. 31) **Arretocera**, Kirby.

Posterior femora with the apical half minutely denticulate.....

(G. 32) **Conura**, Spinola.

10 Antennæ simple, 12-jointed (G. 33) **Hybothorax**, Ratzburg.

Antennæ flabellate, 10-jointed..... (G. 34) **Hippota**, Walker.

LIST of the SPHINGIDÆ of TEMPERATE NORTH AMERICA.

By JOHN B. SMITH.

The following synonymical List embodies the results of my studies in this family now in press, as a monograph of the family.

In order to assist in the Cabinet arrangement of the species, and to bring in a condensed form the synonymy this list is presented somewhat in advance of the monograph. The complete bibliography, as well as the basis of the synonymy will be given elsewhere.

A few species now in the Grote List of 1882, will be found missing here. They are forms not properly to be credited to the fauna of temperate North America, as I hope to show on some future occasion.

Family SPHINGIDÆ.

Sub-family MACROGLOSSINÆ.

Hemaris Dalm.

- 1 palpalis *Grt.*
- 2 thetis *Bdv.*
metathetis Butl.
- 3 rubens *Edw.*
senta Strk.
- 4 cynoglossum *Edw.*
- 5 tenuis *Grt.*
fumosa Strk.
- 6 diffinis *Bdv.*
fuciformis ‡ S. & A.
athra Strk.
- 7 axillaris *G. & R.*
marginalis Grt.
grotei Butl.
- 8 gracilis *G. & R.*
- 9 thysbe *Fabr.*
pelasgus Cram.
cimbiciformis Steph.
ctolus Bdv.
fuscicaudis Wlk.
var. ruficaudis Kirby.
uniformis G. & R.

- pyramus* Bdv.
floridensis G. & R.
var. buffaloensis G. & R.

Lepisesia Grt.

- 10 *flavofasciata* Barnst.
11 *ulalume* Strk.
12 *euterpe* Edw.
13 *phaeton* G. & R.
errato Bdv.
14 *clarkiae* Bdv.
victoriae Grt.
15 *circae* Edw.
16 *gauræ* S. & A.
var. juanita Strk.

Sub-family **CHÆROCAMPINÆ.**

Ællopos Hbn.

- 17 *fadus* Cram.
titan Cram.
annulosum Swains.
balteata Kirtl.
18 *tantalus* Linn.
tripunctata Gœze.
zonata Dru.
ixion Linn.

Enyo Hbn.

- 18 *lugubris* Linn.
fegeus Cram.
camertus Cram.
luctuosus Bdv.

Amphion Hbn.

- 20 *nessus* Cram.

Thyreus Swains.

- 21 *abbottii* Swains.

Deidamia Clem.

- 22 *inscriptum* Harr.

Deilephila Ochs.

- 23 *gallii*
var. chamænerii Harr.

epilobii Harr.
intermedia Kirby.
canadensis Gn.

- 24 *lineata* Fabr.
daucus Cram.
oxybaphi Clem.

Chærocampa Dup.

- 25 *tersa* Linn.

Argeus Hbn.

- 26 *labruscæ* Linn.
clotho Fabr.

Pachylia Wlk.

- 27 *ficus* Linn.
crameri Ménét.
lyncea Clem.
venezuelensis Schauf.

Philampelus Harr.

- 28 *linnei* G. & R.
vitis † Cram.
fasciatus † Grt.
29 *vitis* Linn.
jussieuæ Hbn.
fasciatus Sulz.
30 *pandorus* Hbn.
satellitæ † Harr.
ampelophaga Bdv.
31 *achemon* Dru.
crantor Cram.

Ampelophaga Brem. & Gray.

- 32 *chærilus* Cram.
clorinda Martyn.
azaleæ S. & A.
33 *myron* Cram.
pampinatrix S. & A.
var. cnotus Hbn.
34 *versicolor* Harr.

Sub-family SPHINGINÆ.

Amphonyx Poey.

- 35 *antæus* Dru.

jatrophæ Fabr.
hydaspes Cram.
medor Cram.

Dilophonota Burm.

- 36 *ello* Linn.
37 *obscura* Fabr.
 sitheno Hbn.
 rhæbus Bdv.
38 *merianæ* Grt.
 omphalæ Bdv.
39 *edwardsii* Bull.
40 *melancholica* Grt.
41 *fešta* Edw.

Cautethia Grt.

- 42 *grotei* Edw.
 noctuiformis ‡ HS.

✓ **Protoparce** Burm.

- 43 *celeus* Burm.
 quinquemaculata Haw.
 carolina ‡ Don.
44 *carolina* Linn.
45 *rustica* Fabr.
 chionanthi S. & A.
46 *cingulata* Fabr.
 affinis Gœtze.
 convolvuli ‡ Dru.
 pungens Eschsch.
 druræi Don.
var. decolorata Edw.

Sphinx Linn.

- 47 *kalmiæ* S. & A.
48 *drupiferarum* S. & A.
 vancouverensis Edw.
 var. utahensis Edw.
49 *perelegans* Edw.
50 *gordius* Cram.
 pæcila Steph.
51 *luscitiosa* Clem.
52 *albescens* Tepper.
53 *vashti* Sirk.

- 54 libocedrus *Edw.*
 55 chersis *Hbn.*
 cinerea Harr.
 oreodaphne Edw.
 56 insolita *Lint.*
 57 pinastri *Linn.*
 saniptri Strk.
 58 sequoiæ *Bdv.*
 ♂ *coniferarum* ‡ Wlk.
 59 dollii *Neum.*
 60 coloradus *Smith.*
 61 elsa *Strk.*
 62 canadensis *Bdv.*
 plota Strk
 63 lugens *Wlk.*
 eremiloides Strk.
 merops Bdv.
 andromedeæ Bdv.
 sordida ‡ Clem.
 separatus Neum.
 64 eremitus *Hbn.*
 sordida Harr.
 65 plebeius *Fabr.*
 66 cupressi *Bdv.*

Dolba Wlk.

- 67 hylæus *Dru.*
 prini S. & A.

Chlænogramma Smith.

- 68 jasminearum *Bdv.*
 Ceratomia Harr.
 69 amyntor *Hbn.*
 quadricornis Harr.
 70 undulosa *Wlk.*
 brontes ‡ Bdv.
 repentinus Clem.
 71 hageni *Grt.*
 72 catalpæ *Bdv.*

Ellema Clem.

- 73 harrisii *Clem.*
 coniferarum ‡ Harr.
ab. bombycoides Wlk.

- 74 *pineum* *Lint.*
75 *coniferarum* *S. & A.*
cana *Martyn.*

Exedrium *Gr.*

- 76 *halicorniæ* *Strk.*

Sub-family **SMERINTHINÆ.**

Triptogon *Brem.*

- 77 *modesta* *Harr.*
princeps *Wlk.*
populicola *Bdv.*
cablei *Von Reiz.*
var. occidentalis *Edw.*
imperator *Strk.*

Smerinthus *Latr.*

- 78 *geminatus* *Say.*
var. jamaicensis *Dru.*
ocellatus *Fabr.*
var. tripartitus *Gr.*
79 *ophthalmicus* *Bdv.*
var. pallidulus *Edw.*
var. vancouverensis *Butl.*
80 *cerysii* *Kirby*
astarte *Strk.*

Paonias *Hbn.*

- 81 *excæcatus* *S. & A.*
pavonina *Geyer.*
82 *myops* *S. & A.*
rosacearum *Bdv.*
jamaicensis ‡ *Butl.*
83 *astylus* *Dru.*
integerrima *Harr.*
io *Bdv.*

Cressonia *G. & R.*

- 84 *juglandis* *S. & A.*
robinsoni *Butl.*
pallens *Strk.*

Arctonotus *Bdv.*

- 85 *lucidus* *Bdv.*

Breeding Habits of *Amphicerus bicaudatus*.

BY H. G. HUBBARD.

The larva of this beetle, as observed by me at Crescent City, Fla., lives in the underground stems of a species of *Smilax*. This plant is a strong-growing vine, forming at or just below the surface of the ground immense tangles of thickened rhizomes which receive the local name "briar root." The living roots are receptacles in which the plant stores upon abundant supply of starch for the nourishment of the vigorous young shoots. At the periods of growth these exhaust certain portions of the subterranean stem which then die and become dry and pithy. The dead "roots" are dark red in color and appear to contain a large amount of tannin. In this condition they form favorite nesting places for *Amphicerus bicaudatus* and are riddled with their burrows. The larvæ may be found in large numbers, excavating cylindrical galleries in the pith, and traversing its substance in every direction. They were first observed at Crescent City in the Spring and early Summer 1884, boring into a large mass of roots which had been grubbed from the woods the year before and fastened up under the shelter of a veranda roof to form a rustic ornament. During the Summer of 1884 a large amount of fine sawdust was thrown out from the burrows by the larvæ, but the latter did not attain their full growth until the following year, and at the time of pupating were certainly two, and very probably three years from the egg. Pupæ were found in March and April 1885, and imagos appeared a month later.

A description of the larva which, in general appearance, resembles that of *Apate*, *Dinapate* and allied species, I hope to give at another occasion. The pupæ were found naked in the galleries made by the larvæ or by the perfect insects. *A. bicaudatus* is a rather common insect in the Southern States and still more abundant in the North. The imago has long been known to bore into the living twigs of cultivated trees, and the injury thus done is frequently described in works on economic Entomology but the habits of the larva have hitherto remained unknown.

I firmly believe that in the more Northern States *A. bicaudatus* will likewise be found to breed in the subterranean stems of *Smilax* which abounds in our woods. That allied *Bostrychid* beetles have similar habits has been proven by Mr. E. A. Schwarz, and I append here the following notes which he placed at my disposal upon his return from a visit to South-eastern Florida:

"On the island of Key West and on the mainland a few miles south of Miami River I found in the months of April and May the imagos of *Amphicerus punctipennis* and *Tetrapriocera longicornis*, the former very

rare, the latter in great abundance, boring into the living trunks and branches of *Rhus metopium* and also other trees, but I never was able to find the larvæ of either species in the trees so attacked. Finally, one day my attention was attracted by numerous dead roots of a species of *Smilax* which protruded from the ground in a newly cleared and burned tract within the hammock. These half-burned roots proved on examination to be inhabited and honeycombed by numerous specimens of *Tetrapriocera longicornis*, larvæ and imagos, and after protracted research I also found the imago of *Amphicerus punctipennis* and what no doubt is the larva of this species. Investigation on places not recently affected by fire revealed the fact that among the living *Smilax* roots there were always some dead ones to be found in the ground and these were usually infested with the *Tetrapriocera* larvæ. The half-roasted roots, which are as hard as stone, had, however, evidently a greater attraction to these *Bostrychid* beetles than those not affected by fire."

IN Vol. 48 of the Stettiner Entomologische Zeitung, 1887, p. 315, is an interesting account of how very dirty, non-pubescent beetles may be entirely cleaned, when ordinary washing will not produce the desired result. The specimens experimented with were bright *Phænus* species. They were carefully washed in soap and water, thoroughly rinsed, the moisture removed as far as possible with blotting paper, and were transferred for several days in sulphuric ether. After removal from this they were again tried with blotting paper and the dirty spots painted with Collodium so as to form a rather thick film. When firmly set, this film can be easily loosened at one edge and with a fine forceps removed entirely—and with it also all particles of dirt.

* * *

IN the same Journal Mr. Moeschler reviews Elwes' paper on the genus *Parnassius*, and incidentally mentions some good things: Elwes quotes a translation from Siebold, not having seen the original: "not seldom found on recently dead horses in the lower mountain valleys of Austria and Hungary!!!" referring thereby to the larva of *Parnassius mnemosyne*. Moeschler has hunted out the original which reads "sie sind von dem jüngst verstorbenen Rossi in den niederen Gebirgstälern Oesterreichs und Ungarns nicht selten angetroffen worden." The intelligent translator read "Rosse" (horses) instead of Rossi, hence the blunder. It should read—not seldom found by the recently deceased Rossi &c., &c.

A German translator of Wallace's travels managed a sentence so as to record the capture of "a large number of Butterflies, many of which were Lepidoptera."

Moeschler himself, reading Hulst's paper on *Catocala*, ran across the statement that the larva of *C. minuta* feeds on *Locusts*. Now the only translation of Locust that he could get anywhere in Lexicons grasshopper (Heuschrecke), and it was not until he applied to Zeller that he was enlightened!

J. B. SMITH.

NEWPORT, R. I., JULY 6th, 1888.

EDITOR OF ENTOMOLOGICA AMERICANA.

DEAR SIR:—I observed in the July number of *ENTO. AM.* a criticism by Dr. J. Hamilton of Allgheny, Penn., concerning some remarks recently published by the writer in this Journal, and my attention had but a few weeks before been called to a singularly unjust paper relating to myself published by this same celebrated authority about a year since in the *Canadian Entomologist*. The latter is unjust and discriminating in that it extols in one entomologist that which it condemns in another. To say that these articles display a certain ill-disguised animus is surely superfluous, and I should have passed them by without notice, were it not for the fact that the limited powers of apprehension alluded to by our worthy critic, so distort my meaning that to refrain from some sort of a rejoinder would only be an injustice to myself.

It was not intended by the language used to say that the authors of the Classification were the "synthesists with philanthropic desire etc.," and, in fact, any such statement would have been incongruous, for these authors differed considerably in their methods. There was nothing personal intended, and none other than a disingenuous imagination could so construe it.

Entomologists in general may be ranged into two classes, the line of demarcation being more or less pronounced, one of which is composed of those who devote themselves principally to analysis or the discussion of differences, and who patiently explore all available material with the ultimate object of deriving some law of variation which will enable them to perceive more clearly the solution of the vexed question of specific limitation. The components of the other class are more careless or impatient workers who, on arriving at a point requiring painstaking and minute observation in the separation of species or varieties, surmount the difficulty at a bound by combining all these forms into a composite entity, without indicating any of the salient points of difference which become so prominent to those who are accustomed to careful observation.

It may be that the investigators of the first class make mistakes regarding the specific value of certain characters, but they are the real advancers of the Science, and are the ones who in the end will bring to light any demonstrable laws of specific development or of introspecific variation, although in their efforts they may somewhat increase the complexity of nomenclature.

In the concluding paragraph of the article on "Thoroughness in Entomological Tables," the synthesists referred to were those comprised in the second class above outlined, called less euphoniously "slumpers" by the European scientists.

I do not feel called upon to dilate upon the general petulance of Dr. Hamilton's letter, and will intrude but a little further upon your valuable space.

All entomological tables are condensed, synthetic statements, when regarded in their entirety as genera or groups, but analytic with reference to the species or genera which respectively compose them, so that the surprise exhibited by our non-captious critic at my attempt to use a synthetic table for analytic purposes is not very intelligible; but, as before indicated, the meaning which I wished to convey by the word synthesis, and which has been so ingeniously misinterpreted, was two-fold viz: that of too great concentration in tables, and the process of "slumping" closely allied forms under a single characterization. In other words there are a great many entomological tables in existence, of which one only was cited as an example, which might be slightly less condensed, and, through greater completeness, might be rendered less ambiguous. I am credited here with having possibly made a discovery, but this is really too much honor to be paid the mere statement of an axiom.

Very truly yours,

T. L. CASEY.

Note on Species of *Boarmia*.

By A. R. GROTE, A. M.

In reference to my descriptions of Western forms belonging to *Boarmia* and which are briefly discussed by Mr. Hulst on page 50, I would state that my remark, on page 124 of Can. Ent., Vol. XV, printed after the description of *grisearia*, should follow that of the ensuing species, *separataria*. By a mistake, in transcribing my notes, I must have allowed this comparison to follow the wrong species. The remark should read: "This cannot be the male (not female) of *pulmonaria*." I made this remark, as I recollect, because the undersurface was *discolorous* and *immaculate* though darker than *pulmonaria*, but the color of upper surface and size and markings in detail lead me to consider the two distinct, not sexes of one species, which Mr. Hulst suggests, and which doubt more material will clear up. As to *rufaria*, I rely upon the more cut off secondaries to prove its validity, but as I compare it wrongly with *separataria*, this character may not hold good. As to its strange color I know of no such instance in the genus. Mr. Hulst's remarks as to these seven species, from his experience in the family, will doubtless allow of their better arrangement, although in most cases my comparisons agree; and I am also of opinion that the species should stand until we have more light. So far as I know, the variability of these gray, wavy-lined spanners,

is confined to certain limits which will not allow us to embrace any of the above species as varieties. But my experience is limited and it would not be strange were the fact to be afterwards proven.

**Note upon *Ægeria impropria*, H. E., and a description
of the ♀.**

By J. J. RIVERS.
University of California.

The habit of this insect has hitherto been traced to the roots and lower parts of the canes of the garden Raspberries. But this season it was found equally at home in the roots of the cultivated sorts of Blackberries, causing foliage and fruit to be dwarfed and dried and valueless. I suspect that some other observer will discover that this insect is also addicted to the native species of Brambles though I have been altogether unsuccessful in tracing it to such a source.

The author of this species (Papilio, Vol. I, p. 193) described the ♂ of this insect and which is a good description of the typical male. But there are examples that occur with *three* abdominal bands of pale yellow and when three are present the third is at the base of the anal tuft. Another variation shows a tendency in the male to imitate the dorsal markings of the female by having well developed yellow bands on the 2nd, 4th and 6th segments and on the dorsum of all the other segments is to be seen a cluster of yellow scales forming a nucleus of a yellow band.

Description of the female: Fore-wings nearly opaque, the vitreous spaces being nearly obliterated by a covering of dull orange scales; though a coppery tint is the general shade yet a broad line of dull purple traverses the costal region, the nervules and the stigmata. Hind-wings as in the male but with the fringes of the inner margin more flecked with yellow which darkens into a coppery bronze as an outer marginal line; the remainder of the fringes is of a dull bronze. Abdomen black with purple reflections, yellowish golden bands are on all the segments but the first and third and even these exempted segments sometimes have a central spot of golden scales. Caudal tuft shorter than in the ♂, distinctly orange golden, the centre blackish purple and towards the outer portion it is slightly flecked with black. Beneath, wings rich golden with the palpæ, coxæ, and abdominal rings paler. Abdomen, stigmata and nervules more or less dark purple though the base of the fore wings and some of the nervules of the hind wings are orange golden. Antennæ shorter than in the ♂ and without the pectinations found in that sex. Expanse, 19 to 22 mm. Males vary in expanse, 13 to 22 mm.

Book Notices.

Nouveaux Genres et Espèces de Phycitidæ et Galleriidæ, by E. L. Ragonot, April 1888. Published privately by the author.

In the above pamphlet of 52 pages Mr. Ragonot publishes very brief descriptions of 61 new genera and 230 new species of Phycitidæ and Gal-

leridæ from various parts of the world. We call attention the more particularly to this publication as it is published privately, and so can not, save by a chance, be obtained, and because in it are described two North American genera and species, viz: *Diviana eudoriella* and *Calera punctilimbella*. Mr. Ragonot also proposes a substitute for one of his American generic names previously described but preoccupied, viz: *Dolichorrhinia* instead of *Macrorrhinia*. Mr. Grote has already proposed *Ragonotia* instead of *Ciris*.

We call attention to one other thing which is justly exasperating to the American student, viz: the carelessness of our European co-workers in the giving of localities. *Diviana eudoriella* has its locality given as "Amerique Sept." It does seem that no longer ought any European to look upon North America as corresponding geographically with France, England or Palestine. Staudinger includes in the European Fauna, Europe proper, N. Africa, Northern, Central and South-western Asia, as well as the Amur country. How delightful it would be to have a describer give the locality of insects, one from N. Africa, one from England, one from Greece, one from Amur, each and all as "Europe." Yet this is an exact parallel to the giving of "North America" as the locality of insects from Greenland, Alaska, Florida and California, as the chance may be. We speak of this just now using Mr. Ragonot's work as a text, but it is an evil which has long existed, and among the best European Entomologists, but it is an evil which ought not to exist any longer. With some writers the evil is increased as North America is taken not in the faunal but in the geographical sense, and species from Mexico, the West Indies and Guatemala are included under the term "North America." Indeed, Mr. Ragonot himself in his "Diagnoses on N. American Phycitidæ and Galleridæ" describes 2 species from the West Indies, and 2 from Mexico. It is therefore possible that from the faunal standpoint *Diviana eudoriella* is not North American.

Books and Pamphlets received during May 1888.

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- Proc. Acad. of Nat. Sciences Phila, Part I, '88.
Proc. Amer. Phil. Society, No. 127.
Prairie Farmer, May, '88.
Societas Entomologica, Part I, April, '88.
Am. Monthly Microscopical Journal, April, '88.
Report of Statistician U. S. Dep't of Agric., new series, No. 50.
Canadian Entomologist, Vol. XX, No. 5.
Notes on *Lachnosterna*, by Dr. GEO. H. HORN.
Psyche, Vol. V, No. 145.
Naturæ novitates, Nos. 9 and 10.
Bulletin of the Entomological Society of Belgium, April and May, '88.
Some Pests of the Pomologist, by Prof. J. A. LINTNER.

ENTOMOLOGICA AMERICANA

VOL. IV. BROOKLYN, SEPTEMBER, 1888. NO. 6.

PROCEEDINGS OF THE ENTOMOLOGICAL CLUB OF THE A. A. A. S.

AUGUST 15, 1888.—The Club met as per announcement at 9 A. M. with the President, Mr. John B. Smith in the chair. In the absence of the Secretary, Prof. A. J. Cook, the Club proceeded to election of Secretary for the Cleveland meeting, resulting in the election of Prof. Herbert Osborn.

The Club then adjourned to meet at 1:15 P. M.

Afternoon Session.

The President delivered his annual address.

ANNUAL ADDRESS.

Gentlemen : The selection of a subject for an annual address is not always an easy one:—it should be of general interest, of actual value, and not addressed to one particular branch of our very extensive field of study. In looking over the older records of our Club, and of the Entomological section of the Association, I find that it has been quite usual to give an review of the work done during the previous year, with comments and suggestions, often of great value. It has been a matter of considerable interest to me to find that in almost every instance the presiding officer has been able to mark a decided advance in our Science, and to find a decided increase of interest in the study of Entomology. At our last meeting, our then President, Prof. Comstock selected a somewhat different, but none the less interesting subject for his address, and thus furnished a precedent of which I gladly avail myself. The task of trying to show the advance in our Science by a review of the publications during

the year, is a very great one, and becoming greater and more involved each year. Feeling that I could not do such justice to that subject as it deserved, it occurred to me that as good a service might be done by an even cursory glance at our materials for work—in other words our Entomological collections. My subject shall therefor be:

Entomology and Entomological Collections in the United States.

In the status of Entomology in our country a gradual and great revolution has been accomplished of late days. It is not so long since Entomologists were looked upon as triflers, even by other students of Natural History and only recently the layman did not rank him among persons of sound mind.

The steady labor of our Systematists, the value of their results in questions of general Biology, and for large generalizations, have gradually won for us the respect of the workers in other fields, whilst the value of the labors of the economic entomologist to the farmer is becoming constantly better appreciated. In the so-called "Hatch Bill," with the main provisions of which most of the gentlemen present are as well acquainted as I am—appropriation was made to State Agricultural Experiment Stations, and among other officers, Entomologists have been appointed in many of the States, showing a realization of the necessity for such an officer in each State to study the local needs.

It also places Entomology into the rank of professions, and as soon as it becomes generally known that money may be made by it, even the last and most weighty reproach showered upon the rash young man who showed an inclination to the study of Entomology will lose force. It adds to the corps of working Entomologists a considerable number of men, some of whom at least, will advantage the study of our Science.

It will undoubtedly also add to our literature, and it is a matter of some interest to watch and ascertain what the nature of these contributions will be. The great majority of those already issued certainly do *not* promise well, and are a misfortune rather than otherwise. Judgment however must be suspended until further, and perhaps better considered reports appear.

A certain amount of compilation will undoubtedly be necessary, but it may be as well to suggest that a single obscure point cleared up, a single life-history well worked out, or a single series of original experiments well carried on will add more value to a Report, than any number of second-hand accounts.

The scientific side of our study has made a steady advance, not marked by any prominent features calling for special reference here.

The second, and most important branch of my subject, is the "Entomological Collections of the United States."

Considerable has been written during the past year of the educational value of entomological collections, principally in the "Entomologist." The collection and systematic arrangement of any series of specimens is undoubtedly educational to some extent; but in entomological collections neatness, patience and accuracy are cultivated, while, if the collector is at the same time a student, it brings all his powers of observation into play, and the training is useful in developing all his faculties.

No one will question the fact that numerous, well determined and easily accessible collections are the best possible aids and enciters to the study of any branch of Science, and many a promising young fellow has abandoned Entomology simply because there was no collection to which he could refer for suggestions or determinations.

Although the number of private collections in the United States is much smaller than in any European country (Turkey perhaps excepted) yet their number is quite large, at least in Coleoptera and Lepidoptera, if the record in the Naturalist's Directory may be taken as a guide.

But—there are collections and collections. We have the accumulation of handsome specimens arranged in Stars, Eagles, Harps and other attractive forms on the walls of rooms and in Museums—save the mark—and every intergrade between that, and really scientific collections.

Most of our collections made by individuals occupy a somewhat intermediate standpoint—that is they are rather above the level of a picture collection, and do not attain the level of a collection which could be made useful to Science, by the owner himself or any one else.

The reasons are partly want of time on the part of the owner, partly the want of suitable illustrated and comprehensive literature to bridge over the interspace between the childish collector and the investigator and critical examiner and particularly the difficulty of overcoming the "collecting mania."

This "mania" does not run to careful and thorough field work—unfortunately not—it runs to the accumulation of material in any way, collection, exchange, purchase—all things are tried so that you can get what your neighbor has and perhaps some thing on the list that he does not have. The result is that collections are everywhere much the same. The same *Cicindelæ*—the same *Cerambycidæ*—the same *Bombycidæ*—much the same *Noctuidæ*—the same stock rarities are represented in all collections.

This leads to another, and perhaps the most grivous fault in most of our collections. Specimens are received as a certain species and placed as such. Few collectors will undertake to verify the determination of

specimens received and the species so named is liable to infect any number of others in the same way. I find the same blunders in collection upon collection and often traceable back to one source, where a careless collector mixed things.

A little care on the part of recipients would save much of this.

To one phase of the "collecting mania" no objection can be made—on the contrary it is deserving of all encouragement—it is when it takes the form of exhaustive research in a definite locality, turning up everything discoverable; or when it runs in the accumulation of all possible material in a limited group. I wish I could impress upon the collectors the desirability of careful field work. The best material, and the most valuable should be collected by yourself. It obtains value from the number, the date and the locality, from the variations, individual and local, which it indicates.

In a well covered locality like Washington for instance new species and rarities even in Coleoptera are turning up every year. This season even so prominent a genus as *Lachnosterna* furnished a new species not known when Dr. Horn wrote, and the species is the largest that occurs there.

A knowledge of what we have, will perhaps serve as a guide to those interested, and suggest lines in which collections might be accumulated.

I shall make no pretence to completeness in the enumeration, for I am personally unacquainted with any of the Western collections, while most of the Eastern collections containing good material are known to me personally or by report.

The center of population is rapidly moving westward, and approaches the Mississippi; but the scientific life of the nation still enters in the great cities along the Atlantic coast. The good collections west of the Mississippi might almost be told off on the fingers of one hand, while all the really valuable collections in that vast region west of the Alleghanies can be counted on the fingers of both hands.

Several good nuclei exist however and will be more particularly referred to hereafter.

In my enumeration of collections I will first enumerate all the private collections, and afterward those of Public Institutions. They deserve separate treatment, because while individual collections are often of the largest value, they are always less accessible, and are sure to be either broken up, or absorbed into some public Institution.

The various orders are very unequally studied, and collections are rare or numerous accordingly. So far as I am aware, there is not a single individual collection in which there is any pretence of an equal attention to all orders. The day of general collectors, equally at home in all di-

visions of the Insecta has gone by, and while some few collectors have started with the idea of making accumulations in all orders they have gradually drifted into a specialty and the rest of the collection remains at a standstill.

But what has become of the general collections of our great Entomologists of the past! Every one knows the fate of the Say collection—lost, utterly lost, by the ignorance and stupidity of those whose duty it was to secure its preservation.

The Harris collection, classic and valuable from the work put upon it by its owner, though not very extensive, narrowly escaped the same fate. It is now in the Museum of the Boston Society of Natural History under the care of Mr. Henshaw; it seems but a wreck of its former self yet valuable as a guide to Dr. Harris' meaning in some instances.

The Walsh collection died a more heroic death. It perished in the Chicago fire, and thus probably escaped being devoured by *Anthreni*.*

The Fitch collection was practically ruined even while in the hands of its owner, and afterward, its treatment in the hands of the agent who had it for sale, was not calculated to improve its value. It is now scattered in every direction, and utterly lost.

Prof. Riley's collection rests in the National Museum. The Professor was wise enough to so dispose of it by gift to the Museum in his lifetime as to preserve its value both to posterity and himself.

The Hatch Bill, already referred to, will probably have the effect of starting at each of the Experiment Stations, a general collection, mostly local, and valuable or valueless, according to the capacity or intelligence of its entomological officer. If he makes it the record of work done, by preserving not only insects, but immature states, samples of injury, and all the steps of his investigations, as well as his general collections, the result will be a valuable one. It will excite interest, convey information, and aid the *tyro*—that important factor, the cultivation of which is so important to secure new workers in our Science.

Of general collections, perhaps the only one in which approximately equal attention is paid to all orders, is that of Mr. Bolter, in Chicago. Mr. Bolter is probably the oldest of our collectors, his labors extending over a period of forty years. During this time Mr. Bolter has visited nearly all parts of the United States on collecting trips and has accumulated a large mass of material of great value. This has been determined in all orders by Specialists, and is therefore valuable accordingly. Mr. Bolter has done no original entomological work.

Quite of a different character is the collection of Mr. Henry Edwards, practically general in extent, since it contains material in all orders: except in Lepidoptera and Coleoptera, however in a more or less chaotic con-

* Prof. Forbes informs me that some boxes *did* go to *Anthreni*, not having been sent to Chicago in time to be burned.

dition. It is a store house of surprises to the Specialist. Mr. Edwards' work has been in Lepidoptera, and the collection will be again referred to under that order.

So far as I am aware there is not another individual general collection of any extent, though there are several which will be hereafter referred to—collections of Specialists who also collect without studying, other orders.

The *Coleoptera* have perhaps the greatest number of admirers among the Entomologists, and collections are therefore most numerous and extensive. They are also best named, the literature is most complete, and the student has most encouragement to persevere.

The collection of Dr. Horn of Philadelphia, ranks easily as the best in the United States. Not only does it contain very nearly all of the types of the Doctor's numerous species, but it contains also many types of Dr. Leconte, and an almost complete series of species compared with Dr. Leconte's types.

Dr. Horn believes in small, tight, shallow wooden boxes, with a cork lining; one side only filled with Insects. These boxes are set on their sides, in rows, in plain shelved cabinets. The collection is accessible to any one who shows a sufficiently intelligent interest, and Dr. Horn is extremely liberal in his dealings with other students, readily loaning series to a monographer of special groups as soon as he has shown his ability to deal with it.

Close to this collection in extent is that of Mr. Hy. Ulke of Washington. In beauty of specimens and length of series, showing the range of geographical variation, the collection is perhaps without a peer. A very large proportion of the species were named by Drs. Leconte and Horn, and Mr. Ulke's collection is therefore as a rule very reliably determined. Mr. Ulke is always ready to show his treasures to whomever may visit him, and he has done perhaps as much as any one other man in accumulating material for monographic work, and in naming for and aiding beginners.

The collection of Messrs. Hubbard and Schwarz is unexcelled for its wealth of material in the families containing small species—*Clavicornia*, *Serricornia* and some families of *Rhynchophora*. Both of these gentlemen are excellent collectors—perhaps unequalled in this country—and an intimate knowledge of the habits of species, with extreme patience in working out the minute forms have made their collection a valuable one.

Both of these gentlemen have collected extensively in Florida and Michigan, while separately they have collected in many other parts of the United States—notably on the part of Mr. Schwarz, semi-tropical Florida, Colorado, Lake Superior, and the region about Washington, his present home.

The largest part of the collection is in Detroit, and practically inaccessible, as Mr. Schwarz is in Washington, and Mr. Hubbard in Florida.

In essentials, both the collections above named are kept as is Dr. Horn's and in generally similar boxes.

The collection of Lt. T. L. Casey I have not seen for some time, but Mr. Casey has, since that time, collected extensively on the Pacific Coast and in Texas, and has described a very large number of species of which he has the types.

Following these, there are a considerable number of collections of nearly equal standing, some rich in special groups, some more general: none of them are typical, and none have the value to students that the preceding have.

Among this series of reliably named and really good collections, may be mentioned those of Mr. O. Lugger, now in Minnesota, of Dr. Hamilton, Alleghany, Pa., of Mr. Blanchard, Brookline, Mass., of Mr. Henshaw, Boston, Mass., of Mr. Wenzel, Philadelphia, Pa., of Mr. Jülich, New York City, of Mr. Dury, Cincinnati, Ohio, of Mr. Angell, New York City and Mr. Roberts of the same place.

Of those that are known to me personally the majority use boxes similar to those of Dr. Horn.

The Lepidopterists rank next in number of followers, and New York City and vicinity are the richest in number and extent of these collections.

Easily the best of the series is that of Mr. Henry Edwards of New York City. It is extremely rich in types, both of his own descriptions and of those of others. The collection embraces exotics as well as natives, and micros as well as macros. It has been already mentioned as a good general collection.

The insects practically fill an entire floor in Mr. Edwards' house, every available nook being filled with boxes and cabinets of an infinite variety and shape. Mr. Edwards is exceedingly liberal with specimens either in the way of gift or loan, and the collection is accessible to any one interested whenever Mr. Edwards is in the City.

Mr. Edwards is always ready to assist the student by naming Insects or otherwise.

Nearly equal in extent is the collection of Mr. Neumoegen, richer in some exotic groups, and perhaps in some families of American Insects, but confined to the Macrolepidoptera.

Mr. Neumoegen's collection is in very large cabinet drawers, of uniform size and with a glass top, and is always open to proper persons.

The collection is very rich in Noctuid types, and no one can properly study this family without a knowledge of Mr. Neumoegen's collection.

Somewhere about here comes the collection of Mr. H. Strecker of Reading, Pa. The collection is of great extent, but richer perhaps in exotics than in American forms. The families outside of the Rhopalocera and some few groups of Heterocera are not well determined, and the collection is not accessible for study, Mr. Strecker, contrary to all other Entomologists known to me being entirely illiberal, and refusing to allow his species to be studied.

It is a pity so much and so rich material should be tied up and made inaccessible.

Messrs. Graef and Tepper have each excellent collections, that of Mr. Graef somewhat the larger, and both confined to the Macros, native and exotic, and both containing many types. Mr. Tepper is especially rich in species described by Mr. Morrison.

These collections are in glass-covered drawers not equal in size, and Messrs. Graef and Tepper are always ready to aid students by any means within their power.

The collection of Dr. Holland, of Pittsburgh, Pa., I have not seen. From what I can learn of it, it ranks among the first, but is perhaps richer in Exotics than in American species. The collection of Mr. T. L. Mead, and the *Hesperide* of the collection of Mr. W. H. Edwards have found a place in Dr. Holland's collection.

Among the Albany collections, so often referred to in the older literature of Lepidoptera, that of Mr. Meske is in the National Museum; that of Dr. Bailey has been for sale since the death of that gentleman several years since, and has not been added to since that time.

The collection of Prof. Lintner is rich in local forms, and has quite a number of types, with a very fair representation throughout the order. It really ranks as a general collection, since all orders are represented. Prof. Lintner's work however has been principally in Lepidoptera, save where the economic interest of some species made their study necessary.

Prof. Lintner's boxes have, many of them, glass tops and bottom: small discs of cork are fastened to the bottom in rows, and these hold the insects. A pasteboard cover to each side of the box darkens it. This feature never became popular, and many that once tried it have abandoned its use.

So far as I am aware these are all the more important general collections of Macro-lepidoptera. They have one essential point of difference from the Coleopterological collections of equal rank—they contain Exotic material, and some of the collections are fully as complete in European as in American species.

In addition to those above enumerated, are a series of special col-

lections, of greater extent in their field, than the general collections enumerated.

The collection of Mr. W. H. Edwards I have not seen. It is probably as nearly complete as possible in the Rhopalocera, at least in those families which Mr. Edwards has not sold to pay for the magnificent work he is issuing. I must not lose this opportunity of giving Mr. Edwards credit for his careful and painstaking work in this group. Whatever our individual ideas as to classification, no one can deny Mr. Edwards credit for sincere and honest work, for faithful records and above all for placing the results of his studies before us in such sumptuous style. It is to be regretted that the collection did not go in its entirety to some Public Institution—a lasting monument of his labors.

In the family *Hesperidæ* of the Rhopalocera, the collection of Mr. Eugene M. Aaron of Philadelphia is excellent. Mr. Aaron has spent much time and money to complete his collection in this family; but owing to his numerous business engagements cannot unfortunately devote much time to his collection at present, and cannot do much for seekers of information in this family.

In the *Sphingidæ*, one of the most complete collections that I have ever seen, native or foreign, is at Albany, in the possession of Mr. Erastus Corning, preserved by Mr. Wm. Gray, an Entomologist unknown to fame, but with a fund of knowledge on the subject, not to be despised. I doubt whether there are half a dozen collections of Sphingidæ in the world that are superior to this. It is practically inaccessible to students.

In the *Geometridæ* and *Pyralidæ* the collection of Mr. Geo. D. Hulst of Brooklyn is almost complete. This gentleman has of late, by sacrificing Macro-lepidoptera in exchange and by purchase, secured an almost complete representation of described forms besides many new forms for description. No one has ever applied to Mr. Hulst in vain, either for a sight of his collection or for determinations.

In the Micro-lepidoptera as a whole the collection of Prof. C. H. Fernald of Amherst, Mass., stands pre-eminent. In the *Tortricidæ* the collection will probably rank among the first in the world, while in American forms it has no superior. In the *Tineidæ* it also ranks first among American collections while in the *Pyralidæ* it is probably even better than Mr. Hulst's in some of the families.

Prof. Fernald is always willing to encourage and aid the student in this interesting field.

In addition to these are several collections of still more limited scope—that of Mr. Scudder of New England Butterflies, and that of Mrs. C. H. Fernald of New England Macro-lepidoptera.

There are also several collections of which I know little or nothing and of which I therefore avoid all specific mention.

Prof. G. H. French has probably a very good collection and a number of his own types.

These two orders, Coleoptera and Lepidoptera, attract most of our collectors, and there are plenty of good though not very large collections all over the country—among the better known are those of Dr. Castle, of Philadelphia, Coleoptera; Mr. Schoenborn, Washington, Lepidoptera; Mr. Noble, Savannah, Coleoptera; Mr. Schuster, St. Louis, Coleoptera; Mr. Goodhue, Webster, N. H., Lepidoptera; Prof. Snow, of Lawrence, Kansas, whose collection of Coleoptera and Lepidoptera deserves a better description than I am unfortunately able to give; Messrs. Reinecke and Zesch, Buffalo, N. Y., Coleoptera; and the Pacific Coast collectors Messrs. Koebele, Coquillett, Ricksecker, Wright, Rivers, Behr, Behrens, and perhaps some others.

In Hemiptera, the collection of Prof. P. R. Uhler, of Baltimore, Md., stands pre-eminent. Prof. Uhler has been for many years gathering material, and studying and arranging it for study. From him, directly or indirectly, most of our named material comes.

Mr. Ashmead, of Jacksonville, Fla., has more recently begun the study of this order, and, as I understand, has accumulated a very large material.

Prof. Osborn, of Ames, Iowa, has quite a collection of Hemiptera, and has devoted considerable time to their study. His favorites are *Mallophaga* and *Pediculidæ*, the exact location of which is perhaps still matter of dispute.

The collection of Mr. Heidemann of Washington, D. C., is a rapidly growing though somewhat local one. Mr. Heidemann, by careful collecting has accumulated a large amount of material, much of it undescribed.

In this order there is a wide and interesting field for the student, the Homoptera affording some of the most intricate and fascinating problems ever confronting a Biologist.

In the *Thripidæ*, assuming them for the present to be undoubted Hemiptera, the collection of Mr. Pergande of Washington is unique. There are about half a dozen species described, and Mr. Pergande has in his collection distinguished nearly 150 species!! Mr. Pergande is *not* troubled with the *mihi* itch—yet.

In *Orthoptera*, Mr. Scudder's collection stands first. So I am assured by Prof. Riley and Mr. Bruner, both of whom have seen or studied it. I have not had the good fortune to see it myself.

Mr. Bruner's collection, at West Point, Nebraska, stands next in

rank, and so far as I know is the only other individual collection worthy of the name, in the United States. It is difficult to find a reason for this, since the species are not, as a rule, difficult to get, and they are certainly not uncommon.

The Hymenoptera, interesting as they are, can boast of but few followers. The collection of Mr. Cresson in Philadelphia, is the only really fine collection of the order. Mr. Cresson has had perhaps the greatest opportunities for accumulating a collection, and he has faithfully used them. As a general collection, it is unexcelled. In some special groups it is not so full.

In the *Formicidæ* the collection of Mr. Pergande probably takes first rank. This gentleman has devoted considerable effort to an accumulation of material in this family and has an excellent collection both in Exotics and Natives. In other families of the order his collection is extremely rich, while not so complete nor as well worked up, as in the *Formicidæ*.

The collection of Mr. Ashmead is especially rich in Parasitic Hymenoptera in which he has described many genera and species. The greater part of Mr. Ashmead's collection by the way is kept loose, in small boxes and packed away in drawers. He has however begun to get them into more usual and convenient shape so he writes me. The collection also contains besides Mr. Ashmead's specialties a very fair general collection, largely local species.

Prof. Cook of Lansing, Mich., has of late been studying *Apidæ* and has, I believe, accumulated quite a considerable material.

The *Hymenoptera* are awaiting workers, and promise a rich reward to any one interested. Some families represent absolutely unworked fields, while few are really known.

In the *Diptera* the collection of Dr. Williston stands first, and is really the only individual general collection of the order. Dr. Williston is a busy man, but finds time for a great deal of work looking to the assistance of the tyro.

Mr. Coquillet of Los Angeles, Calif., has, as I am informed, a very good collection of Western forms, and is especially rich in the *Bombyliidæ* to which Mr. Coquillet has devoted more particular attention.

So far as I can find, there are no other collections of *Diptera* worthy of the name, and the *Neuroptera* are still worse off, for so far as I am aware there is but a single collection—that of Dr. Hagen, at Cambridge. This magnificent series, the result of years of patient work in accumulating material, is practically the property of the Cambridge Museum. No one else has attempted any systematic collection so far as I know. Dr.

Hagen is a very busy man and unfortunately unable to devote much time to naming insects.

Mention may be made here of the collection of Prof. Forbes at Champaign, Ills., which, as Prof. Riley informs me, is particularly rich in illustrations of the food habits of birds and fishes.

In the *Arachnideæ* the collections are few in number, and owing to the fact that they must be preserved in Alcohol, are differently kept. I know very little of collections in this class, and can enumerate only, in the order of their respective importance, the collections of Mr. Emerton, Dr. Marx, Prof. Underwood, and Mr. Peckham.

The Myriapods also have but few adherents: so far as I know, the collections of Prof. Underwood, and Messrs. McNeill and Bollman are the only ones.

In this brief review I have undoubtedly omitted many collections well worthy of mention, but it would have exceeded the purposes of the address had I endeavored to present accurate statistics.

Now however good the collection or however accessible the city containing it, all these individual collections have always one drawback:—it depends entirely upon the owner whether, when, and how long you shall see them. The student must absolutely submit in all his arrangements for study and comparison to the whims and caprices of the owner of the collection. There is the additional disadvantage, which I hope authors and collectors will some day realize—their uncertain duration. They may be neglected through loss of interest or they may be scattered after death, and the results of life-long labor destroyed. I have seen several instances of this, and there are at least two excellent collections of Lepidoptera in great danger of going the same road—both of them contain many uniques and types, but the relatives of the deceased owner hold on for a fancy price which they do not need and will never obtain. Meanwhile the collections lose in value each year.

It seems to me that all this points irresistibly in one direction. All types should go to some public Institution, offering a fair guarantee for its permanent existence, and at the same time assurance both that the specimens be cared for, and yet open to all reasonable inspection and study by Specialists, at all reasonable times.

I do not mean by this, in any way to disparage individual collections—on the contrary such a collection, made by a Specialist will in most cases soon outrank Museum collections. Everything depends on special and persistent efforts directed to a definite point—everything must be sacrificed to get lacking species and the result is unavoidable.

A Museum cannot do that without becoming a mere means of the Curator to an individual end.

[TO BE CONTINUED.]

New Genera and Species of EPIPASCHIÆ and PHYCITIDÆ.

BY GEO. D. HULST.

The following, as far as I am able to determine, are new to Science. Yet it is very probable that some may be synonyms of genera or species already described by European authors, the determination of which can not at the present time be satisfactorily made by me.

EPIPASCHIÆ.

Winona, n. gen.

Fore wings 12 veins: 1 furcate near base, 3, 4 and 5 separate, 7, 8 and 9 stemmed, 10 separate; hind wings 8 veins: 2 far from angle, 4 and 5 joined at angle which is at middle of outer margin of cell, 7 and 8 stemmed. Type: *incrustalis*, Hulst.

Saluda, n. gen.

Fore wings 12 veins: 10 and 11 stemmed, 7, 8 and 9 stemmed, 4 and 5 joined at base; hind wings 8 veins: 4 and 5 stemmed, 7 and 8 stemmed; antennal process short; maxillary palpi of ♂ with brush of long hairs on end. Type: *asperatella*, Clem.

Katona, n. gen.

Fore wings 11 veins: cell very short, 3, 4 and 5 separate, 6 long, waved, 7, 8 and 9 stemmed; hind wings 8 veins: 4 and 5 stemmed; antennal process short, rather slender, closely scaled; maxillary palpi of ♂ with brush of long hairs on end. Type: *euphemella*, Hulst.

K. euphemella, n. sp.

Expands 17 mm. Front dark gray; antennæ blackish; thorax dark blackish gray; abdomen yellowish fuscous; fore wings light gray, more or less overlaid with black; base gray; basal line black, diffuse, dentate, edged outwardly with a band of blackish gray; outer line white, straight at costa and inner margin, bent outwardly and sinuate between; discal points distinct black; outer space gray with apical dash of blackish; tufts blackish gray, or blackish; hind wings light fuscous, fuscous on veins; beneath light fuscous gray, the markings above faintly produced.—Texas.

Tioga, n. gen.

Fore wings 11 veins: 1 furcate near base, 4 and 5 separate, 6, 7, 8 and 9 on a short stem; hind wings 8 veins: 4 and 5 stemmed, 7 and 8 stemmed; antennal process short; maxillary palpi wanting. Type: *aplastella*, Hulst

T. aplastella, n. sp.

Expands 20 mm. Head light gray; antennæ dark fuscous; thorax blackish gray; abdomen yellowish brown; base of each segment blackish; fore wings light gray; basal field blackish, limited by a light gray cross line edged with black on either side; basal half of middle field of ground color, outer half fuscous; outer line light gray, edged within with black; outer field fuscous; veins lighter, a row of sub-marginal black spots; hind wings yellowish brown, blackish along edge. This is possibly *melanogrammos*, Zell.

Loma, n. gen.

Fore wings 11 veins: 1 not furcate, 4 and 5 separate or from a point, 7, 8 and 9 stemmed; hind wings 8 veins: 3, 4 and 5 stemmed, 7 and 8 appearing stemmed; maxillary palpi present. Type: *nephelotella*, Hulst.

L. nephelotella, n. sp.

Expands 25 mm. Head light gray, slightly reddish brown on summit; thorax and abdomen light yellowish brown, the segments of abdomen fuscous at base; fore wings reddish brown at base, with a central dark dash, and dark along inner margin; basal line whitish, edged both sides with blackish, slightly outwardly oblique towards inner margin, slightly rounded with angle inwardly at middle; middle and outer fields dark fuscous; outer line lighter, edged within with blackish; hind wings dark fuscous. —Penn.

Wanda, n. gen.

Fore wings 11 veins: 7, 8 and 9 stemmed, 6 waved, 3, 4 and 5 stemmed, the subdiscal vein to furcation of 5 extraordinarily broad; cell very short; hind wings 8 veins: 4 and 5 stemmed, 7 and 8 stemmed; antennal process short, closely scaled; labial palpi thin, erect, extending above front; maxillary palpi in ♂ with brush of long hairs on end. Type: *baptisiella*, Fern.

W. tiltella, n. sp.

Expands 20 mm. Head, thorax and fore wings gray, peppered over with black scales, giving a general blackish gray color; basal space somewhat darker than the rest of the fore wings; at the middle of basal field a jet black cross-line not reaching costa or inner margin; inner line light gray, three times dentate inwardly; at the middle of the middle field is another jet black cross-line extending from inner margin nearly to discal spot; outer line straight from costa angulated outwardly, then rounded, wavy dentate, returning near inner margin, then with a single bend reaching the margin. Hind wings dark fuscous. —Texas.

Tetralopha callipelella, n. sp.

Expands 16 mm. Palpi, head, antennæ and thorax uneven fuscous gray; fore wings gray, rather strongly overlaid with blackish, more especially on the basal field; extreme base and posterior portion of basal field reddish; basal cross-line white, slightly waved, distinct, edged on both sides with distinct fine black lines; discal spots black; outer line gray, straight from costa, then rectangular outward, then rounding forming a deep sinus shorter than usual, then angulate and slightly bent to inner margin; veins on middle and outer fields rather darker than ground color; marginal line black; hind wings light fuscous, darker on the outer margins. —Texas.

This will I think prove to be *T. militella*, Zell. I do not think it at all likely that Zeller's species is the same as *Lanthaphe platenella*, Clem.

PHYCITIDÆ.

Pima, n. gen.

Fore wings 11 veins: 4 and 5 separate, 10 separate; hind wings 8 veins: 4 and 5 stemmed, 3 appearing stemmed with 4 and 5, 2 at angle of cell; tongue wanting; palpi horizontal, long, heavy, end member drooping, long; antennæ of ♂ simple; maxillary palpi invisible. Type: *fosterella*, Hulst.

P. fosterella, n. sp.

Expands 25 mm. Palpi light gray; head light gray, whitish along eyes, ocherish behind; thorax ocherish, lighter on dorsum; abdomen light ocher, white on first seg-

ment, and on the rest on dorsum ; fore wings almost pure white along costa to apex, behind this very narrowly edged with black, then the rest ochreous, darker anteriorly and basally ; hind wings clouded white, shining, beneath as above with colors shaded with fuscous.—Colorado.

From Mr. Wm. Foster, in whose honor the name is given.

✓ **Oreana**, n. gen.

Fore wings 11 veins : 8, 9 and 10 stemmed, 4 and 5 stemmed ; hind wings 8 veins : 2 near angle, 3, 4 and 5 stemmed ; labial palpi present, those of ♂ with brush of long hairs on end ; tongue strong ; antennæ of ♂ bent above base with heavy tuft of scales in bend. Type : *unicolorella*, Hulst.

✓ **Sciota**, n. gen. Fore wings 11 veins : 8, 9 and 10 stemmed, 4 and 5 separate ; hind wings 8 veins : 3, 4 and 5 stemmed ; tongue strong ; antennæ of ♂ bent above base with tuft of scales in bend ; labial palpi erect, short ; maxillary palpi present. Type : *croceella*, Hulst.

S. croceella, n. sp.

Expands 19 mm. Palpi and head fuscous yellow ; thorax of same color with purplish stain ; abdomen reddish brown, interlined on each segment with dark brown ; fore wings reddish brown, lightest at base, and broadly and brokenly washed with blackish along anterior half, this being most decided on basal part of middle-field ; a geminate black discal spot, and in place of outer line a curved row of black points ; a marginal line of black points also ; hind wings fuscous, darker outwardly.—Texas.

Tacoma, n. gen.

Fore wings 11 veins : 10 separate, 4 and 5 stemmed ; hind wings 8 veins : 3, 4 and 5 stemmed ; tongue strong ; antennæ of ♂ simple ; ocelli present ; labial palpi erect, long ; maxillary palpi present. Type : *feriella*, Hulst.

T. feriella, n. sp.

Expands 20 mm. Palpi gray, white beneath ; head and thorax dark gray with a bluish shade ; abdomen fuscous gray, interlined with light gray ; fore wings dark gray with a bluish shade ; lines whitish, the inner nearly at middle, angulate, the outer waved and dentate, subparallel with outer margin ; on inner margin just beyond basal line is a rather large broken white spot ; discal spot faint with outer edge whitish ; a marginal line of black points ; hind wings fuscous, a black marginal line.—Texas.

pink **Tallula**, n. gen.

Fore wings 11 veins : 10 separate, 4 and 5 separate ; hind wings 8 veins : 3, 4 and 5 stemmed ; maxillary palpi present ; labial palpi erect, recurved ; tongue strong ; antennæ of ♂ simple pubescent ; ocelli present. Type : *atrifascialis*, Hulst.

Tehama, n. gen.

Fore wings 11 veins : 2 and 3 separate, 4 and 5 stemmed ; hind wings 7 veins : 3 and 5 separate, 2 far from angle, 7 and 8 stemmed ; tongue strong ; labial palpi drooping, long ; maxillary palpi wanting ; antennæ of ♂ simple. Type : *bonifatella*, Hulst.

✓ **Monā**, n. gen.

Fore wings 11 veins : 4 and 5 separate at a point, 10 separate ; hind wings 7 veins : 2 near angle, 3 and 5 stemmed, 7 and 8 appearing stemmed ; labial palpi erect, recurved, 3rd member short ; maxillary palpi wanting ; antennæ of ♂ simple, slightly bent above base ; ocelli present ; tongue strong. Type : *olbiella*, Hulst.

M. olbiella, n. sp.

Expands 21 mm. Palpi fuscous gray ; head ochreous ; abdomen light ochreous ; thorax reddish ochreous ; fore wings along costa to subcostal vein white, with a few scattered black scales, this band reaching to outer cross-line ; the rest of the wing reddish brown, varying in different specimens through reddish ochreous to ochreous, all with a few scattered black scales ; basal line indeterminate or indistinct, outer line very close to margin and parallel with it, broad, grayish, more or less edged inwardly with blackish scales and outwardly with blackish narrow marginal space ; hind wings pellucid fuscous, margin becoming very dark. —Colorado.

Altoona, n. gen.

Fore wings 11 veins : 4 and 5 stemmed, 10 separate ; hind wings 7 veins : 2 at angle, 3 and 5 stemmed ; tongue wanting ; labial palpi horizontal ; maxillary palpi present ; antennæ of ♂ bent over base with tuft of scales in bend. Type : *opacella*, Hulst.

Welaka, n. gen.

Fore wings 11 veins : 10 separate, 4 and 5 separate ; hind wings 7 veins : 2 at angle, 3 and 5 long stemmed, 7 and 8 stemmed ; tongue wanting, labial palpi long, ascending, end member horizontal, 2nd and 3rd members long ; maxillary palpi long ; antennæ of ♂ simple. Type : *multilincella*, Hulst.

Cayuga, n. gen.

Fore wings 11 veins : 3 and 5 separate ; hind wings 7 veins : 2 at angle, 3 and 5 stemmed ; antennæ of ♂ with members broad, toothed, pubescent, bent above base with tuft of scales in bend ; labial palpi long, horizontal, end member drooping ; ocelli present ; tongue wanting. Type : *gemmatella*, Hulst.

Petaluma, n. gen.

Fore wings 10 veins : 8, 9 and 10 stemmed, 3 and 5 stemmed ; hind wings 7 veins ; 2 at angle, 3 and 5 stemmed ; tongue wanting ; clypeus with a cone shaped tubercle ; labial palpi drooping ; maxillary palpi invisible ; ocelli present ; antennæ of ♂ simple. Type : *illibella*, Hulst.

Uinta, n. gen.

Fore wings 9 veins : 4 and 9 wanting, 3 and 5 separate ; hind wings 7 veins ; 3 and 5 separate, 2 far from angle, 7 and 8 separate to base ; labial palpi horizontal, heavy, long ; maxillary palpi strong, heavily scaled on end ; antennæ of ♂ bent above base, pubescent ; ocelli present ; tongue wanting ; legs shorter and more heavy than usual. Type : *oreadella*, Hulst.

U. oreadella, n. sp.

Palpi fuscous gray, as is also the head ; thorax blackish gray ; abdomen blackish gray, becoming fuscous and yellowish anally, each segment except basal edged narrowly with gray ; fore wings dark fuscous, darker at base ; basal line not evident ; outer line broad, blackish, a marginal broad line also blackish ; at base of center of middle field a lengthened black point ; hind wings fuscous, shining, margin darker ; beneath even fuscous on all wings, margins darker. —Colorado.

Acrobasis albocapitella, n. sp.

Expands 14 mm. Palpi, head and thorax snow white ; abdomen white, slightly stained with fuscous ; fore wings white at base, with a faint reddish fuscous stain along costa and inner margin ; basal line dark brown, rather indistinct ; wings beyond

fuscous gray, except along basal line on inner margin, which is whitish; outer line gray, indistinct, rounded in middle outwardly, edged within with dark brown; veins slightly darker than ground color; hind wings pellucid fuscous, darker outwardly.—Canada.

***Dasypyga carbonella*, n. sp.**

Expands 15 mm. Palpi, head, thorax and forewings gray, heavily overlaid with black, giving a uniform dull black color, the lines very faintly or not at all suggested, abdomen dark fuscous, interlined with lighter; hind wings pellucid fuscous, veins and outer space darkest.—Texas.

***Lipographis decimerella*, n. sp.**

Expands 26 mm. Palpi, collar and thorax gray, stained with fuscous; head somewhat whiter; abdomen light ochreous gray, almost yellowish at middle; fore wings lead gray, broadly whitish along costa nearly to apex, whitish with a reddish shade along inner margin; fringes whitish; hind wings dark fuscous, fringes lighter. There is considerable variation in the different specimens, some having generally a reddish tone, others being more inclined to clear gray.—Texas.

***Lipographis niviella*, n. sp.**

Expands 29 mm. Palpi, head and thorax pure snowy white, with a slight sprinkling of black scales; abdomen yellowish white; fore wings pure snowy white, more or less marked with black; costa white; posteriorly the wing is finely marked with black on veins, and on posterior half stained with fuscous; basal line narrow, white, shaded inwardly along inner margin with large black spot; outwardly with narrow line of black; outer line white, toothed within between the veins, edged with a line of black points outwardly along margin; apex with two black points on either side the outer line; hind wings dirty whitish, yellowish at apex and along anterior margin.—Colorado.

***Anoristia olivella*, n. sp.**

Expands 24 mm. Palpi whitish; head, thorax, abdomen and fore wings light fuscous gray, scatteringly and coarsely dusted with a few black scales, the whole washed with a light olive shading; the black scales are a little more plentiful at the base, along inner margin, and at apex; basal line whitish, merely a break in the slight dusting of black; outer line formed as the basal, but rendered distinct by a heavier shading of the dusting of black within, oblique, subparallel with outer margin, with one inner angulation one third from costa; hind wings olive whitish.—The Needles, California.

***Nephopteryx filiolella*, n. sp.**

Expands 16 to 18 mm. Palpi reddish brown; head and thorax brown; abdomen brown with an ochreous shading; fore wings brown, ochreous gray along costa, chestnut red on posterior median space and outer margin; basal line blackish, indistinct; outer line dark gray, broad, indistinct, edged on both sides with blackish; hind wings fuscous, outer margin and veins much darker.—Texas.

***Honora glaucatella*, n. sp.**

Expands 22 mm. Palpi, head and thorax light gray, stained with fuscous; abdomen ochreous gray; fore wings white along costal half and base, stained with fuscous on posterior half of middle and outer fields; basal line rounded, indistinct, edged outwardly with black, broad and heavy in middle, obsolete at both ends; discal spot black, prominent; outer line oblique, wavy, edged both sides with dark

fuscous, outwardly becoming black at costa ; hind wings faded white, pellucid, yellowish outwardly.—Texas.

Honora obsipella, n. sp.

Expands 23 mm. Palpi light gray beneath, mouse gray above and at tip; thorax dark brown; abdomen reddish brown; fore wings reddish brown at base, more marked just within basal line; basal line well out, dentate, distinct; middle field reddish brown, discal spot blackish, faint, elongate horizontal; outer line strongly twice dentate inwardly; outer field reddish brown, except marginal band of gray; hind wings dark smoky fuscous.—Texas.

Honora fuscata, n. sp.

Expands 15 mm. Palpi, antennæ and thorax dark gray fuscous; head and abdomen lighter, the latter ringed with very light fuscous; fore wings light gray, almost entirely overlaid with gray fuscous, the light gray showing in the cross-lines and sparingly over the surface; basal line near the middle of the wing, twice waved, dentate; the outer line rectangular below costa, then rounded, angular again near inner margin; hind wings pellucid smoky fuscous.—Texas.

Altoona ardiferella, n. sp.

Expands 18 mm. Palpi and head mouse gray with scattered black scales; thorax gray; abdomen gray with an ochreous tint; fore wings with a broad gray stripe along costa; base and along inner margin to middle of wing reddish ocher; base with a black dash; outer and center portion of middle field fuscous gray; outer field gray above, fuscous below; basal line white, straight, oblique, with black on costal half outwardly, on inner half inwardly; outer line near margin lined heavily with black on both sides near costa, and all the way inwardly; a marginal line of black points more pronounced near apex; hind wings yellowish fuscous.—Texas.

Zophodia longipennella, n. sp.

Expands 25 mm. Palpi dark smoky gray; head and thorax same color; abdomen light clouded gray; fore wings with a broad white stripe along costa, posteriorly striated with fuscous gray, gradually merging into the fuscous gray of the rest of the wing; basal line hardly discernible; outer line faint, waved or scalloped, edged within with blackish; hind wings pellucid, stained whitish.—Texas.

Hardly a typical *Zophodia* as the palpi are long and the wings very narrow and extended.

Homœosoma candidella, n. sp.

Expands 20 mm. Palpi and front fuscous; summit white; thorax light fuscous; abdomen light ocher; fore wings pure chalk white, sparingly dusted with black and fuscous scales; costa at base very narrowly black; basal line indeterminate save by 3 black points; discal spots black, horizontal oval; outer line faintly evidenced by a slight increase of black dusting; hind wings dark fuscous.—Arizona.

Bandera cupidinella, n. sp.

Expands 18 mm. Palpi dark gray; head fuscous; thorax ocher fuscous; abdomen ocher; fore wings, ground color buff ocher, with 3 white stripes, the first subcostal from base to apex, the second starting from first about $\frac{1}{5}$ out from base and reaching to middle of outer margin, the third on vein 1; all these are edged with scattered black scales, and all became diffuse and indeterminate outwardly so that the ocher, white, and the black scales are quite mixed in submarginal space; hind wings fuscous pellucid.—Colorado.

ON THE GENUS DIATRÆA.

BY PROF. C. H. FERNALD.
Amherst, Mass.

The genus *Diatræa* was established by Guilding in 1832, for the species which he described as *Diatræa sacchari*, but which is without doubt the same species that Fabricius described in 1794, in his *Entomologia Systematica*, Vol. III, Part 2, p. 238, under the name *Phalæna saccharalis*. The habits and life-history of this species have been given in an excellent manner in the Report of the Department of Agriculture of the United States for the year 1880.

This genus may be characterized as follows :

Eyes large, hemispherical and naked. Ocelli wanting. Labial palpi horizontal, nearly as long as the head and thorax. Maxillary palpi triangular and about as long as the head. Antennæ about two-thirds as long as the costa. Front slightly swollen but varying in the different species.

Fore wings about twice as long as wide, the apex right angled and the outer border slightly and regularly rounded. There are twelve veins, of which vein 1 is simple at the base and ends a little before the anal angle ; vein 2 arises a little beyond the middle of the median vein and ends in the anal angle ; vein 3 arises half way between the origin of vein 2 and the end of the median vein ; vein 4 arises at the end of the median where the cross vein begins ; vein 5 arises very near it from the cross vein. From this point to the origin of vein 6, the cross vein is very fine and turns in towards the base of the wing forming a right angle. Vein 6 arises quite near to the origin of 7 which last arises from the end of the subcostal and ends below the apex. Veins 8 and 9 are from the subcostal a little before the end. Vein 8 ends in the costa quite near the apex and 9 ends in the costa a little before it. Vein 10 runs near to and parallel with the stem of 8 and 9, through the first half of its length. Veins 11 and 12 unite nearly above the origin of vein 10, and separate again before reaching the costa.

The hind wings have eight veins, three inner border veins and the frenulum is single in the male but divided in the female. The origin of veins 2, 3 and 4 is equally distant, but vein 5 arises from a short stem with 4. Vein 6 arises near the base of the stem of 7 and 8. The cross vein forms an acute angle pointing towards the base of the wing. The basal part of the median vein is pectinated on the upper side.

The legs are moderately stout and the vestiture is smooth over the whole surface of the body and wings. Genital hook present in the male.

The described North American species may be separated by the following table :

1. { Fore wings pale ocher with two parallel dusky cross lines. *crambidoides*
 { Fore wings without cross lines.....2
2. { Fore wings pale ocher yellow.....3
 { Fore wings seal brown or light brownish yellow.....*differentialis*
3. { Fore wings with a terminal row of brown spots.....*saccharalis*
 { Fore wings with a terminal brown line.....*alleni*

I have not seen *crambidoides* and it may not belong here. It was described by Prof. Grote in the Canadian Entomologist, Vol. XII, p. 15, under the genus *Chilo*, but in his New List he put it under the genus *Diatræa*, probably because of the absence of the ocelli. Whether it agrees with *Diatræa* in venation remains to be determined.

Diatræa alleni, n. sp.

Expanse of wings, 30 mm. Head, palpi above and middle part of the collar, cream white. Outer side of the labial palpi, sides of the head and thorax and the fore wings, cream-buff. The hinder border of the fore wings as far as vein 1, and a few longitudinal streaks beyond the dark brown discal spot are paler and the whole surface of the wing is evenly and sparsely sprinkled with minute brown scales. There is a fine dark brown terminal line somewhat broken. The fringes are whitish at the base but darker beyond. The hind wings are of a sordid cream color but lighter on the basal part. The dark brown terminal line does not reach the anal angle. Fringes lighter than the adjacent parts of the wings. Underside of the fore wings, pale fuscous with the brown terminal line reproduced.

Described from one male taken in Orono, Me., by the late Mr. Anson Allen for whom I name this beautiful species.

Diatræa differentialis, n. sp.

Expanse of wings, 43 mm. in the males; 54 to 61 mm. in the females. Head, palpi, antennæ, thorax and fore wings, seal brown. The top of the head and palpi and the hinder edge of the fore wings as far as vein 1, are somewhat lighter and the fore wings are sprinkled with dark scales. There is a small dark brown discal spot at the end of the cell and a terminal row of seven spots of the same color, the one at the anal angle being double. The hind wings are pale fuscous, lighter towards the base which is of the same color as the abdomen. Underside of the hind wings like the upper side in color and the underside of the fore wings a little darker. Legs pale seal brown, darker in front.

The above description is from the male. The female has the head, palpi, thorax and fore wings of a light brownish yellow color, the latter sprinkled with brownish atoms. The discal and terminal spots are similar to those in the male. The remaining parts of the insect are similar to those in the male except that the shades incline to yellowish. The difference of color between the two sexes as shown above is most remarkable.

Described from two males and two females taken in Florida in April and May.

These two species differ from *saccharalis* in having veins 11 and 12 separate though bent towards each other. Whether this is sufficient to separate them generically I do not yet feel positive.

Note on *Cerathosia tricolor*, Sm.

By A. R. GROTE, A. M.

Through the kindness of Mr. Graef I have several specimens of *Cerathosia tricolor*, described by Mr. J. B. Smith, on p. 79, Vol. III, of this Journal, as a new genus and species of *Arctiidae* from Texas. The moth is new to me and I do not venture a decided opinion as to its position, but I quite decidedly dissent from the position assigned it by Mr. Smith. In the first place I wish to correct the diagnosis of the neururation. Mr. Smith says of hind wings: "5 wanting." Now 5 is distinctly present; weaker, as in many *Noctuidae*, but midway between 4 and 6. In the *Arctiidae* 4 and 5 are near together. On the primaries there is a small accessory cell, from the lower and outer angle of which 6 is given off. From the upper outer angle vein 7 proceeds, throwing off 8 at a short distance to apex and at a shorter distance 9 to costa. 3, 4 and 5 are not "nearly equidistant," as Mr. Smith says, but 4 and 5 are more than twice as near at base to each other than to 3. On hind wings the cell is closed by a weak vein. Having studied the neururation of such Noctuid genera as *Spragueia*, *Grotella* and *Acopa*, the neururation of *Cerathosia* reminds me of these. The singular insect looks like a Lithosian from the narrow wings, but the ocelli exclude it. It is not allied to *Psecadia* and the Micros, because the hind wings have two internal veins. The claw on the tibiae and especially the embossed front, the tongue, are all much as we find them in the smaller *Noctuidae* allied to *Grotella*. In the neururation of primaries I wish to correct also Mr. Smith's statement that "10 springs from upper angle of accessory cell." Vein 10 springs from the middle of the upper margin of accessory cell. If we correct these neurational characters on both wings, we shall incline to consider the moth, notwithstanding its Lithosii-form look, a Noctuid. The clypeus with its lower edge projecting like a rim and its sub-central button-like projection is quite unlike the *Arctiidae*. It is paralleled by genera in both *Noctuidae* and *Pyralidae* which I have not by me to compare. The weak vein 5 of secondaries, equidistant between 4 and 6, springing from the middle of the weak cross vein closing the median cell, will not allow us to refer the moth to the *Arctiidae*. I am sure that only a casual resemblance would allow us to place the moth, as Mr. Smith desires us to, next to *Uletheisa* (*Deiopeia*). The "wing form" is not, I think, identical in these two genera. The outer margin of primaries is somewhat oblique in *Cerathosia*; the secondaries not so full. While I should rather consider the Texan form a *Noctuid*, I do not certainly refer the insect there from the want of material to compare it with. Yet it belongs more naturally to the *Noctuidae* from my memory of the structure of many N. Am. genera. In my opinion the comparison of the insect with *Ocnogyna* on account of the tibial claw is wide of the mark and irrelevant.

Cerathosia tricolor, Smith.

By JOHN B. SMITH.

Mr. Grote's remarks on this genus and species are really a matter of surprise to me, and I feel almost as though I owed an apology to all Lepidopterists for treating them seriously. However Mr. Grote does correct me in one particular, and one only, and the acknowledgment of my error there may serve as an excuse to mention the other points. Mr. Grote is correct in stating that vein 5 of secondaries is present. It is however so weak that in the specimens I looked on it as a fold, and in the recent slides it was totally invisible. Later it became visible on the hardening of the balsam, but very faintly, and variable in the specimens and in one scarcely visible. This does not control or modify the family reference in any way, however, since in the *Arctiidae* the location is not constant, while in the *Lithosiidae* with which this genus has great affinities—so great indeed that the presence of ocelli alone excludes it—the venation is absolutely paralleled, and vein 5 is present or absent in the same genus. This Mr. Grote should have known, and he should have known also that the location of vein 5 in the *Noctuidae* is by no means a constant factor either as to strength or location.

Mr. Grote however utterly fails to refer to the important family character found in the costal vein, which in no Noctuid arises from the subcostal, but always from the base, though sometimes forming a connection with the subcostal further on. In this genus the origin of the costal is so plainly from the subcostal, remote from base, that this feature alone would locate the insect as to family were it the sole character. The so-called corrections to my description of the venation of primaries are purely verbal and imaginary. Mr. Grote knows, if he has studied venation in any group other than the so often cited genera allied to *Spragueia*, that the accessory cell, even in the same species, often varies in size and form, and that in the same insect it may be present on one side and absent on the other. In *Callimorpha* I have drawn attention to this fact in my paper on the species. The differences pointed out by Mr. Grote are due wholly to individual variation, and though great in sound, are great in no other way. In reference to vein 7 and its derivatives, renewed examination bears out my description fully. I am ready to believe however that Mr. Grote's description is also correct. As to vein 10 again, he says that it arises from the middle of the upper margin while I say upper angle. Another *verbal* correction. The specimen from which I described had a short but rather wide accessory cell somewhat diamond shaped, the widest part considerably toward outer margin. The lower

angle of this diamond gives off 6, the tip of cell 7 and derivatives, the upper angle gives off 10. In a specimen in which the angle of the diamond is more near the middle, vein 10 while still arising from the upper angle, will also arise from the middle. To make so much of so little illustrates the character of Mr. Grote's entire criticism. Finally Mr. Grote utterly fails to state that in most, if not all the *Arctiidae* with accessory cell the neuration is practically the same as in the *Noctuidae*, except in one important particular, for while in the *Noctuidae* the dorsal or internal vein is forked at base, in the *Arctiidae* and *Lithosiidae* it is simple. Now of these two really family characters, viz: character of dorsal vein of primaries and origin of subcostal of secondaries which make this genus distinctively *Arctiid* Mr. Grote says absolutely nothing, while "from memory" he allies it in venation to *Grotella et al*, with which it has not even a habitual resemblance.

The characters of head structure and tibial armature are Noctuidiform as Mr. Grote says, and when I first called attention to this insect as a new *Arctiid*, before the Entomological Society Washington, Prof. Riley at once challenged the location on these grounds. I proved to his and my own satisfaction that this structure was not controlling, and he at once agreed that I was probably correct. I cite this as showing that the point was not overlooked. The tibial armature is not unique—several of the *Arctiid* genera, including *Ocnogyna* have a similar armature—nor indeed is the clypeal structure, for *Cydosia* has almost identically the same—a point probably unknown to Mr. Grote.

I have gone fully into this matter in a paper presented 8–10 months ago for publication in the U. S. National Museum, but not yet reached. Wherever *Cerathosia* goes there must *Cydosia* go also.

I have replied thus at length to Mr. Grote's remarks because they were so utterly absurd that their very baselessness might challenge belief. Also to prove that "memory" is a bad staff to rely on in scientific work, and especially when it is in the form of criticism of another's work.

Collecting Notes on Lepidoptera.

BY A. G. WEEKS, JR.

Among the White Mountains from July 8th to the 20th, I found the following species of diurnal Lepidoptera:—*Pap. turnus*, *Lim. proserpina*, var. *arthemis*, *Lim. dissipus*, *Grapta comma*, *Grapta J-album*, *Van. antiopa*, *Van. milberti*, *Mel. phæton*, *Chion. semidea*, *Mel. Harrisii*, *Phyc. tharos*, *Lyc. pseudargiolus*, *Arg. cybele*, *Arg. atlantis*, *Arg.*

idalia, *Colias philodice*, *Pieris rapæ*, *Chrys. americanus*, *Arg. myrina*, and several common species of the *Hesperidæ*.

Lim. arthemis was very common, frequenting the beds of brooks, open lanes, and sunny spots in the woods. On damp sandy spots they were often gathered in bunches of fifteen to thirty, and especially about bits of decaying matter and the dung of wild animals. Other varieties of this species were not seen.

At the summit of Mt. Kearsage, I took *Lim. arthemis*, *Mel. Harrisii*, *Van. antiopa*, *Pap. turnus*, &c. In fact the altitude, 3200 feet, does not interfere with the habits of valley butterflies.

I reached the summit of Mt. Washington on July 11th. *Chion. semidea* were unusually abundant there this season, and their numbers were remarked by all visiting there. Undoubtedly the best locality for them is the "Alpine Garden," about two miles from the summit on the right of the carriage road (see Ento. Am., Vol. III, No. 1, p. 12). The majority taken were females heavily laden with eggs. Presuming these were the first brood, emerging from July 1st to the 10th, it is reasonable to suppose that a second brood is perfected before their season closes, about the middle of August. How peculiar the habits of this butterfly! In times of distress, they seek the rocks, and falling into the crevices among small stones, they show the agility and nimbleness of spiders in secreting themselves. On the 13th, a severe storm swept over the mountain, the heaviest July storm for thirteen years. The wind travelled 90 to 120 miles an hour, and at times 140 miles. The thermometer fell to 24° F., and snow was piled a foot deep, extending two miles below the summit. The effect of this extreme weather on *C. semidea* was scarcely perceptible, as far as their number was concerned, for after the storm on the 15th, they were out as thickly as before, but badly broken and worn. I found them also on neighboring summits, but not abundantly.

I spent nearly two days on these summits in a fruitless search for *Arg. montinus*. Reports from other collectors preceding me this summer were equally disappointing as to this butterfly.

I took *Lim. arthemis* and *Pap. turnus* at an altitude of 6000 feet. At an altitude of 4000 feet one finds nearly all varieties of butterflies common to the valleys, flies, mosquitos, midgits, and other plagues almost unknown 1000 feet higher. In the vicinity of "Crawford's," I found the food plant of *Met. phaeton* and took several worn out specimens.

Arg. atlantis was undoubtedly the commonest fly seen, with *Lim. arthemis* a good second. *Grapta J-album*, *Colias philodice*, and *Pieris rapæ* were scarce. As to *Arg. montinus*, I was greatly disappointed in not getting some points of interest.

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PROCEEDINGS OF THE ENTOMOLOGICAL CLUB OF THE A. A. A. S.

[President's Address.]

[Continued from page 112.]

Some arguments and suggestions against individual collections have been made in "The Entomologist" for 1887, and in "Psyche" for June 1888 there is an approving citation of such an expression.

I do not at all agree with such ideas. The advantages of individual collections for scientific purposes are immense, and the best work ever done has been done in private collections, even in countries with many and large Museum collections. A Museum cannot allow its specimens to be handled as an individual can—it cannot consent to any destruction of any except really duplicate material, even to clear up questions of scientific value—it must limit the times of work.

An individual collection is always at the service of the owner for any purpose: he can mutilate or destroy his specimens *ad libitum*. He can remount; denude, dissect or do anything else he chooses. Best of all, his collection is always handy. He can go to it at any hour of the day or night to solve a doubt—to verify an idea or to test a theory. Museum collections in this country too are not so numerous that any arguments made for the London collectors could be given much weight here.

I would say therefore, make individual collections by all means and make them as extensive as time and scientific work will permit. Preferably make a special collection and try and complete that, even at the expense of the other groups.

And let me suggest too that in making such a collection the date of capture, the exact locality and some indication as to habit be given. This,

with a series of early stages and a sufficient number of specimens to show the variation will make an almost ideal collection.

Private collections must largely remain the gatherers, therefore—the Public Museum must be the conservator—the keeper and preserver of the life labors of the student, the open record of work done, to be verified by subsequent workers in the same field. A place of resort for students to *see* the material with which their predecessors worked, and to remember in their greater knowledge, when they contemptuously cast aside the earlier conclusions that but for these incomplete observations their own results would not be so full, and to consider too that a future generation will be apt to treat the present much as the present now treats the past.

This does not mean at all that a museum should be *only* a record—it should also seek in all ways to accumulate material and to become a known and influential element in the progress of Science.

In his able address to the Ent. Soc. of London, Dr. Sharp speaks of the aims of public collections and emphasizes the fact of their being a record. He prominently urges the fact that collections *now* made are important and should be urged, as civilization, especially in Islands is entirely changing the faunal condition, so that in a few years no trace of the peculiarities now existing will be discoverable. No collector in the vicinity of rapidly growing American cities can fail to be struck by Dr. Sharp's arguments. He says that a single pair of goats on an Island previously uninhabited by them can change the entire fauna. I know that a herd of cows introduced into my favorite collecting ground near Brooklyn, produced this effect in a single year, and within my experience the fauna of the Western end of Long Island has undergone a complete change.

The observations of Dr. Hamilton on this subject recorded some years since in the Canadian Entomologist, strikingly illustrate the same subject.

The importance to a museum of acquiring individual collections thus exemplified, local collectors, even with but small collections, should see to their deposit in a Museum to preserve in that way a record of the fauna at a definite period.

The curator of such an institution should be a working systematist, and he will find his hands full in keeping his charge abreast of the times. He should also be a specialist, able by his scientific work to inspire confidence and attract material—in his own specialty at least, to render the collection in his charge, pre-eminent—not however to the neglect of branches outside of his specialty.

There are several Institutions, but only two which seem to me to fill all of the requisitions to invite deposit of collections, viz: the Museum of

Comparative Zoology at Cambridge, and the National Museum at Washington.

In many States there are colleges and other institutions having collections, but in the rarest instances have they a competent person in charge, and the usual fate of the collection, after the retirement of the person making it, is dust and decay. I know several such collections.

The collection in Cornell University at Ithaca, N. Y., is a shining exception. Here Prof. Comstock is, by earnest and persistent labor getting together a good collection, determined by specialists in each order. Prof. Comstock has original ideas on Museums, and his block system for cabinet boxes, and the bent neck vials have been described and figured by him. Whether Prof. Comstock's successor will appreciate and carry out his work is of course another question.

The Boston Society of Natural History has a general collection of considerable extent, but no special curator of insects. Mr. Henshaw, the present curator of invertebrate Zoology, is fortunately an Entomologist, and able to appreciate the valuable material now in the Museum.

The American Museum of Natural History has allowed one typical collection to go to ruin in the most unwarrantable manner, and has allowed individuals to handle the material whose knowledge of the subject was such that they *took off* the labels on the few still existent types of Robinson's Tortricidæ, and thus destroyed the value of the imperfect remnants of what was once a valuable collection of Lepidoptera. The treatment of other orders and collections was not more enlightened. They have just appointed a curator at a very small salary and have not as yet shown any disposition to give him any facilities for work.

In Missouri, 60 drawers prepared for the State by Prof. Riley containing a large lot of Biological material of value was allowed to go to ruin by simple neglect.

The American Entomological Society has a large collection of Insects owned by it, or on deposit, but no salaried officer to take care of it. So much intelligent care has however been accorded the collection that there has been little loss. In Coleoptera, the Wilt collection has given them a large material in addition to the large lot of species previously on hand.

In Lepidoptera there is a large amount of material well determined by Grote and others, typical of many of the older described species. There are also many of the types of Clemens' Micros.

In Hymenoptera the Cresson collection is on deposit, and they have also a very fair lot of species in some other orders. Altogether there is a fair nucleus for a collection, needing only a competent salaried curator to develop and increase it. The insects are in large cabinet drawers, cork-lined.

Of the two Public Institutions first above mentioned, the Cambridge Museum is very much the older and more extensive, and in the choice of the curator of Entomology, has been singularly fortunate, not only in the character and ability of the gentleman placed in charge, but also in the fact that he has been able to spend so many active years in developing and perfecting his plans for a comprehensive collection.

Dr. Hagen has well appreciated the responsibilities of a Museum and its aims, and has labored to accumulate and preserve, allowing his personality to interfere singularly little with his duties to the Museum.

A brief statement of what American material the Museum has and the manner of its preservation may be interesting.

The collections are all in cabinet boxes of uniform size, 16 x 19 inches, glass covered, and painted inwardly with white zinc paint. Dr. Hagen does not approve of cork, and the insects are pinned directly into the bottom made of Linden, I believe, or some other soft white wood. The frame of the box is of Poplar, and the cover fits into the frame by means of a tongue and groove, making a very tight joint. The cabinets are uniform in size and each contains 2 sections of 9 drawers each. The drawers are interchangeable, and the cabinets close with a door to each section. Tight boxes and care are Dr. Hagen's reliances to preserve from damage by Museum pests, and they are sufficient where the material is not in constant use.

Among the Museum's treasures is the Leconte collection of Coleoptera, and its place here illustrates one of the uses of a Museum—it perpetuates the collection, and allows access to it by students desirous of following in the footsteps of this illustrious leader. I have not seen the collection since its installation in the Museum, but believe it is left in its original boxes, they being placed in the Museum boxes. The other collection of Coleoptera is good; but the knowledge that one day the Leconte collection would rank among its treasures has prevented any special attention to this order. One of the advantages of a Museum is, gentlemen, it never dies—it can afford to wait.

Next in order—perhaps actually superior in completeness and certainly superior in showing a full series of exotics—is the collection of Neuroptera. This is Dr. Hagen's specialty and shows the advantage of having the curator a specialist—it puts it in one group at least on a somewhat better footing temporarily—a future curator will probably have some other specialty; but the advantage gained in the Neuroptera, will never be lost.

In the Diptera, a glance at Osten-Sacken's catalogue will show the wealth of the collection. Osten-Sacken deserves the sincere thanks of American students for his liberal and enlightened course of placing

American types where American students could get hold of them—an example by no means generally followed by Americans themselves.

In the Lepidoptera, the collection does not rank high. I have been over the Heterocera several times and over the Rhopalocera on one occasion and it ranks far behind the individual Lepidopterological collections enumerated. It has however many types of Packard's description, mostly in miserable condition, and many species named by Zeller, which, considering that this author wrote considerably on our species, are valuable.

The Chambers' types of Tineidæ add little perhaps to the value of the collection owing to their poor condition.

What the representation is in the other orders, I confess I do not know. It is certainly good, without having any special claims to high rank. In the *Myriapods* Meinert's recent paper shows the collection of *Chilopoda* to be a good one.

Dr. Hagen has also devoted much time to the formation of a biological collection, and has accumulated an extremely interesting and instructive series, largely however of European species.

The Cambridge Museum is well worthy a visit by any entomologist, and specialists in some orders cannot afford *not* to visit it.

The last branch of my subject and the end of my tax on your patience is a review of the insect collections in the U. S. National Museum, with which I have the honor to be connected as assistant curator.

By the courtesy of Prof. Riley the Honorary Curator, I have permission to tell all that I know myself; as I have learned in the three years that I have worked in it to love and know the collection as though it were my own I may be pardoned if I speak somewhat enthusiastically of this collection and its future.

I will first give an account of how our collection is kept, and this subject was a matter of very full discussion between Prof. Riley and myself before a final standard was agreed upon. Prof. Riley had carefully studied the methods in use in museums here and abroad, and the standards adopted, seemed to him most practical and safe.

Two styles were finally adopted as most convenient and best adapted for the varying wants of various orders.

The one is a small, 8x13 inches wooden box 2½ inches deep, calculated for the temporary reception of Coleoptera, Hymenoptera, Diptera and Hemiptera; the other a square, glass covered drawer 18x18 outside measurement, for Lepidoptera and the other orders containing large insects and as permanent cabinet drawer. Our small boxes are all cork-lined, since all concerned are believers in the convenience and utility of that material, the top and bottom are of cross-grained thin pine stuff, the two thicknesses calculated to control warping. Inside they are lined with white

glazed paper and they close over a tongue forming a perfectly tight joint all around. The rows of insects are transverse, and the boxes set on shelves, a neat label in a brass holder indicating the contents. The shelvings are closed by glass doors, excluding dust and pests, and yet allowing the legends on the labels to be plainly seen. We have seen no reason to find fault with this scheme thus far, it has worked perfectly and given complete satisfaction.

The Museum Cabinet drawers are a modification by Prof. Riley of the British Museum box. They were adopted as combining convenience, durability and safety in an unusual degree. They consist really of two boxes, the inner about $\frac{1}{4}$ inch from the outer and of $\frac{1}{8}$ inch poplar, a tongue from the cover fitting into the interval. Naphthaline, or any other repellent can be placed in the chamber between the inner and outer box without soiling the paper or specimens. The bottoms are cork lined and papered with a white glazed paper.

The drawers run in grooves and are inter-changeable. They are in cabinets containing 2 sections of 10 drawers each, each section closed by a door. The materials now used are cherry for cabinets and mahogany for drawers, save the bottoms which are of 3-ply pine veneer.

It is almost impossible for museum pests to get into these drawers with reasonable care in excluding infested specimens, and Naphthaline constantly kept in the space between the boxes retards or controls development to such an extent as to render damage practically impossible.

The most important feature however is the collection itself and few have any idea of the wealth of material awaiting arrangement. The accumulation of material, considering the time of existence, is wonderful.

For many years Government expeditions had been collecting material which wandered into individual collections, or was stored until destroyed. The Smithsonian Institution allowed one collection at least to go to ruin and others would have been lost had they not been distributed. A few years ago Prof. Riley induced the authorities to establish a Department of Insects. As a nucleus to a national collection, he first deposited, and afterwards, when provision was made for a salaried officer, donated his entire collection.

This collection forms the starting point of the Department of Insects, and most, if not all of the gentlemen present have seen a detailed statement of its contents, published in most scientific journals at the time.

In this collection was contained not only the material accumulated by 25 years of collecting and labor, but also the Burgess collection of *Diptera* purchased by Prof. Riley, and the American collection of Mr. Belfrage also purchased by that gentleman, altogether representing 15328 species in 115058 specimens besides nearly 3000 vials of alcoholic material and about 3000 slides of microscopic insects.

The Exotics of the Belfrage collection were also purchased by the Department of Agriculture and turned over to the Museum. Since that time there has been acquired the Lepidoptera collection of Mr. O. Meske, in its day one of the best and most complete, my own collections in Coleoptera and Lepidoptera, rich in both orders and typical in some families of each, and the remnants of the Morrison Collection, principally Coleoptera.

The sources of income in addition, have been from the continuous breeding and collections of the Entomological Division of the Department of Agriculture and its agents, the deposit of types described in Museum publications and the ordinary accessions from Government expeditions and Smithsonian correspondents.

To review special orders—we are most rich in Lepidoptera, both Macros and Micros, without reaching the level of the best individual collections in either branch. In the American series however, we have a very large proportion of unique and typical material.

In Coleoptera our material is richer than in any individual collection save those especially enumerated in the first part of this paper.

In the Diptera we have an exceedingly rich, if somewhat unarranged material. In *Syrphidæ* we have nearly all of Dr. Williston's types and an almost if not quite complete representation of described species.

In *Bombyliidæ* we have many of Mr. Coquillett's types, and fully twice as many species as are enumerated in Osten-Sacken's Catalogue. In many other families the collection is proportionately rich.

In *Hymenoptera* we have a very large material, much of it well determined. The numerous parasitic forms bred in the Department work have all passed through Mr. Howard's hands and are accurately determined, the *Cynipids* have been arranged by Mr. Ashmead, and in *Apidæ* our material is especially rich.

Specialists in all these orders will find much that is new and rare in our collections.

In *Orthoptera* our collections are especially rich and well determined; Thomas, Riley and Bruner having been over parts or all of it. Mr. Bruner has been of late in connection with Prof. Riley accumulating material for a monograph of the *Acrididæ* and this material will also go to the Museum.

In *Hemiptera* our collection is good, without being remarkable in any particular: it has been worked over by Prof. Osborn, and parts of it by Prof. Uhler.

In *Neuroptera*, our collection is undeniably poor, except perhaps in early stages, though probably next in importance to that at Cambridge as the order is so very generally neglected by collectors.

In *Arachnida* we have the advantage of Dr. Marx's collections and labors. Our material is largely in his hands for determination and will prove an excellent one. In the *Scorpiones* we have probably all but one or two of Wood's types, and several new species.

In *Myriapoda* our material is very rich in species and specimens. Many of Wood's types are still here, and our older material has been determined for us by Prof. L. M. Underwood. The same gentleman on a recent collecting trip through parts of Georgia, added a considerable quantity of material in this sub-class.

Mr. C. H. Bollman of Bloomington, Indiana, has within the last year or two described many species of Myriopoda, a large proportion of the types of which are in our collection.

In addition to this there is a very large and important class of material which has not yet been mentioned at all—viz: the Biologic material. In this, the collection is incomparably rich, nearly all of the results of Prof. Riley's breedings and of the work done in the Department of Agriculture being represented in it.

Nowhere else is there such an abundance of adolescent stages in all orders, blown and in alcohol.

This vast mass of material is being slowly put into shape. The demands upon the time of the Museum officers in routine work, answering inquiries, making determinations &c., are so great that progress is not so rapid as desirable. However, the *Orthoptera* are completely arranged. The *Hemiptera-Heteroptera* are also in good shape. In the *Lepidoptera* about half the work is done. In *Coleoptera* a good beginning has been made—in *Hymenoptera* and *Diptera* isolated families only have been put into shape. It is expected however that greater facilities will be provided hereafter in laboratory space which will advance work much more rapidly.

A great demand upon time is caused by the necessity of preparing an Exhibition collection for the Public at large. The Museum, being a Government Institution, of course demands a visible result in its Exhibition Halls from all its Departments, and with this aim a large number of boxes, 24 x 30 inches, has been prepared and is being prepared. In all we have nearly 100 such boxes besides a large quantity of other Exhibition material.

It has been deemed wise in this series to separate the scientific, practical, and merely interesting sides.

For the first we have prepared, and very nearly finished, a complete synopsis of the class. A single box defines the sub-classes and orders, each illustrated by specimens or drawings. Following this, in each order all the families and higher divisions are defined on printed labels, and

nearly each family is represented by specimens and drawings of structural peculiarities. 50 of these boxes will constitute this series which will thus be a complete text book of North American Entomology, illustrated by the insects themselves. Thirty-seven of these boxes are complete, and for the balance the labels are printed, most of the drawings made, and many of the specimens selected.

For the practical or economic side we have a series of 8 boxes, illustrating insect injuries to forest trees. So far as possible all stages of the insects as well as samples of their work are shown. Brief descriptive labels are added in a large proportion of cases. 14 boxes illustrate insects injurious to cultivated plants, and the arrangement is similar, save that here the insect enemies of the injurious species are also given. A printed label directs to the chief article on the subject and gives in brief words the nature of the remedies to be used. 8 boxes are devoted to native and foreign silk producers.

In all we have on Exhibition about 3,200 species in about 10,000 specimens, beside architecture of insects. 16 boxes contain Exotic Coleoptera and Lepidoptera, and 6 contain American Lepidoptera, furnishing the third part of the series.

In describing the objects and aims of the National Museum collections I cannot do better than quote from Prof. Riley's Report as Curator, for 1886. He says: "Collections of objects intelligently brought together, are necessarily educational in influence; but a National collection of Insects, on account of the very great number of species, and the exceeding minuteness and fragility of the great majority of the species, as compared with other animals, must needs have a dual character, and should consist of (1) the cabinet or study collection proper, and (2) the exhibit collection."

"The ideal *Cabinet* collection of a National Museum should represent, as completely as possible, the insect fauna of the country properly classified and determined. It can, necessarily, have little interest for the public at large and should be consecrated to the use of the Specialist, and to the advancement of the Science of Entomology. For this purpose it should be most carefully guarded and conserved in the best made drawers and cases, and secured alike from light and the too constant handling of the mere curious. It should constitute a study collection to which workers are drawn for unpublished facts, and for comparisons and determinations. It should be so well conserved and provided for, as to induce describers of new species to add to it their types or authentic duplicates thereof. It will be many years ere such an ideal collection can be got together, and none now living may witness it; but the material on hand, forms a good foundation for it."

“The *Exhibit* collection should be something entirely independent and apart from the other, and, on account of the rapid deterioration of insect specimens constantly on exhibition and necessarily much exposed to light, should consist, as far as possible, of duplicates only, or of such commoner species as can be easily replaced. Intended for the instruction and edification of the lay visitor to the Museum, it should illustrate in the boldest possible way the salient characters of the class, the larger classificatory divisions and the structure on which they are based, the wonderful metamorphoses and economies of the commoner and more easily recognized species, and particularly in their relations to man either directly or indirectly through injury or benefit.

The value of such an exhibit collection depends very much on conspicuity, and this can best be obtained by the liberal use of diagrams and enlarged drawings, as the majority of the most interesting species and those which concern man are almost microscopical in size. Such an exhibit collection will miss its mark and object whenever it exceeds these limits and by too much detail seeks to interest and instruct the Specialist or in other ways trenches on the function of the study collection.”

Prof. Riley then further shows what a vast source of increase to the Museum collection is the Department of Agriculture at which the most interesting material is constantly received, especially in specimens of biologic interest, which renders necessary and extremely desirable the formation of a separate Biological collection.

Parallel therefore with the study collection will be the Biologic collection illustrating so much as is possible of the life history of each species.

The aim will be to create and develop a truly National collection, in which American Entomologists can take pride, to which they can resort for study at all times and in which they can feel a certain right of property.

To accomplish this it will be necessary to obtain the cheerful assistance of all American Entomologists. If each collector or student would send duplicate series of types, the collections would soon reach a very high standard: and if students—specialists with large collections would provide for a transfer of their collections to the Museum, when they can not further need them, the results of their work would be preserved to their fellows and successors, and the aims of the Museum would be in a fair way to fulfillment.

The Museum as a Government Institution is reasonably certain to grow and continue while the Government exists, and no better place it seems to me can be found to deposit collections.

Its connection with the Smithsonian Institution, will enable it also to accumulate original collections specially made for it and will give it an importance as a study collection second to none in the world.

ON THE GENUS SCHÆNOBIUS.

By PROF. C. H. FERNALD.

Amherst, Mass.

The genus *Schænobius* was established by Duponchel in 1844, in his Catalogue Methodique, page 312, with the European *gigantellus*, S. V., as the type. For the purpose of re-arranging our North American species, I have made a careful study of *gigantellus*, and would characterize the genus as follows :

Head of medium size. Eyes large, globose, naked and without lashes. Ocelli present; proboscis short or rudimentary. Front clothed with a wedge-shaped tuft of hairs extending forward. Labial palpi horizontal, as long as the head and thorax; maxillary palpi triangular, as long as the head and resting on the labial palpi. Antennæ ciliated and about two-thirds as long as the costa in the males, simple and nearly half as long as the costa in the females. Thorax smooth; abdomen ending in a dense tuft in the females, simple in the males. Claspers somewhat spoon-shaped and clothed with scales on both sides. The genital hook is present with an accessory hook curving up and meeting it at the apex.

Legs long and slim, with the inner spurs twice as long as the outer.

Wings long and narrow. Fore wings with twelve veins. Veins 5 and 6 remote from each other and the cross vein between them is fine and forms a right angle pointing towards the base of the wing. Veins 8 and 9, arise from a common stem and 8 ends in or very near the apex, while 9 ends in the costa before it. The other veins are separate.

The hind wings have eight veins, 3, 4 and 5 separate at their origin but near each other; 7 and 8 from a common stem, and 6 arises near the angle of the cell. The cross line makes an acute angle into the cell. Frenulum single in the male, divided in the female. Median vein not pectinate above.

The sexes differ so much in some of the species and there is so great variation that the following table for separating the species is only given provisionally :

- | | | |
|----|--|--------------------------|
| 1. | { Hind wings gray with a silky luster..... | sordidellus. |
| | { Hind wings white or nearly so..... | 2. |
| 2. | { Fore wings yellowish fuscous with a broad whitish costal stripe.. | albicostellus. |
| | { Fore wings without a whitish costal stripe..... | 3. |
| 3. | { Fore wings without terminal dots..... | 4. |
| | { Fore wings with terminal dots..... | 5. |
| 4. | { Fore wings dark fuscous with a prominent discal dot..... | unipunctellus, ♀. |
| | { Fore wings bright yellow, usually without a discal dot..... | melinellus, ♀. |
| 5. | { Fore wings pale straw yellow..... | longirostellus. |
| | { Fore wings light ochre yellow with a fuscous shade through the middle..... | dispersellus, ♀. |
| | { Fore wings fuscous..... | 6. |
| 6. | { Fore wing with three dark dots on the surface..... | tripunctellus. |
| | { Fore wing with one dark discal dot..... | 7. |
| 7. | { Terminal points present on the hind wings..... | clemensellus. |
| | { Terminal points wanting on the hind wings..... | unipunctellus, ♂. |

S. sordidellus, Zinck.

This species has not hitherto been observed since Zincken first described it in 1821 in the 4th volume of Germar's Magazine der Entomologie, page 247.

Neither of Clemens' species could be referred to it nor was it known to Robinson, but I have just received a series from Prof. Forbes, taken in Illinois and two from Mr. Hulst, taken in Florida. There are thirty-one males and two females in the series from Prof. Forbes. Zincken's description was of a male and he says that "the female probably has pointed wings," which proves to be true. I have drawn up the following description from the series before me.

Expanse of wings, 25 to 33 mm. in the males; 32 to 43 mm. in the females.

Head, palpi, thorax and fore wings, ashy gray, but tinged with ochreous in some specimens. The hind wings and abdomen are of the same color as the fore wings but perhaps a shade lighter and without any ochreous tinge. The fringes are much lighter, especially those of the hind wings. There is terminal row of nine black or dark brown spots which rest on the ends of the veins and a similar row of dark spots on the hind wings, all of which are visible on the underside. There is also a dark brown spot resting on the lower outer angle of the cell, and fresh examples show a sprinkling of minute brown scales over the upper surface of the fore wings. In addition to the above markings, some of the specimens have a spot of the same color on the middle of the base of the wing, one on the upper outer angle of the cell; two on the subcostal vein rather nearer to each other than to the base or end of the cell; three on the fold, one near the base, one on the outer third and one rather within the middle of the fold; two on vein 1, the first on the middle and the second half way between this and the anal angle. There is also an arcuate row of eight spots resting on the veins beyond the end of the cell, the first one resting on the end of vein 9, on the costa a little before the apex, the last on vein 2, a little beyond its origin where there is another spot. All these spots are of the same color but a little larger than the terminal points.

The underside of the wings and body as well as the legs is a shade lighter than above, and the whole surface of the insect has a silky luster.

S. unipunctellus, Robs. Ann. Ly. N. H., N. Y., Vol. IX, 1870.

Robinson's description is as follows:

"Palpi, head and thorax fuscous. Anterior wings uniform dark fuscous with a large prominent black dot at the end of the cell on the middle. Posterior wings and fringes pure white. Abdomen and anal tuft white or very pale fuscous. Expanse, 20 mm. Habitat, Texas. The uniform dark color and prominent black discal dot readily distinguish this species."

Robinson's three types which I now have before me, are females in rather poor condition. I have two females and several males from Florida in somewhat better condition than the types but have nothing to add to the above description.

S. tripunctellus, Robs.

"Palpi, head and thorax, whitish cinereous, the former white beneath. Anterior wings whitish cinereous, finely powdered with pale fuscous scales. On the fold at

basal third an improminent dark dot, a similar more prominent dot on the middle at the end of the disk, and a third below it, near internal margin. Terminal dots dark fuscous, minute. Posterior wings, fringes and undersurface of both pairs glossy white. Abdomen and anal tuft white. Expanse 22 mm. Habitat, Texas."

Robinson wrote the above description from three females in very poor condition. I now have three males from Texas before me with the types and would add that fresh specimens have terminal dots on all the wings, a dot on the fold near the base, another on the outer third of the median vein and an oblique stripe from near the apex down to the hind margin through the outer dot on the fold, all of a dark brown color.

S. melinellus, Clem.

This species was described by Clemens in the Proceedings of the Academy of Natural Science of Philadelphia for the year 1860, p. 205. The following is his brief diagnosis :

"Ochreous yellow. Fore wings with a pale fuscous streak along the middle of the fold, extended nearly to the tip, and a faint oblique line of the same hue, from the tip, not extended to the hind margin. Hind wings pale yellowish white. Abdomen tufted."

The type of this species is not in existence and was probably destroyed before the Clemens collection was given to the Am. Ent. Soc. Dr. Clemens does not say whether there are terminal dots or not. It *may* have had them, since in the same paper he described *S. longirostrelus* which has terminal dots and he did not mention them. His type was undoubtedly a female since he mentions the abdominal tuft.

Robinson in his paper in the Annals of the Lyceum of Natural History of N. Y., Vol. IX, 1870, described what he believed to be *melinellus* as follows : "Palpi, head and thorax ochreous, the palpi pale internally. Anterior wings varying from pale to dark ochreous, shaded more or less prominently with fuscous above the middle from the base to the apex. A dark fuscous dot, sometimes obsolete, at the end of the cell, and a more or less prominent oblique streak from the apex to the middle of the wing. There are *no terminal dark dots* before the ochreous fringes. Posterior wings and fringes white or pale yellowish white. Expanse, ♀ 24 to 28 mm. Habitat, Penn., N. Y. This species agrees most nearly of any in my collection with Dr. Clemens' brief description."

I have before me Robinson's two examples from which he wrote the above description and also eight other examples from Mass. and London, Ontario. Robinson lays stress on the absence of terminal points in this species, but in some of the specimens before me there are faint indications of terminal points, and in fact this species grades so imperceptibly into *dispersellus* that I am not able to separate them. It is impossible to say which of these forms Clemens made his description

from, but I believe it to have been from one of them. I am therefore disposed to regard *melinellus* and *dispersellus* as varieties of the same species.

S. dispersellus, Robs.

I have forty-seven females including the types, and three males of this type before me. I was disposed to think at first that I had several species but now conclude that they all belong to one very variable species. The following description will cover the varieties before me.

Expanse of wings, 22 to 26 mm. in the males ; 25 to 38 mm. in the females.

Head, palpi, thorax and forewings testaceous in some specimens and tawny in others, more or less sprinkled with minute fuscous scales in some. A dark brown discal dot rests on the lower angle of the cell and there is a terminal row of the same color scarcely visible in some of the specimens. An oblique stripe of dark brown extends from near the apex down to or in the direction of a dot on the outer third of the fold. A more or less prominent dark brown stripe extends from the base of the wing along the cell to the outer margin near the apex. This marking has every degree of prominence, from a heavy stripe to complete obliteration. In some specimens the costal portion of the wing above this stripe is yellowish white, much lighter than the rest of the wing. This variety may be called *albicostellus*. There is another dark brown dot resting on the fold below the middle of the cell.

The hind wings are white, somewhat sordid or yellowish in some of the specimens and there is a row of dark points quite prominent in some, scarcely visible in others and entirely wanting in others.

The abdomen and anal tuft are white, more or less sordid. The underside of the hind wings is of the same color as above, and the fore wings are nearly of the same color and showing to some extent the markings of the upperside.

The males have the fore wings somewhat suffused with fuscous and the terminal points are more pronounced on both the fore and hind wings.

The synonymy will be as follows :

Schœnobijs melinellus.

Chilo melinellus, Clem. Proc. Phil. Ac. Sc. (1860).

Schœnobijs melinellus, Robs. Lyc. N. H. of N. Y. (1870).

var. dispersellus.

Schœnobijs dispersellus, Robs. Lyc. N. H. of N. Y. (1870).

var. albicostellus, Fern.

S. clemensellus, Robs.

Robinson gave this name to the species called *Chilo aquilellus* by Clemens, because the latter name was pre-occupied, and states that he has recognized the insect and therefore appends the original description which is as follows :

"Dark fuscous. Fore wings with an ochreous streak along the sub-median nervure and its nervules, and those beneath likewise touched with the same hue. Hind wings yellowish fuscous."

I have before me, belonging to the collection of the Am. Ent. Soc., a specimen on a short pin with a small label marked *Chilo* n. sp.?, in Dr. Clemens' hand-writing and also a large label in Robinson's hand-

writing marked *Schaenobius clemensellus* Rob. It is evident that Robinson found this specimen and considered it the Clemens type after he had published his paper.

I have four male examples before me which have an expanse of wings 22 to 24 mm. The head, palpi, thorax and fore wings are of the color of burnt umber, lighter along the middle of the thorax and hinder part of the fore wings. There is a minute dark brown point at the lower outer angle of the cell and the terminal points are of the same color. The surface of the wing is sprinkled with umber colored atoms and there is an obscure oblique dark stripe from near the apex not reaching across the wing. The hind wings are yellowish white with minute terminal dark dots in two of the specimens but wanting in the type, underside of the wing lighter than above.

While I am disposed to believe with Robinson that this is the type of Clemens, I should not be greatly surprised if it eventually proved to be only an extreme variety of *S. longirostrellus*, Clem.

S. longirostrellus, Clem. *

I have eleven males and three females of this species before me, including the types of Clemens and the material that Robinson had when he made his studies on this species. I also have four specimens of the European *S. forcicellus*, to which it is closely related.

Expanse of wings, 22 to 24 mm. in the males; 25 to 27 mm. in the females.

Head, palpi and thorax straw yellow, tinged more or less with fuscous on the side. Fore wings in the female straw yellow, sparsely sprinkled with fuscous dots in one specimen, with a terminal row of brown dots, a similarly colored one on the lower angle of the cell, one on the outer third of the fold and another on the fold near the middle of the wing. An oblique brown stripe extends from the apex down to the outer spot on the fold. Fore wings in the male, yellowish white, more or less sparsely sprinkled with fuscous atoms. The space above the subcostal vein from the base to the outer fourth of the costa is more or less tinged with fuscous. There are three brown dots on the fold: one near the base, the second a little within the middle, and the third on the outer third of the fold. A similar dot rests on the lower angle of the cell at the outer end of the median vein and in some specimens there is one on the upper angle. A minute brown dot rests on the end of veins 1 to 9. An oblique stripe of the same color extends from the apex to the dot on the outer third of the fold and there is sometimes a curved shade band between this and the outer margin. An oblique line nearly parallel to the apical stripe extends from the dot near the middle of the fold up and out to near the middle of the cell where it forms an acute angle and then extends obliquely up and in till it is finally lost in the costal shade.

Hind wings cream white and without markings in the females but with a terminal row of dark points in the males and in one specimen there are two faint, parallel fuscous bands from the costa just within the apex, which do not reach beyond vein 2. Underside of the wings pale fuscous with the terminal points repeated.

I can find no constant differences between this species and the European *forcicellus*, in the material before me, and believe they will yet prove to be identical.

Perstrialis, Hüb. = *macrinellus*, Zell., and *opalescalis*, Hulst, do not belong to this genus.

A GENERIC SYNOPSIS OF THE CICADIDÆ.

By WM. H. ASHMEAD.

FAMILY I. CICADIDÆ.

Head usually short and broad, somewhat triangular, the front convex. Ocelli 3 on the disk of the vertex. Thorax large, broad. Scutellum moderate. Wings long, vitreous or opaque, with sixteen cells or areas, or with numerous irregular net-like meshes. Tegulæ present. Anterior coxæ oblong, prismatic, inserted in the anterior angle of the prostethium; middle and posterior coxæ shorter, sub-conic, sub-contiguous, not reaching the sternum. Anterior femora thickened, toothed beneath. Tibiæ cylindric. Tarsi two or three jointed; no pulvilli between the claws. Males with a pair of stridulating organs at the base of the abdomen, called drums or tympana; consisting of cavities, more or less completely covered with parchment-like lids, termed the opercules.

Following Amyot et Serville, the family may be divided into three subfamilies of nearly equal value as follows:

TABLE OF SUBFAMILIES.

Fore wings having but sixteen cells or areas.

Elytra entirely membranousSUBFAMILY I. **CICADINÆ.**

Elytra more or less coriaceous or opaque.....SUBFAMILY II. **TOSENINÆ.**

Fore wings having their posterior half composed of a net-work of hexagonal meshes, numerous and irregularSUBFAMILY III. **POLYNEURINÆ.**

Of these subfamilies, the last two are apparently strictly tropical forms, neither being represented in the European or North American faunas.

SUBFAMILY I. CICADINÆ.

This group is an extensive one and species have been described in it from all parts of the world. Many species have already been described from our fauna, and others yet remain undescribed.

The following table compiled principally from the writings of Amyot et Serville, Fieber, Stål, and Uhler, comprises the genera found in Europe and North America, and will, it is hoped, enable the student to readily recognize them.

TABLE OF GENERA.

Prothorax not dilated at sides.....2.

Prothorax dilated at sides.

Lateral dilation of the prothorax angulated.

Ulnar veins contiguous at base; interior ulnar area narrowed posteriorly.....

G. 1. **Zammara**, A. et S.

Ulnar veins somewhat distant at base; the lateral margins of the interior ulnar areas parallel.....G. 2. **Odopœa**, Stål.

Lateral dilations of the prothorax rounded.

Metasternum elevated.

- Mesosternum short, transversely broadened, lozenge-shaped; rostrum extending to the middle of the mesosternum; anterior femora with 3 teeth beneath..... G. 3. **Triglena**, Fieber.
- Mesosternum broadly triangular, convex with a short and feeble apical groove; rostrum extending to first ventral segment; anterior femora with 2 teeth beneath..... G. 4. **Tettigia**, Kollar.
- Metasternum not elevated.
- Head broad, short; body hairy..... G. 5. **Tettigades**, A. et S.
- 2 Mesothorax not semilunately hollowed out posteriorly 3.
- Mesothorax semilunately hollowed out posteriorly.
- Metasternum transversely elevated, the elevated part longitudinally impressed, slightly produced anteriorly, the same truncate or sinuate G. 6. **Fidicina**, A. et S.
- 3 Pronotum a parallelogram 6.
- Pronotum trapezoidal.
- Mesosternum flattened, sometimes slightly transversely convex behind without a groove 4.
- Mesosternum convex with a groove.
- Costal and radial veins toward apex contiguous, apical appendage of wings moderate. Ocelli remote from base of head; drums all uncovered G. 7. **Tibicens**, Latreille.
- 4 Clypeus at apex truncate or subsinuately truncate 5.
- Clypeus at apex acuminate.
- Lateral margins of thorax distinct; last ventral segment in ♀ not or only slightly emarginate in the middle..... G. 8. **Tympanoterpes**, Stål.
- Lateral margins of thorax not distinct. Transverse vein closing the second apical cell not or scarcely oblique; costal margin of wing before the middle nearly straight or very slightly rounded. Front somewhat prominent..... G. 9. **Proarno**, Stål.
- 5 Tympanum present.
- Anterior femora with 2 large teeth and a minute one at the extremity; rostrum extends only to the extremity of the mesosternum; ♂ opercules moderately large, hiding the mesosternum..... G. 10. **Cicada**, Linn.
- Anterior femora with 3 teeth beneath; rostrum extends only to the middle of the mesosternum; ♂ opercules semioval or broadly triangular..... G. 11. **Cicadatra**, A. et S.
- Tympanum wanting or rudimentary.
- Elytra with 8 apical cells..... G. 12. **Melampsalta**, Kollar.
- Elytra with 6 apical cells.
- Ulnar veins separate at base..... G. 13. **Platypedia**, Uhler.
- Ulnar veins united at base..... G. 14. **Carinata**, A. et S.
- Elytra with 5 apical cells..... G. 15. **Calyria**, Stål.
- Elytra with 4 apical cells..... G. 16. **Prunasis**, Stål.
- 6 Margins of pronotum joined to the sides in a prominent lobe.
- Anterior femora with 3 teeth beneath, ♂ opercules abortive G. 17. **Cicadetta**, A. et S.
- 7 Head small, forming a very acute angle, much narrower than the prothorax, the median lobe prolonged into a long point in front of the lateral lobes. ♂ opercules small, not entirely covering the sonorous cavities..... G. 18. **Cephaloxys**, Signoret.

The Determination of *Hesperidæ*.

By EUGENE M. AARON.

It is with much pleasure that I have read the first instalment of Mr. J. B. Smith's novel and very instructive address to the Entom. Club of the A. A. A. S. The younger students, as well as some of us who have been in the field for some years, owe Mr. Smith a vote of thanks for the address, showing, as it does so clearly, where we can find willing specialists with capable collections to whom we can refer our undetermined specimens.

On page 109 Mr. Smith speaks as follows of my own collection :

"In the family *Hesperidæ* of the Rhopalocera, the collection of Mr. Eugene M. Aaron of Philadelphia is excellent. Mr. Aaron has spent much time and money to complete his collection in this family ; but owing to his numerous business engagements cannot unfortunately devote much time to his collection at present, *and cannot do much for seekers of information in this family.*"

The italics are mine ; and it is of the accuracy of the statement contained in this last clause of which I wish to write. When it was penned by Mr. Smith it was an exact statement of the facts of the case as they have existed for the past three years. Fortunately for my peace of mind, for my collections have been at all times in my thoughts, I have been able to make business arrangements during the past summer which will give me for the six months to come, a considerable amount of time to give to the study of the *Hesperidæ* and to the examination and determination of material from collectors of this puzzling family.

I have explained elsewhere (PAPILIO, Vol. IV, p. 171) the methods adopted by me in 1880 for the determination of all *Hesperidæ*, and in fact all Rhopalocera from America north of the Isthmus of Panama. These methods are still pursued by me, and at this writing, my Edwards' and Kirby's Catalogues are complete so far as it is possible to make them from the Zoölogical Records and from the unequalled libraries of the American Entomological Society and The Academy of Natural Sciences of Philadelphia. In print or in MS. copy I have the original description of every species of the Rhopalocera in America north of Mexico, and in the *Hesperidæ* north of the Isthmus. For ready reference I have had the leading writings of Hübner, Geyer, Felder, La Sagra, Boisduval, Herrick-Schäffer, Poey, Speyer, Mabilie, Oberthür, Staudinger, et al., carefully translated into English and these MSS. brought together in a bound form and copiously indexed. All corre-

spondence from specialists and MS. information relative to habits and geographical distribution are also gathered together in this manner and indexed.

Many of the more obscure species have the labels of determination affixed by such students or collectors as Edwards, Strecker, Morrison, et al., and in the *Hesperidæ* a majority of the species are represented by series of from 12 to 50 or more specimens. In this family only the genus *Pamphila* has more than one absentee in the collection. Beginning with the genus *Amblyscirtes*, as arranged in Edward's Catalogue of 1884, *Eudamus Electra*, Lintn., and *Erycides Sanguinea*, Scud., are the only missing species. In the four genera preceeding *Pamphila* all the species are represented. In the *Lycænidaæ* and *Erycinidæ*, catalogued as above, the collection is nearly as full; the latter family is complete. These data are given to illustrate the working condition and my literary material.

If anything in the above shall encourage any collector with material, the determination of which is not satisfactory to him, to entrust me therewith for the purposes of identification and study I shall be amply repaid by the benefits of the latter and shall do my best to see that he is promptly benefited by the former.

Book Notice.

"*Insect Life*, Vol. I, No. 1. U. S. Dept. of Entomology. Periodical Bulletin, July, 1888. Devoted to the economy and life habits of Insects, especially in their relations to Agriculture, and edited by the Entomologist and his Assistants, with the sanction of the Commissioner of Agriculture. Washington, D. C."

The above pretty fully explains the prospectus of a new Journal devoted to Entomology and issued by the Entomological Department at Washington. Under the personal supervision of Dr. Riley it cannot fail to be well edited; and giving more or less the details of the Department experiments and researches, it cannot fail to be of great and lasting value.

We have only one exception to note. Having the name "*Insect Life*" given it, an impression might be given that it is to be a scientific Journal in the ordinary sense of the term, and not what it professes and aims to be a "*periodical Bulletin*"; this impression is strengthened by the fact that in the very first number there are given descriptions of new species of insects whose types are entirely out of the possession of the

Government and of no economic importance; moreover it has become a rule almost universally recognized and regarded that no original description should be made save in a standard scientific publication, and the existence of these descriptions at once seems to carry "Insect Life" beyond its prospectus and professed aims.

At the same time we would be glad if this could be carried out and made a continuance and in this way be the beginning of a new departure on the part of our Government, that thus our country might become an aid much more than she has been to systematic Science. Under those at present connected with the Division of Entomology the new Journal would be of permanent systematic, as it cannot fail to be of permanent and great economic value.

The numbers would in our opinion be in better shape if the custom of the close cutting of margins prevalent in the Government printing office were remedied. There is hardly room left for recutting after binding.

The work is, we believe, issued gratuitously by the Government, and as such publications ought to go, as far as possible, to those most interested and most to be benefitted, and as this is the desire and aim of the Department, we advise our readers to make the proper application which will bring them the Journal as it is issued. G. D. H.

Publications Received.

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NO. 8.

PROCEEDINGS OF THE ENTOMOLOGICAL CLUB OF THE A. A. A. S.

[Continued from page 134.]

Thursday, 1 P. M.—Club met as per adjournment and the minutes of previous meetings were read and approved.

Mr. L. O. Howard and Dr. D. S. Kellicott were appointed a Committee to arrange programs for the meetings to be held during the week.

In the discussion of the President's Address Prof. Osborn mentioned the Putnam collection in the Davenport Academy of Natural Sciences, Davenport, Iowa, as containing the material in *Coccide* and *Solpugidæ*, worked by Mr. J. Duncan Putnam, as also his collections in Utah, Montana, Idaho, etc.

Mr. Howard remarked upon the material used by Dr. Hagen for bottoms of cases as being Italian Poplar, imported for the purpose.

Mr. Fletcher spoke of the use of Basswood for the same purpose.

Dr. Riley remarked upon the cases used in European collections.

At the request of the President, Mr. James Fletcher made some remarks upon Canadian collections. Of those available for reference by students he spoke particularly of the collection of the National Museum of the Geological Survey at Ottawa. The nucleus of this was a large collection, chiefly exotic diurnal Lepidoptera, purchased from Mr. Gamble Geddes. To this however had been added many valuable collections made by the members of the Survey staff, notably by Prof. J. Macoun and Messrs. G. M. Dawson, Tyrrell & Dowling, and J. M. Macoun. It contained about 10,000 specimens and some types. He also spoke of the collection of the Entomological Society of Ontario, which he characterized as a good working general collection, containing

specimens in all orders. Great pains had been taken to have the identifications verified. Many valuable additions had been lately made by members of the Society.

Speaking of "types" or rare species, Mr. Flétcher spoke very strongly in favor of their being deposited for safe-keeping in Public Museums, where they might not only be preserved from destruction but would be accessible for examination by students. It was well that now Entomologists had both in the National Museums, at Washington and at Ottawa, depositories where rarities might be thus preserved from loss.

He further asked for opinions from those present as to the technical meaning of the word "type;" his own view was that nothing should be labelled "type" even by the describer of a new species, except the actual specimens before him at the time of drawing up the description, and if there were more than one specimen each should be carefully labelled at the time, with a consecutive number. He suggested that the number of specimens used might also be given beneath this consecutive number. *Example*—If a species had been described from 3 specimens these would be labelled: Type No. $\frac{1}{3}$, Type No. $\frac{2}{3}$, Type No. $\frac{3}{3}$. He was of the opinion that if a describer subsequently distributed other material, even although he considered it quite typical of his species, he was not justified in labelling it "Type," but it might be labelled "Typical." He had received from one author a specimen marked as "type" of a species described some years before, which turned out not even to belong to that species at all, but was a specimen wrongly named from memory and without even examination of the original material.

Mr. Howard expressed his agreement with Mr. Fletcher in the matter of types.

Dr. Riley expressed as his opinion that specimens determined by the author as identical with original specimens which served as basis for description or as representative of the species might also be considered as typical, but not as the original types of the species.

Prof. Webster thought types should be deposited in Public Institutions or Collections as a guard against loss of correct specimens. He urged also the importance of examining amateur collections where rare species may sometimes be buried under common names.

Mr. Smith would consider no specimens that were after determinations, even by the author, as types.

Mr. Osborn preferred to indicate a difference between specimens determined as typical of a species and those which served as the basis for the original description and called attention to the fact that the specimen first described often proved to be not representative of the spe-

cies when a greater amount of material had been gathered. In such case the later specimens were the safer guides for comparison.

Mr. Smith instanced as illustrating this point the descriptions of *Arctia anna*, Grote, and *persephone*, of the same author, the former species proving to be simply an aberrant form of *persephone*.

Herbert Osborn presented notes on the origin of the wing in *Aleu-
rodes*, and exhibited slides to illustrate the points observed. "Slight pressure upon fresh adults of *Aleuodes* causes the protrusion of pleural folds upon the prothorax and the abdominal segments. These protrusions agree precisely in outline and position with the expanded pleural portions of the same parts as seen in prepupal and pupal stages. Specimens in different stages of development show a modification of this pleural portion in meso- and meta-thorax during prepupal and pupal stages to form more contracted, denser and darker colored parts from which the wings of imago are produced. The pleural expansions of prothorax and abdomen are simply contracted to conform to the outline of the body when the imago issues from the scale, but are readily extended by pressure. No such protrusions occurring on the meso- and meta-thorax would seem to indicate that the portion thus extended on the other segments has in these been transformed into the sack-like expansion of wings."

The time for the convening of section "F" having arrived it was decided by motion that the Club should meet again immediately after adjournment of the section and also at nine o'clock in the morning and after adjournment of section "F" in the afternoon of the following day.

The Club reconvened at 3:30 and a paper by Clarence M. Weed on the parasites of the honey-suckle Sphinx, *Hemaris diffinis*, Boisd., was read by the Secretary.

On the Parasites of the Honey-Suckle Sphinx, *Hemaris diffinis*, Boisd.

By CLARENCE M. WEED.

Last August my attention was called to a parasitic attack upon the larvæ of *Hemaris diffinis* which were then abundant upon the bush honey-suckle (*Diervilla trifida*) on the grounds of the University of Illinois; and a large number of the larvæ were collected and the parasites bred. So far as I am able to learn from an examination of the literature at hand no parasites of this Sphinx have as yet been recorded.

The insects engaged in the attack belonged to three different species—two being primary parasites and the third a secondary parasite. The first two were *Rhogas fumipennis*, Cresson, and an apparently undescribed variety of *Apanteles limenitidis*, Riley; while the third, which attacks the *Apanteles* is a species of *Hemiteles*, probably undescribed.

Rhogas fumipennis, Cresson.

This insect was described (Trans. Am. Ent. Soc., Vol. II, p. 378) in 1869 by Mr. E. T. Cresson from a specimen (♀) collected in Illinois, and I believe, has not since been especially mentioned in our literature, so that its host is now first reported.

The only other North American species of *Rhogas* whose life-histories have been observed so far as known to me are [1] the *parasiticus* of Norton (Trans. Am. Ent. Soc., Vol. II, p. 327), and [2] the *rileyi* of Cresson (Ibid, p. 383). The former was bred from *Lophyrus abietis*, Harr., by its describer; and the latter from *Acronycta obliqua*, Sm. & Abb., by Dr. Riley (Third Rept. St. Ent. Mo., p. 71). The breeding of a *Rhogas* from a tenthrædiniid is exceptional, and though it has twice been reported in Europe,—once by S. V. Vollenhoven, who bred *R. circumscriptus*, Nees, from a *Lophyrus* cocoon, and again by Brischke, who mentions the breeding of a *Rhogas* from a *Nematus* cocoon,—the fact has commonly been discredited by European Entomologists (Marshall, Monograph of Brit. Braconidæ, Trans. Ent. Soc. Lond., 1885, Pt. I, p. 87). This additional testimony however by so reliable an observer as Norton renders it almost certain that some species attack Hymenopterous larvæ.

But the normal habit of this interesting genus is to attack young Lepidopterous larvæ and kill them before they are ready to become pupæ. Marshall remarks: "The insects of this genus manifest a peculiar economy. They are solitary parasites of young lepidopterous larvæ, the bodies of which they do quit at the time of pupation, but make their cocoons inside protected by the indurated skins of their victims. The perfect *Rhogas* ultimately escapes through a hole bored in the posterior dorsal segments of the caterpillar." And Dr. Riley says that *R. rileyi* causes "the larva of the Smeared Dagger to die when about full grown, and its contracted and hardened skin, which may often be seen during the winter with its head attached fastened to the twigs of apple and willow trees, forms a snug little house, where the parasite undergoes its transformations, and through which it gnaws a round hole to escape the latter part of April."

The habits of *Rhogas fumipennis* correspond very well with those of the species just mentioned. The dead *Hemaris* larvæ may be found attached to the twigs of their host plant greatly shriveled, and with the skin hard and dry. Inside of this is the *Rhogas* pupa, and when the insect is ready to emerge it gnaws a circular opening, about two mm. in diameter, in the posterior dorsal segments and comes forth. I judge that the time spent in the pupa state is about a fortnight. Our specimens

were collected during the latter part of August, and the adults emerged early in September.

***Apanteles limenitidis*, Riley, var.**

On the under surface of the leaves infested by the *Hemaris* larvæ, there were frequently found solitary yellow cocoons, which were at once recognized as belonging to some of the *Microgasterinæ*. From numerous specimens collected there emerged early in September two specimens of an *Apanteles*, and ten specimens of a *Hemiteles*. The former approach nearly to *A. limenitides*, bred by Dr. Riley from *Limenitis disippus*, (Third Rept. St. Ent. Mo., p. 158), differing principally in the color of the posterior femora, which are reddish with black tips, while in typical *limenitidis* they are wholly black. The cocoons in shape, color and position are apparently similar in the two forms.

The secondary parasite is, as I have already stated, an apparently undescribed *Hemiteles*, but I prefer to wait until the genus can be more thoroughly worked up before speaking of it definitely.

A second paper by Mr. Weed on the Hymenopterous parasites of the strawberry leaf-roller *Phoxopteris comptana*, Fröl., was read by Mr. Howard.

On the Hymenopterous Parasites of the Strawberry Leaf-Roller

PHOXOPTERIS COMPTANA, Fröl.

BY CLARENCE M. WEED.

So far as I can learn the only positive record* of a parasite attacking the common strawberry leaf-roller (*Phoxopteris comptana*, Fröl.) to be found in American literature occurs on page 97 of the Report of the Michigan State Horticultural Society, where, in an article concerning this insect, Professor A. J. Cook writes:

“There is an Ichneumon fly that is very abundant in Michigan, which preys upon this leaf-roller. I think it is undescribed. It certainly is not referred to as a destroyer of the leaf-roller. I have not access to Cressons description of the genus *Eiphosoma*, but from the very short description, and figure, given by Packard, this species would seem to belong to that genus.”

* The only other mention of possible parasitism upon this species I have met with is by Professor S. A. Forbes, who writes: “*** from a breeding cage containing larvæ of this and another leaf-roller (*Cacæcia obsoletana*) *** I obtained last July specimens of a hymenopterous parasite belonging to the genus *Bracon*. Unfortunately, however, it is impossible to tell from which of these species this parasite was bred.”—Thirteenth Rept. St. Ent. Ill., p. 92.

"This species is black, with legs, ventral surface of abdomen, ring about the eyes, and base of the wings yellow. The antennæ are 4 mm. long, the wings about 3 mm. The ovipositor is black and about as long as the wings. The thorax and abdomen are finely punctured."

In working over the *Ichneumonidæ* in the Laboratory collection I found many examples of a species of *Cremastus* which had been bred from *Phoxopteris complana*. I was at first disposed to refer them to *C. piceus*, Cresson, (Trans. Am. Ent. Soc., Vol. IV, p. 176), but on sending a specimen to Mr. Cresson for comparison with the type, was kindly informed that it differed materially from this species, and in fact from everything else in the collection of the American Entomological Society. I had seen the Michigan species and from my recollection of it together with the above description, surmised that it was the same as ours, and on comparing a specimen, kindly submitted to me by Prof. Cook, found my surmise to be correct.

Besides this *Cremastus* we have bred from *P. complana* a single specimen of a very well marked species of *Glypta* which is also apparently undescribed. The first mentioned species is described below under the name *Cremastus cookii*, the specific name being given in honor of the gentleman who first called attention to the insect; and the second is treated of as *Glypta phoxopteridis*, being so called because of the insect it infests.

***Cremastus cookii*, sp. n.**

The North American species of *Cremastus* have as yet received little attention. Eight species are recognized by Cresson in his Synopsis of the Hymenoptera (pp. 204, 328), five of which were described by Provancher from field specimens; two by Mr. Cresson; one (*C. retinice*) having been bred from *Retinia rigidana*, Fernald, and the other (*C. piceus*) collected in the field; and one (*C. forbesi*) by myself, it having been bred from *Teras minuta*, Robinson. Hence it appears that but two of the eight American species now known have had their hosts recorded.

A lot of leaf-roller larvæ were collected on blackberry at Anna, Ill., June 6, 1884. Transferred to breeding cages at Normal three of the parasites emerged June 28, two more July 1, and one more July 3. The moths (*P. complana*) began emerging June 21 and continued to appear until July 1. Both sexes of the parasites were represented.

Another lot of the same Tortricid collected on raspberry at the same time and place yielded two specimens (♂♂) of the parasite, differing somewhat in the color of the face from the others, which are treated of below as variety *rufus*.

From larvæ of this leaf-roller collected on strawberry at Villa Ridge, April 4, 1883, a ♂ *Cremastus* was bred April 21, and a ♀ of the same species appeared May 5. Another specimen was bred in August, 1883, from *Phoxopteris* larvæ taken at Anna.

Besides these bred specimens this parasite has been taken by sweeping in strawberry fields at Normal during May and June, 1883; and at Urbana during July, 1885.

Description.—The imago may be described as follows:

Length 6 to 7 mm. ♀. Black; clypeus, mandibles, maxillæ, palpi and upper two-thirds of eye-orbits, yellow. Antennæ almost as long as body, piceous, yellowish brown beneath near base. Face punctate. ³⁰Metathorax, including scutellum, shining, punctate. Metathorax with the elevated lines well developed, and posterior portion of central dorsal area transversely aciculate, while anterior portion of same area, and the greater portion of the other areas, rather coarsely punctate. Posterior margins of abdominal terga, behind the second, sometimes brownish. Ventrums of abdomen yellowish. Ovipositor $\frac{2}{3}$ as long as abdomen. Anterior and middle legs including coxæ, light yellow, with tarsi dusky. Posterior legs dull yellowish red, with coxæ, except at tip, and basal portion of trochanters black, and tarsi dusky. Tegulæ and base of veins whitish yellow; rest of veins, and stigma, except whitish spot at base, pale brown.

Described from many specimens bred in Illinois from *Phoxopteris comptana*; and one specimen bred by Prof. A. J. Cook from the same Tortricid in Michigan.

The male differs from the female in having the entire face below the insertion of the antennæ and a line below a spot in front of the tegulæ yellow, and another yellow patch which varies much in size (being sometimes wanting) on each side of the front of the mesonotum.

In a well marked variety of the male of the male, of which we have bred two specimens, the face, eye-orbits and under surface of scape are distinctly reddish, almost approaching vermillion. It may be called variety *rufus*.

Glypta phoxopteridis, sp. n.

From a number of larvæ of *P. comptana* collected on blackberry at Anna, July 14, 1884, there was bred early in August a single specimen of an apparently undescribed species of *Glypta* for which I propose the above name. The species is so well marked, and is of such economic interest in this connection, that I describe it now, notwithstanding my belief that the fewer are the descriptions that are drawn up from single specimens of parasitic Hymenoptera, the better will it be for Science.

Length 7 mm. ♀. Black, varied with white; face except space beneath antennæ, broad eye-orbits, clypeus, mandibles except teeth, palpi, ventrum and sides of thorax, tegulæ and wide line running forward, scutellum, post scutellum, lateral and posterior margins of metanotum with space on meson reaching two-thirds the way to the anterior margin, basal and apical margins of abdominal terga, with vent-

rum of abdomen, white. Legs yellowish red, with coxæ and trochanters of anterior and middle pairs, whitish, as are the posterior tarsi, except the basal half of first joint which is dusky. Wings hyaline, iridescent; nervures and stigma dark brown. Ovipositor as long as abdomen.

The antennæ are broken off of the only specimen at hand, so I am unable to describe them now.

Described from one specimen bred from *Phoxopteris comptana*, Fröl., August, 1884.

Herbert Osborn presented a paper on the "Food Habits of the *Thripidae*."*

Mr. Smith remarked that he considered the habits of the group as very important economically and hoped additional information could be stated here.

Mr. Howard mentioned the supposed occurrence in Europe, in Phylloxera Galls, of the species called *Thrips phylloxeræ* by Prof. Riley.

Mr. Webster stated that he had kept a species of *Thrips* for several weeks on wheat without other nutriment.

Mr. Fletcher mentioned the injury done on exhausted meadow lands in Canada to June Grass (*Poa pratensis*) and to Timothy (*Phleum pratense*) which was apparently due to *Thrips*.

Mr. Howard had seen the species mentioned by Prof. Comstock and had known cases where every stalk of grass showing injury would be found on examination to contain *Thrips*.

Mr. Smith said he had observed *Thripidae* in galls but had not considered them as the authors of the galls or as feeding upon the larvæ.

Mr. Smith asked Mr. Westcott for information concerning Illinois collections.

Mr. Westcott remarked that there were a few good collections in Illinois and invited the President and others to examine them in person.

Mr. Smith remarked upon the collection of Mr. Bruce, especially commending the rich series in certain species which were represented by such number of specimens that the lines of variation could be very clearly followed.

Adjourned to meet the following morning.

Friday Morning.—Club met at nine o'clock, and the reading of the minutes having been deferred, the Club listened to a paper by Mr. D. S. Kellicott on *Hepialus argentiomaculata*.

* To be published in INSECT LIFE.

Note on *Hepialus argentiomaculatus*.

By D. S. KELLICOTT.

At the Ann Arbor meeting of this Club I described the larva and pupa of an unknown species of moth, supposed to be one of the *Cossidae*. I provisionally called it *Cossus alni*. The examples were obtained in Oswego County, N. Y., from the roots and stems of *Alnus incana*. I showed that the larva probably required three years to complete its growth and that the habits were substantially those of the better known species of its group.

Efforts to obtain the imago were fruitless until this present summer. A pupa sent to me from Hastings Center, Oswego County, N. Y., June 1st, gave a female imago June 2nd and it proved to be *Hepialus argentiomaculatus*.

I have little to add to what I have already said in the Club concerning its history. I have found the wood-peckers most successful rivals in collecting the mature larvæ. In the Fall before the final changes are to occur they bore up into the stems and the birds then seek them and successfully remove them from burrows that are deep in the wood. As the larva does not then open the way to the surface the bird must locate it by sounding. The larvæ occur in abundance in the locality where found. I have sought for it at Buffalo and elsewhere without finding it.

Mr. Schwarz stated that he had collected the species on the shore of Lake Superior, near Marquette, July 29th of the present year.

Mr. Smith stated that he had met with it in various places and he believed it to be probably quite generally distributed, and breeding in Oak, Willow and Poplar.

Mr. Kellicott remarked that he had taken *Prionoxystus querciperda* from the limbs of Red Oak.

Herbert Osborn presented a note on the occurrence of *Cicada rimosa*, Say, in Iowa.

"During the present summer I have received from a student, Mr. F. A. Sirrine, living in Tama Co., Iowa, a few specimens of *Cicada rimosa*, Say. As this is the first time I have met with specimens collected in the State and as I had supposed its distribution did not cover any portion of the State it is perhaps worth while to put its occurrence on record. Its distribution must be local or else its occurrence quite rare, otherwise it would probably have been noticed by some of the collectors in the many years during which insects have been collected in Iowa. The specimens received were collected in a grove in the North Eastern part of Tama Co. and said to be quite abundant there. Another student,

living in Worth Co., is quite sure he has seen the same species there, but I have seen no specimens."*

Prof. O. S. Westcott presented the following Entomological Memoranda.

ENTOMOLOGICAL MEMORANDA.

By PROF. O. S. WESTCOTT.

I.

While at Port Arthur, Ontario, Canada, in July, 1888, I was informed by Mr. John Merrill of that place, that in June of this year his attention was called to a great gathering of butterflies. On close investigation he discovered that the centre of attraction for the butterflies was a dead dog. The fondness of many diurnals for carrion is already a matter of record and this memorandum is made only as corroborative. So near as could be learned from Mr. Merrill's descriptions, the gathering consisted mainly of *Danaïs archippus*, supplemented by *Limenitis arthemis*, *Melitæa* and *Colias*. In all, Mr. Merrill counted one hundred and ten examples.

II.

At the same place, July 20th to 23rd, 1888, I took nineteen examples of *Melitæa*. Of these one was *nycteis*, and seventeen *tharos*, eight of the form *marcia*, and nine of the form *morpheus*. Query:—Should *marcia* and *morpheus* be found abundantly together during the latter part of July, if, as supposably demonstrated by Wm. H. Edwards, they are seasonal variations, due to the varying degrees of temperature to which the pupæ have been subjected?

III.

On a gravel work in the park at Sault St. Marie, Mich., Aug. 1st, 1888, I gathered twenty pupæ, apparently of some *Agrotis*. The caterpillars had selected a nearly solid foundation on which to pupate, but, exposed as they were to the foot of every pedestrian, many others had been crushed. Why should they leave the grass plots and resort to the gravel walk as a preferred place for their transformation?

IV.

In the monograph of the genus *Lachnosterna*** Dr. Horn remarks of *L. fusca*: "This species is probably the most widely distributed of any in our fauna and at the same time the most abundant wherever it occurs." This opinion is doubtless concurred in by most, if not all collectors, and yet some observations I have made for the last two years

* Since this note was read I have seen specimens from Worth County collected the present season by the student above mentioned.

** Transactions of the American Entomological Society, Vol. XIV, p. 245.

may be regarded by some as casting a shadow of doubt on this belief. Having taken occasion to capture *L. fusca*, Fröl., and *L. gibbosa*, Burmeister, in considerable numbers during the last two seasons and having preserved memoranda of numbers taken and dates of capture, I embrace this opportunity of putting such memoranda on record.

In the June issue of "ENTOMOLOGICA AMERICANA" (Vol IV, p. 56,) Mr. J. B. Smith remarks that "observations made by several Entomologists indicate that the species [of *Lachnosterna*] relieve each other,—*i. e.* appear successively, though a few will have a long life and overlap. * * * It will be a valuable addition to knowledge if collectors would note dates of first appearance, of greatest abundance and of last capture." The memoranda I have made will, in a small way, relieve collectors from this implied criticism.

My captures were made at Maywood, Cook Co., Illinois, a suburb of Chicago, a place about 12 miles West of Lake Michigan. I used a large funnel-shaped trap, made to fit around a street lamp. In fair weather the trap was allowed to remain out all night. It was so constructed that any beetle flying against the inwardly sloping glass sides of the street lamp would inevitably be taken.

The following table exhibits the date of capture and the number of *L. fusca* and *L. gibbosa* taken in this trap.

—o 1887. o—

	MAY														JUNE					
	9	11	12	15	16	18	19	20	21	23	24	25	9	11	12	13	14			
Fusca	27	52	20	93	98	22	90	125	83	37	48	6	3	20	33	29	12			
Gibbosa				10	28	2	25	39	35	37	46	9	1	31	28	17	5			

It is unfortunate that these observations were not conducted daily for a series of months. But moon-light takes the place of gas-light for a respectable fraction of each month and occasional storms as well as persistent foul weather dampen the ardor of both victim and collector. This table indicates the correctness of the statements of both Dr. Horn and Mr. J. B. Smith.

The greater abundance of *fusca* and the overlap of the species are both sufficiently evident.

Similar collections the present year are shown by the following table.

—o 1888. o—

	JUNE															JULY	
	2	3	4	5	6	7	8	9	10	11	12	13	25	29	30	1	2
Fusca	1	4	5	1	4	1	24	10	2	2	6	9			3	1	
Gibbosa		35	75	10	38	19	264	371	4	86	355	204	84	20	65	152	54

only recognizable, mostly good material, no account being made of a mass of damaged and microscopic material which found its way immediately in the waste basket. *Lachnosterna*'s so abundant presence is of course thoroughly destructive of the respectability of any Bombycid or Noctuid which is wheedled into the crowd. My best moth-catches with the trap are hence confined to the evenings before the advent of *Lachnosterna* and after its exodus. Unfortunately, no anæsthetizer that I have tried is so promptly effective with vigorous Coleoptera as to allow the trap to furnish undamaged Lepidoptera, when beetles are abundant.*

Prof. Kellicott stated that he had frequently observed butterflies attracted to carrion.

Mr. Smith had noted the location of a dead dog and after removal of dog had observed that butterflies collected at the spot.

Dr. Peabody had observed *arthemis* collected on foul smelling objects.

Dr. Kellicott had taken *cresphontes* in barn yards in Michigan and found them there in July last more common than *Asterias*.

Mr. Smith expressed his opinion that extensive collecting would reveal about equal numbers of both forms of *Melitæa*.

Dr. Kellicott inquired if the pupæ of the insects occurring in such numbers on gravel walks were formed there.

Mr. Westcott stated that he was sure they were *there* and completely exposed and that knew of no way to account for their occurrence but that they pupated there.

Mr. Osborn stated that in Iowa *Lachnosterna gibbosa* was more abundant than usual this year. *Fusca* has been most abundant every three years, 1880, 1883 and 1886.

Mr. Schwarz remarked that the notes showed that much can be done by thorough collecting for certain species and urged collecting more systematically.

Mr. Smith remarked that he had collected *Lachnosterna* carefully the present summer and had observed that the females appeared first, for

* Since writing the above I have unearthed a few memoranda made in 1886. For a few days I took in my trap *fusca* and *gibbosa* as follows :

	MAY					JUNE
	26	27	28	29	30	1
Fusca	36	3	47	4	5	24
Gibbosa	196	18	94	12	58	56

My notes say that the 27th of May was cold and stormy. Of these *fusca* carefully examined for sex I found the ratio of males to females 7 to 1. O. S. W.

fusca, a week previous to the males, then the males were more abundant for a time and after that the females more abundant. The males appear to be short-lived as compared with the females. He would take females fresh and full of eggs, then old and full of eggs and then very old battered with few eggs. *Gibbosa* is not common at Washington. *Ilicis* is rather rare wherever known but a few may be beaten from trees. In New York he collected in early evening and watched for movements of the insects in grass and the most collected were *ilicis* while but very few of these were taken at the lamps. Many species are absolutely local. *Fusca* and *inversa* are everywhere. *Affinis* occurs in very limited spots. He had observed in Washington one particular tree where it was almost certain to be found. Mr. Ulke, collecting later in the season, had taken *fraterna*.

Mr. Webster remarked that he had collected many years in Eastern Illinois (DeKalb Co.) without getting *gibbosa* but found it common in the Western part of the State (Stark Co.) and he was somewhat surprised at Mr. Westcott's securing it in such large numbers.

Mr. Westcott stated that he had collected *gibbosa* for twenty years near Chicago.

Dr. Peabody had no doubt that the condition of weather would affect the numbers of *Lachnosterna* which would appear on certain nights. He doubted whether it would influence the numbers that would appear in a given season. These insects transform to imagos in autumn, and hybernate in that stage; after having endured the cold and wet of a long winter, it is hardly possible that their emergence would be prevented by a little cold or wet in May or June, unless they should be actually drowned out. When a warm night gives them their opportunity they will appear in numbers determined chiefly by the conditions affecting in their larval growth.

Mr. Smith said conditions of weather have a great influence; the beetles transform in Fall and it takes wet hot weather to bring them out in the Spring.

A motion to continue the session of the Club through the morning was lost, many of the members wishing to attend meeting of section "F."

Mr. Howard made a few remarks upon the recent successful experiments made under Dr. Riley's direction at Washington with kerosene emulsion against white grubs. (A fuller account of these experiments than that given by Mr. Howard has since been published in *Insect Life*, Vol. I, No. 2.)

Mr. Webster expressed his doubt of the practicability of this plan on large farms.

Mr. Howard said it could probably be used only on lawns or where special value of ground warranted the necessary expense.

Dr. Peabody stated that he was sorry that Prof. Forbes was not present to tell his own story, as he had used the kerosene emulsion with success, but, as he remembered, the conclusion was that it would cost too much per acre, to be of general service.

Mr. James Fletcher gave a descriptive account of an expedition he had made with Mr. S. Scudder to Nepigon, North of Lake Superior, in quest of the eggs of diurnal Lepidoptera; but particularly for those of *Chionobas macounii*, *Carterocephalus mandan*, and *Colias interior*. This expedition had been eminently successful. Not only had eggs been procured of all the species mentioned, but of many others besides. An account was given of the methods of capturing, caging and general treatment which had given the best results. It was found most convenient to place all the cages near together in the woods, so that they could all be visited and examined without loss of time, and also that females might be carried a long time in smaller boxes before caging. Eggs had even been procured from *Colias interior* which had been sent from Sudbury to Ottawa (323 miles) by mail in a tomato can. In speaking of cages it was pointed out that these could be made with great ease. Mr. Scudder had given most valuable suggestions in this line. Cages for all small species can be made in a few minutes by cutting off the top and bottom of a tomato can and then fastening a piece of netting over one end, either by slipping an elastic band over it or tying it with a piece of string. The female is then placed in this over a growing plant of the species the larvæ are known to feed upon. These cages had answered well for all the skippers which feed on grass, and the small Argynnidæ. For such species as lay on the foliage of shrubs or trees bags had to be tied over living branches, care being taken that the leaves were not crowded up; but that they should stand out freely so that the female could lay, if such were her habit, either upon the upper or lower side or the edge of the leaves. In this way eggs were obtained of *Nisoniades icelus* and *Papilio turnus*. Another cage for insects which lay upon low plants and which is easily constructed, is to cut two flexible twigs and bend them into the shape of two arches which are put one over the other at right angles to each other with the ends pushed into the ground; over this pent-house so formed a piece of gauze is thrown and the edges are kept down either with pegs or earth laid upon them. This kind was useful for larger insects than could be placed in tomato cans. In these, eggs of *Chionobas macounii*, *Colias eurytheme*, etc., were secured.

Interesting notes were given on the habits of some of the species collected, and the larvæ of *Carterocephalus mandan*, *Pamphila hobomok* and *P. mystic* were exhibited as well as specimens of *Chionobas macounii* and *Colias interior*. Out of 19 species of Diurnals caged eggs had been obtained from 17.

(TO BE CONTINUED.)

On a New and Interesting Spider.

By GEO. MARX, M. D.

Washington, D. C.

The family *Pholcidae* has been hitherto placed in close relation with the *Theridiidae*, but the peculiar structural characters of this small but well marked family have made this affinity doubtful to some of our systematists. In fact, the right place for the *Pholcidae* has not been found so far, and all our modern arachnologists content themselves with leaving it where it was, near the *Theridiidae*. Dugès alone placed it with *Filistata*, but for what reason I do not know.

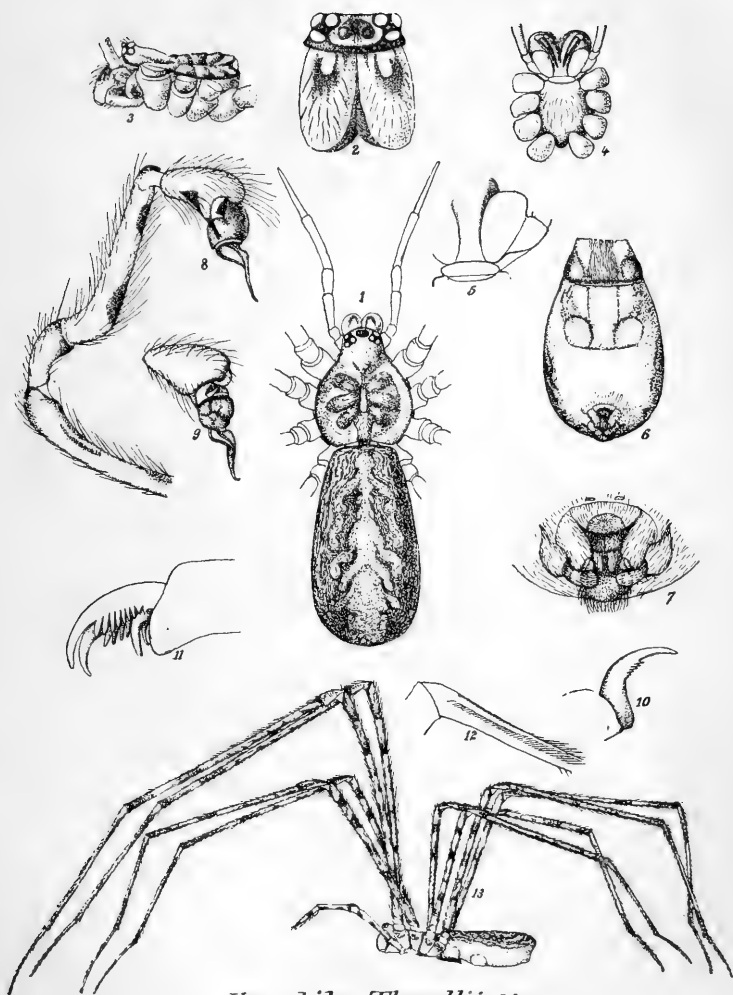
In July last I received, from the vicinity of Lookout Mountain, Tenn., a few males and females of a spider, which were collected in the forests of that mountainous region, where they had constructed, at the underside of projecting cliffs and rocks, large, white, saucer- or lampshade-like webs, in which they dwelt, assuming an inverted position, and shaking the web like a *Pholcus*, when one approaches.

This spider appeared at the first glance to be a *Pholcus* from its long, slender legs, the shape of the body and the arrangement of the eyes; but a closer study showed that it was an entirely new animal, with characters widely differing from any known spider, and yet combining in itself some of those characters upon which a certain number of families form a natural group, viz: *Dysderidae*, *Filistatidae* and the *Territelariæ*. Moreover, this spider brings into this group the *Pholcidae* and *Scytodidae*, since it possesses characters which belong to these families.

The principal and peculiar characters of this interesting spider are as follows: It has four true lamellar tracheæ or lungs like the *Territelariæ*. It has a cribellum and calamistrum like the *Filistatidae*. It has the nearly vertical mandibular claws and the male palpus, like the *Dysderidae*. It has the legs and body shape and the arrangement of the eyes of the *Pholcidae*.

But it is unlike the hitherto known *Territelariæ* in the presence of a cribellum and calamistrum, in the slenderness of the legs and in the shape of the body. It is unlike the *Filistatidae* from its four lungs, the position of the mandibular claws and the form of the labium. It is unlike the *Dysderidae* from the number of the eyes, the presence of the cribellum and calamistrum and the length of the tarsi. It is unlike the *Pholcidae* by the presence of four lungs, the cribellum and calamistrum and the direction of the mandibular claws.

The fact that our spider has four lungs places it at once in the



Hypochilus Thorellii. Marx.

C. Marx del.

sub-order *Tetrapneumones*, but the fact that it spins a web like a *Tubitelaria* excludes it from the *Territelariæ* and demands at least a new family.

I have named this interesting spider, at the suggestion of Prof. Thorell, *Hypochilus*, and, in appreciation of this distinguished naturalist, *Hypochilus thorellii*, and the new family I have called *Hypochilidæ*.

Family **HYPOCHILIDÆ**, nov. gen.

Four lamallar tracheæ, the anterior pair close the base of the abdomen, the posterior in the middle region of the venter. Mandibular claws nearly vertical. Legs long and slender. Cribellum and calamistrum present.

Spiders which make saucer- or lampshade-like webs.

HYPOCHILUS, nov. gen.

Hupo below, *cheilos* lip: from the position of the labium.

Cepha'x with a flattened dorsum, depressed in the median region; sub-circular, posteriorly slightly emarginate; pars cephalica rising abruptly. Eyes, 8, 3 in a cluster on each side and two in the middle between them; the anterior lateral eyes about as far from the margin of the clypeus as their diameter. These eyes are directed downward. The two middle eyes a little lighter than the anterior lateral. Mandibles cylindrical, slightly tumid in the middle region. Claws long, nearly vertical. Maxillæ longer than broad, parallel; palpus inserted in the middle of the external border. Labium broad, short and straight, situate below the maxillæ which stand upon it. Abdomen long, subcylindrical; cribellum semicircular; undivided. Coxæ nearly vertical, not free. Legs long and slender, not spiny. 1.2.4.3.

Hypochilus thorellii, nov. species.

Female.—Measurement: Cepha'x long 5.4, broad 4.4, abdomen long 9.2 mm.

		Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Leg	I.	22 mm.	2.4 mm.	19.2 mm.	13.2 mm.	6 mm.	62.8 mm.
"	II.	16 "	2.2 "	14.5 "	10.4 "	5 "	48.1 "
"	III.	13 "	2.2 "	11 "	8.6 "	5 "	39.8 "
"	IV.	15 "	2.2 "	13 "	10.6 "	5.4 "	46.2 "

Cepha'x flattened, with a depressed ventral area, light yellowish gray with a star-shaped darker colored ventral figure. Pars cepha shorter and about half as wide as the thoracic part. Lateral sides vertical. Clypeus low. The two smaller median eyes black, the others large and white.

Mandibles whitish gray with a black indistinct figure at the front, as long as patella I, about as thick as femur I, and nearly vertical in position; claws long, groove bordered at the anterior side by 5 long and strong teeth, at the internal border by 4 small tubercles. Maxillæ nearly twice as long as broad, parallel, with straight inner borders, truncate at the tip and standing with their narrow and pointed base upon the labium. Sternum ovate, truncate anteriorly by the broad labium, its sides with depressions and a blunt point between coxæ IV. Palpi long, equal to metatarsus II. Abdomen—upperside mottled with black indistinct lines and figures which leave a somewhat lighter dorsal region. Underside whitish gray; the borders of the 4 lungs distinct; no vulva, but the area between the anterior pair of lungs covered with long dark hair. Spinnerets short; median pair very small. Legs whitish

yellow, spotted with irregular black dots; the discal ends of the joints somewhat thickened and darker colored; all legs with a fine and rather long pubescence. No spines. Calamistrum of metatarsus IV short and consisting of long but slender hairs.

Male.—Cepha'x, long 4. Abdomen 6 mm. Palpi as long as abdomen.

		Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Leg	I.	24.5 mm.	2.4 mm.	24 mm.	20.4 mm.	8 mm.	79.3 mm.
	" II.	17.5 "	2.2 "	17 "	14.6 "	6 "	57.3 "
	" III.	13 "	2 "	12.8 "	11 "	4.6 "	43.4 "
	" IV.	15.6 "	2.2 "	15 "	14.4 "	6.6 "	53.8 "

Cepha'x and abdomen like in the female in form and color, trophi also. Palpi long, tibial joint with an elbow at base; tarsal joint short, club-shaped; at its underside near the tip, a long spiral bulbus, thick at the base and drawn out in a slender point, hanging free from the palpal tarsus. Legs longer and much thinner than in the female.

EXPLANATION OF THE PLATE.

Fig. 1.—Dorsal aspect of a female, much enlarged.

" 2.—Clypeus with the arrangement of the eyes. Mandibles.

" 3.—Lateral view of Cepha'x showing the dorsal depression and the vertical position of the coxæ.

" 4.—Sternal side of Cepha'x.

" 5.—Maxilla and labium showing insertion of labial palpus.

" 6.—Ventral aspect of abdomen.

" 7.—Spinnerets and cribellum.

" 8.—Male palpus.

" 9.—Genital part of the same from the other side.

" 10.—Claw of female palpus.

" 11.—Claws of first pair of legs.

" 12.—Calamistrum.

" 13.—An enlarged female.

Zeuzera pyrina, *Fabr.* and *Z. Canadensis*, *Herr.-Sch.*

By E. L. GRAEF.

From my friend Mr. Angelmann I received two males of the genus *Zeuzera* Latr., and as I had not heard of the capture of *Z. pyrina* in the United States and not knowing Herrich-Schäfer's species *Z. canadensis* I concluded it was the last named. On comparing it with my specimens of the European *Z. pyrina* I at once concluded it to be that species.

I have yet to compare the females but the males differ in nothing that I can discover. Whether this species is one of the many introduced into this country or whether it is an indigenous species is difficult to determine. In my long experience in field collecting I have never

taken it and I now hear of a number of specimens being taken in the vicinity of Newark, N. J., where the two specimens now represented in my cabinet were also captured. From this last circumstance I would infer the species was introduced from Europe as the larva lives in the trunks of the Walnut, Chestnut and Appletree.

Grote, in his last Check-List does not cite *A. pyrina* as being found in the U. S., while Dr. Morris (Synopsis Lepidoptera, page 125), and Dr. Packard (Proceedings Phil. Ent. Soc'y. Vol. 3, p. 390,) both enumerate it among the American species.

For those who do not possess a copy of Dr. J. G. Morris Synopsis of Lepidoptera I append a description of *Z. canadensis*, H. Sch.

"Male. Straw color; primaries thickly covered with little transparent brown streaks; fore part of the disk white, hind part grayish. Secondaries white, with straw-colored veins. Hab. Canada."

I should very much like to see a specimen of the true *Z. canadensis* and any of my friends possessing the species would confer a favor by sending me a specimen for examination.

Elateridæ in the vicinity of Cincinnati, Ohio.

BY CHARLES DURY.

Species of the sub-family *Eucneminae* occur in numbers in the vicinity of this city. The following species have been identified from this locality.

Melasis pectinicornis, Melsh. Taken as it emerged from dead Beech which was riddled with holes made by it. June.

Tharops ruficornis, Say. Abundant, taken as it emerged from dead Beech logs. June.

Stethon pectorosus, Lec. Taken from fungus growing on the underside of Poplar logs. July.

Deltoimetopus amænicornis, Say. May, July.

" *rufipes*, Mlsh. June, found running about on dead Beech.

Dromæolus cylindricollis, Say. June.

" *striatus*, Lec. June and July.

" *harringtoni*, Horn. June and July.

All occur on Beech.

Fornax calceatus, Say, June.

" *hornii*, Bonv. = (♀ *calceatus*. June.

" new species. June.

" *orchesides*, Newm. June.

All taken on dead Beech. *Calceatus* and *orchesides* are very variable in color and size.

Microrrhagus humeralis, Say. June, July.

“ *subsiniatus*, Lec. June.

“ *impressicollis*. Bonv. June.

“ *pectinatus*, Lec. June.

All taken on dead Beech. 400 *humeralis* were taken out of a small Beech limb that had broken from a neighboring tree.

Hypocælus terminalis, Lec. Dead Beech.

Nematodes atropos, Say.

“ *penetrans*, Lec.

Many of both species taken while running up and down dead beach trees. Some *atropos* taken from Sycamore were very large in size.

While the sun shines warm and bright from the latter part of May until the middle of July members of this interesting sub-family are found actively running about on the dead and dying timber, generally Beech. Late in the afternoon they conceal themselves in crevices and under loose bark where they rest for the night.

Book Notice.

Entomology for Beginners, by A. S. PACKARD, M. D., Ph. D. 8vo. pp. 367. Henry Holt & Co., New York.

The above work is by the generosity of the Author in our possession. It is a compact handy volume, well printed, neat and attractive.

In its subject matter it is what it professes to be, but its profession has a strong flavor of modesty. It is a well conceived, well arranged compendium of Entomology for beginners, but it reaches very often and very far into the deep things of the science.

What the work treats of can be in no better way summarized than by giving the table of contents by chapters. This is as follows: Chap. 1, the structure of Insects; Chap. 2, growth and metamorphosis of Insects; Chap. 3, classification of Insects; Chap. 4, Insect Architecture; Chap. 5, Insects injurious and beneficial to Agriculture; Chap. 6, directions for collecting, preserving and rearing Insects; Chap. 7, Mode of dissecting Insects; Chap. 8, Cutting and mounting microscopic sections of Insects, and mounting them whole, etc.; Chap. 9, the Entomologists Library.

The work is a summary of most that is best in the experience of entomologists up to the present time, compactly arranged and clearly stated. It is a work to which, so far as our knowledge goes, no work heretofore published, can, in the carrying out of the special purpose of its existence be compared. There certainly is no work so well adapted to the needs of the beginner, no work so well fitted as a text book for schools and colleges. Many of us will no doubt differ from the learned Author on certain matters of opinion, but not one of us but will acknowledge his great indebtedness for what Dr. Packard has so ably done.

We give the work the unstinted praise it deserves, and recommend it to all beginners or veterans in the science of Entomology. G. D. H.

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NO. 9.

PROCEEDINGS OF THE ENTOMOLOGICAL CLUB OF THE A. A. A. S.

[Continued from page 159.]

Dr. Kellicott commended the methods employed in breeding.

Mr. Smith said he was specially interested in the methods employed for securing eggs.

Dr. Kellicott stated that he used earthen flower pots in rearing insects.

Mr. Fletcher mentioned the use of lamp chimneys as very convenient cages.

Mr. E. A. Schwarz presented a paper on the Insect Fauna of Southern Florida.

THE INSECT FAUNA OF SEMITROPICAL FLORIDA WITH SPECIAL REGARD TO THE COLEOPTERA.

By E. A. SCHWARZ.

“Synopsis of the Hymenoptera of North America north of Mexico;” “Revised Catalogue of the diurnal Lepidoptera of America north of Mexico;” “Monograph of the Aphodiini of America north of Mexico”—such are a few samples of the titles of numerous works treating on North American insects, the authors thereby intimating that the fauna of North America represents on all sides a well limited area except along the Mexican frontier, and that here it has been found convenient to substitute the political boundaries of the two countries in the absence of a natural dividing line. I have not yet come across a similar work entitled: Monograph or Catalogue of a certain family of insects of North America north of Mexico and the West Indies, and it cannot be denied that hitherto very little attention has been paid to the insect fauna of the

region forming the extreme southeastern point of North America; whereas a great deal of interest has been shown for many years in the study of the insects of all Orders inhabiting the south-western extremity. Of course, it has long been known that there existed in southern Florida a colony of West Indian forms but no one knew how large or small this colony was, nor how far north it extended. Most entomologists considered this colony as a very small one, or as having only a temporary character, the insects having flown or having been in some other way brought over from Cuba to disappear again from the Florida coast within one season or two. In fact some of the species reported in former times from southern Florida are now again dropped from our lists as doubtfully belonging to our fauna. Aside from this West Indian colony quite a number of species have been described from southern Florida as being peculiar to that section, thus creating the impression of the presence of a distinct endemic fauna in southern Florida. A few of these insects came from Key West but most of them are simply recorded from "Southern Florida," a rather indefinite and somewhat mysterious locality, since it must be remembered that by far the largest part of southern Florida consists of unproductive Cypress or Mangrove swamps, or impenetrable sawgrass savannahs, or overflowed land like the immense stretch of the Everglades.

Thus when last year I had the opportunity of spending a few weeks on an exploring trip to southern Florida, a preparatory study of what was known of the insects of that region furnished hardly any information, and, in fact, I started on my trip quite ignorant regarding the general character and extent of that fauna. To make sure of striking the semitropical part of Florida I proceeded at once to Key West and here I found indeed a fauna entirely different from any I had found on various previous trips to Florida.* Of course, the island of Key West contains also a great many species well known to me but all these are species of general distribution, either in our Southern States or distributed through both North and South America. After a study of this peculiar fauna of Key West which I also found on many other localities farther north and which constitutes the semitropical fauna of Florida, I have come to the conclusion that it is entirely of West Indian origin, and that the region I shall hereafter circumscribe as Semitropical Florida does not

* The following remarks pertain only to the Coleopterous fauna, to the study of which most of my time and attention was paid; but from what I collected or saw in the other orders I feel confident that the character and extent of the semitropical insect fauna as a whole does not differ in the least from that of the Coleoptera. The strong flyers among the insects, viz : certain *Lepidoptera* and *Odonata*, differ of course in the mode of immigration but their number is comparatively small.

contain any endemic forms. In other words, the distinctive fauna of Southern Florida is a permanent colony of West Indian forms, much more numerous in species than it has hitherto been supposed; the number in Coleoptera alone amounting, according to a very low estimate, based upon my collection, to at least 300 species not yet in our catalogues. In describing species from Southern Florida the point I have just mentioned has been too much overlooked, the result being that many of these species prove to have been previously described from the West Indies.

This conclusion which of course cannot be fully proven before we have acquired a more complete knowledge of the West Indian fauna, but which is fully sustained by the peculiar composition and mode of occurrence of the semitropical insect fauna of Florida, forms the starting point of the following remarks.

Before entering on a discussion of the character and extent of this West Indian colony in Florida it seems worth while and instructive to give a glance at the south-western extremity of North America where our fauna comes also in contact with a semitropical fauna. The great faunal regions known as Nearctic and Neotropical are connected or divided by the Central American fauna which from the nature of the conditions participates in the characters of both regions, but is more nearly allied to the latter than to the former. It is again divided into the fauna of the Central American continent and the Insular fauna of Central America, more commonly called the West Indian fauna; these two faunal regions being related to each other in the same degree as is the fauna of our Atlantic slope to that of the Pacific slope. At the zone of contact between the North American fauna and that of Mexico the conditions are as follows: The ocean current along the Pacific coast of North America runs from north to south, thus facilitating the spread of more northern species southward. It loses its force and disappears before reaching southern California and thus the North American fauna along the coast does not come into contact with that of the Mexican coast. On the mainland we find between California and the largest portion of Arizona on the one side and Mexico on the other, a broad tract of the most barren and sterile country* which proves to be a most effectual barrier between the two faunal regions. Farther east, and more especially along the Rio Grande, a complete intermingling of the two faunas takes place in such a way that species of all families participate in this intermingling. It is thus impossible to decide whether a collection of insects comes from Texas or the State of Tamaulipas, or

* See Dr. G. H. Horn's "Notes on the 'Biologia Centrali-Americana,'" Trans. Amer. Ent. Soc., Vol. XIII, Month. Proc., p. VII.

whether it comes from southern New Mexico, from south-eastern Arizona, or from Sonora. The Morrison collection, for instance, has been distributed among North American entomologists as coming from south-eastern Arizona and is worked up in the "*Biologia Centrali-Americana*" as coming from Sonora, Mex.

Returning to Florida and the West Indies we find a quite different state of affairs. Florida is apparently well separated from Cuba, the nearest of the West Indian islands, by an ocean which, at its narrowest place, is 90 miles wide. In reality, however, this wide arm of the ocean does not separate but connects the West Indies with Florida; in fact it is not an ocean but the mightiest river on this globe, with a strong current; in short it is the Gulf stream. As everyone knows, the valleys of large streams are most favorable for distributing different faunas. Take the Mississippi River for instance: it has often been pointed out that along its banks and its valley the fauna and flora of the Southern States extends well up into the Northern States as far as Iowa and Nebraska, while the current of the river constantly carries numerous species of northern plants and insects into the Southern States. The Gulf stream has neither banks nor a valley and a distribution or migration against the current or up stream is not possible but a distribution with the current takes place as in any other large river. The result is that Floridian insects and plants cannot migrate southward into the West Indies, while numerous species of West Indian plants and insects are easily carried with the current on to the shores of Florida where the insects find a permanent lodgement because their original food-plants have also established themselves at the same place.

In looking for the original home of this colony of West Indian insects and plants we have been hitherto too much accustomed to consider the island of Cuba as the only place from which this immigration has taken place. In the task of determining my South Floridian Coleoptera it was found over and over again that these immigrants may have been described not only from Cuba, but from any other of the West Indian islands, or from the Central American continent south of Yucatan, or even from Columbia and Venezuela—in other words from all parts of Central America which come under the influence of the Gulf stream. As can be seen from any physical atlas, the warm equatorial current enters the Caribbean sea through the Windward Islands and attaining by this contraction a considerable velocity forms the Gulf stream which flows between the southernmost chain of the West Indies and the Leeward Islands and strikes the Central American continent, flowing northward along the coast. Deflected by the projecting peninsula of Yucatan, the stream turns eastward and reaches the coast of Cuba

and the southernmost part of Florida. Thus the West Indian colony of insects in Florida may come from any part of this vast area swept by the Gulf stream, although the largest proportion comes of course from Cuba since this island is the nearest to Florida. This immigration by the aid of the Gulf stream explains the following interesting phenomenon in geographical distribution. We have seen that insects from the coast of Central America south of Yucatan may occur in Southern Florida; but the same species often had the power of extending their geographical distribution northward on the Central American mainland through Mexico, thus reaching the south-western limits of the United States. Certain species may occur, therefore, in the United States, in Western Texas or South-eastern New Mexico and in Southern Florida, being however, absent in the intervening Southern States, viz: Eastern Texas, Louisiana, Alabama, Georgia, and Northern and Central Florida. This curious distribution has never been pointed out so far as I am aware but can be exemplified by numerous species, not only among the Coleoptera but also other Orders of insects.

The distance between Cuba and Florida is not very great, the current of the Gulf stream is very swift, and logs and other debris swept out to sea from the rivers of Cuba may reach the coast of Florida within three or four days; from Yucatan in about double that time. It is evident that within this short time all such insects may safely be carried from the West Indies to Florida which, in the imago or praeparatory stages, live under bark, or within the wood of trees, or within seeds and similar sheltered conditions, or whose eggs are firmly attached to trees and covered with viscous liquid. But it is evident that this sea voyage is too long for all such insects as do not live in such sheltered positions. As a consequence, all adephagous Coleoptera, further all those living under old leaves, in the ground, in very rotten wood and similar places, and finally most of the *Chrysomelidæ* which lay their eggs either on to the leaves or in the ground are not brought over from the West Indies. There are, therefore, no West Indian *Carabidæ*, *Lampyridæ*, *Staphylinidæ* and other rhyphagous Clavicorn families and very few West Indian *Scarabæidæ* and *Chrysomelidæ* to be found in Southern Florida.* This is a most characteristic feature of the semitropical Coleopterous fauna of Florida, strikingly contrasting with the state of affairs in the south-western extremity of North America. I have stated before that along the Texan and New Mexican frontier there is a perfect intermingling of the North

* The absence of fresh water in the coral region of the Keys and the mainland south of Miami River necessitates the absence of *Dytiscidæ* and most other aquatic or semi-aquatic families. Even the Everglades and the rivers draining the same at the northern end of Biscayne Bay seem to be almost destitute of aquatic Coleoptera.

and Central American faunas so that it is impossible to decide whether a miscellaneous collection of Coleoptera comes from Western Texas or the adjacent parts of Mexico. A miscellaneous collection, consisting only of about 100 species but made promiscuously in semitropical Florida can at a glance be distinguished from a similar collection made in Cuba or any other part of the West Indies. Further, the peculiar composition of this fauna at once precludes the assumption that any agencies other than the current of the Gulf stream could have been active in assisting the immigration from the West Indies.

To find out the geographical extent of this semitropical fauna in Florida was the chief object of my trip and since I was fortunate enough to transverse the whole length of the region to be taken into consideration, I have been able to contribute to the solution of this question. But long before I got through with my trip I had come to the conclusion that in the course of my first expeditions to Florida in the years 1875 and 1876 I had been, in the vicinity of Fort Capron and other points on the Indian River, in the very midst of this West Indian colony of insects without capturing any of them, except, accidentally, a few stray specimens. I feel quite sure that my companions and myself passed then within a few yards of places where we might have collected scores of species belonging to this semitropical fauna. But at that time we did not know anything about the peculiar mode of occurrence of this fauna. Some years later, Mr. H. G. Hubbard instituted a careful search at several points on the narrow strip of land lying between the ocean and the Indian River between Capron and Jupiter inlet. He found then for the first time quite a number of these species which I now recognize as West Indian immigrants. All these occurred exclusively in small and isolated thickets of hammock land found at wide intervals in the dense shrubbery back of the ocean beach. Mr. Hubbard recognized several trees composing these thickets as West Indian species, but the relation of the insects to this flora was at that time not fully recognized, and some of the more striking species found by Mr. Hubbard were shortly afterwards described by Dr. Leconte as belonging to the Floridian fauna.

Most of the more southern Keys are covered with semitropical forest, *i. e.* forest composed of West Indian trees, while, as I stated before, the true Floridian fauna and flora are almost entirely absent. These islands are, therefore, by no means favorable to a study of the relation of the semitropical to the true Floridian fauna. However, a stay of a few weeks on the shores of Biscayne Bay fully sufficed to settle this question. Here as well as on the mainland farther south and the northernmost Keys (Key Largo and Elliott's Key) the Floridian flora largely infringes upon the semitropical forest and reduces the same to smaller or larger

island-like patches lying close to the shore or occupying similiary isolated patches on the shore of the Everglades and the few islands in the Everglades. The bulk of the mainland is covered by pine woods* with an undergrowth composed almost entirely of true Floridian plants. There are further vast stretches of what is called "the prairie," *i. e.* land quite recently formed, partly by the accumulation of seaweeds swept ashore by the waves, and partly by the advance of the Mangroves. This prairie is covered with the same herbaceous vegetation which we see in similar places in Central Florida and does not contain a single semitropical plant. Even the hammock is invaded by several true Floridian trees: the Live Oaks, several Palmettos, the Hackberry and others make their appearance and, on higher ground we find plenty of *Persea carolinensis*. Now on all these trees, in the pine woods and on the prairie, in short wherever there is the Floridian flora we meet the true Floridian insect fauna whereas the semitropical fauna is confined to the semitropical forest.** This fact once recognized, it becomes evident that the northward extent of this fauna is identical with that of the semitropical forest, a fact fully borne out by subsequent experience.

We have seen that the semitropical forest occupies the chain of the Keys and island-like spots on the shores of Biscayne Bay and farther south on the mainland. North of Miami River the coral formation rapidly sinks below the level of the ground and the land is covered with vast stretches of Mangrove and saw-grass swamps until it is lost into the Everglades. The semitropical forest is no longer to be found here but it is continued northward in a remarkable way on the narrow and sandy coast strip beginning with Cape Florida. Here we meet for the first time with the semitropical maritime flora in its fullest development. It covers as a dense shrubbery the land back of the beach; but to my surprise I was unable to discover any peculiar Coleoptera on this flora although in Hemiptera I found here quite a number of the most striking species. But in the very midst of this shrubbery, at a distance of from 2—300 yards from the beach, there occur little patches of the semitropical forest, these patches being only about one acre in size, rarely larger and often

* While it is true that the Pine of Southern Florida, *Pinus cubensis*, is also of West Indian origin, its distribution in Florida is quite different from the rest of the semitropical flora and its introduction evidently of a very ancient date. Its fauna does not differ from that of the Yellow Pine (*P. palustris*).

** There is, in addition, in Southern Florida a maritime fauna of semitropical character but the number of species composing the same (about 12 in Coleoptera) is so small that it is hardly worth while considering. Its northern extent is still uncertain but it is safe to say that on the eastern coast, it does not reach beyond Musquito Inlet at New Smyrna.

smaller but always widely distant from each other and difficult to find in the high and dense shrubbery of the maritime flora. At Lake Worth, about 100 miles north of Cape Florida the semitropical forest attains a most unusual development extending for 8 or 9 miles on the narrow space between the lake and the sea. In their northward extent along the Indian River these semitropical thickets become smaller and scarcer, one species after another of the semitropical trees disappears and with their food-plants the semitropical insects become gradually scarcer in individuals as well as species. Before reaching Cape Canaveral this peculiar fauna and flora may be said to have disappeared. I desire to emphasize here once more as one of the principal characteristics of this flora and fauna, that north of the Everglades they nowhere appear inland but always close to the shore. Even along the inner bank of the Indian River there are—or rather were—but a very few spots covered with semitropical forest, viz: on the mouth of the St. Lucie and Sebastian Rivers, at the southern end of Merritt's Island and perhaps some others; but they are now mostly destroyed by cultivation.

What I have hitherto said of the extent of the semitropical fauna refers only to the eastern and south-eastern coast of Florida. I know nothing from personal experience how far north this fauna extends on the western coast.* In fact the south-western part of Florida south of the Caloosahatchee River is at present the most unknown and least accessible portion of the whole United States and, entomologically, still *terra incognita*. I rely here entirely on a statement by Prof. C. S. Sargent published in his "Report on the forests of North America" ** and quote it herewith; but I wish to say that long before I saw it I had worked out from my own experience and with the aid of Mr. Hubbard's notes the extent of the semitropical fauna and flora along the south-eastern coast. Says Prof. Sargent: "A group of arborescent species of West Indian origin occupies the narrow strip of coast and islands of Southern Florida. This belt of semitropical vegetation is confined to the immediate neighborhood of the coast and to occasional hammocks or islands of high ground situated in the savannahs which cover a great portion of Southern Florida, checking, by the nature of the soil and want of drainage, the spread of forest growth across the peninsula. This semitropical forest belt reaches Cape Malabar on the east, and the shores of Tampa Bay on the west coast, while some of its representatives extend fully two degrees

* The distribution of semitropical insects on the western coast is facilitated by a counter current which, originating at Cape Florida, runs in a south-westerly direction between the Keys and the mainland to Cape Sable, thence northward along the coast.

** Tenth Census of the United States, Vol. IX, 1884, p. 6.

farther north. It is rich in composition ; nearly a quarter of all the arborescent species of the Atlantic forest are found within this insignificant region."

In these few words the extent of the semitropical insect fauna is also sketched, but Prof. Sargent omits to emphasize the island-like distribution of the semitropical forest which as a matter of course exists on the Keys but is maintained throughout on the mainland.

This distribution of the semitropical fauna which surrounds, like a necklace of pearls by far the largest portion of the peninsula of Florida is certainly a most remarkable one, and has, I think, no parallel in any other country of the globe.

In a paper read at the March (1888) meeting of the Entomological Society of Washington, Mr. Uhler, while speaking on the Hemiptera collected by myself in south-eastern Florida, stated that the present Hemipterous fauna of North America is largely derived from the neo-tropical fauna, and that the comparatively few really nearctic forms in Southern Florida have a hard struggle with the invaders from the South. His first assertion is undoubtedly correct and holds true also of the other Orders of insects ; but Mr. Uhler omits to state that the immigration to which he refers and which shaped the character of the present fauna of the North American continent, took place at a very remote age, viz : at the end of the Ice period, long before there existed a Southern Florida. The settlement of West Indian plants and insects which has been the subject of my communication is, geologically speaking, of quite recent date and, in fact, is still going on. This West Indian colony occupies, as we have seen, a very modest place in Florida and certainly does not infringe upon or contend with the continental forms. Some species have acquired, and some others no doubt will acquire the power to change their food-habits and extend their geographical range northward, but the majority will remain confined to the isolated spots covered by the semitropical forest and will never compete with the North American forms. Yes, this semitropical flora and fauna stands even in imminent danger of being considerably restricted by the agency of Man since the hammock land, on account of its rich soil, is rapidly brought under cultivation. Thus the once famous semitropical hammock of Lake Worth will have entirely disappeared ere long.

During my stay on the shores of Biscayne Bay I witnessed myself the destruction by cultivation of some of the prettiest pieces of semitropical hammock land, and if on the island of Key West the building boom, which flourished at the time of my visit, holds on for only three or four years, not the slightest trace will then be left of the hammock, and the semitropical insect fauna of that island will be a thing of the past. Still,

there is no danger that this fauna will become entirely extinct in Southern Florida, since many spots covered with semitropical forest are situated in the most inhospitable and inaccessible parts of the country which will never have any attraction to the settler.

One more question remains to be briefly touched, viz : What shall we do with these colonies of semitropical insects in the south-western and south-eastern extremities of our country? Shall we include them in the lists of North American insects or shall we exclude them therefrom? From the standpoint of systematic Entomology it would no doubt be advantageous to include as much as possible or the whole of the semitropical faunas since the systematic position of many now isolated species or genera or higher groups could then be established in a much more satisfactory way than it is possible from the study of the North American fauna alone. Some of our authors, dealing with whole Orders of insects, have indeed included this semitropical fauna, *e. g.* Dr. Hagen in his Synopsis of the Neuroptera of North America, Baron Osten-Sacken in his Catalogue of Diptera, and Mr. Uhler in his Check List of Hemiptera. These authors could do so, however, without much inconvenience since the material at their command from Central America and the West Indies was very limited as to the number of species. If they had now the immense material from the continent of Central America that has been accumulated by the enterprise and energy of the editors of the "Biologia Centrali-Americana" they would no longer include the Central American fauna into a Monograph or Catalogue of North American insects, for the simple reason that the true North American fauna would then appear as an insignificant appendix to the much richer fauna of the Semitropics. The fauna of the West Indies is as yet but very imperfectly known; but it is safe to say that, although poorer than the Central American fauna, the number of its species also exceeds that of the North American continent.

This inclusion would, in Coleoptera alone, involve the addition of at least 20,000 species. Our systematists would thus be utterly overwhelmed by this abundance of material, and, moreover, after this inclusion we would be in the same trouble as before, since there is again no dividing line between the Central American faunas and the adjacent portions of the tropical fauna of South America. This inclusion is, therefore, impracticable but so is also a wholesale exclusion, for the reason that the many semitropical species found along our south-western frontier and the few species that were hitherto known of the West Indian colony in Florida, have already been included into our own fauna, and it would cause considerable confusion and inconvenience to exclude them again from our lists and synopses. Moreover, a portion of these species have

acquired a more or less wide distribution in our Southern States and could, therefore, be still less conveniently excluded.

Thus some intermediate way must be found to deal with this semi-tropical colony. Mr. J. B. Smith, in a recent paper in the *ENTOMOLOGICA AMERICANA* proposes to admit only such species as are found breeding within our territory and to reject all temporary visitors. This would admit, so far as the Coleoptera are concerned, the whole fauna of the semi-tropical forest of Southern Florida which has been the subject of this communication. I am fully in accord with Mr. Smith though I can foresee that there will be considerable dissent among Entomologists, and especially Lepidopterists, whether certain species are to be considered as permanent residents or temporary visitors. Still I would like to add another restriction, viz : to exclude also all such species which add a strange or disturbing element into the classification of North American insects. Under disturbing elements I understand all such species or genera which in their characters contrast more or less strongly with those of the nearest North American species or genera and which would thus occupy a more or less isolated position in our monographs and synopses.*

Dr. Riley remarked that he thought there was little room for difference of opinion regarding the exclusion of West Indian species from the Floridan fauna. We can no more exclude them from consideration than the Mexican species in Southern California. As we extend our realm we are obliged to recognize additional forms as connected with the fauna of the United States. The United States does not have a natural geographical limit and embraces portions of different great faunal regions. Where the presence only of species has been recorded they should be included in our lists simply as visitors and when breeding here as residents.

Mr. Fletcher asked what the object could be in excluding them. He thought the occurrence of a species in our territory sufficient reason to include it in our faunal list. As information might be at any moment required concerning its habits. There was no difficulty in indicating in such lists that it was an accidental visitor.

Mr. Bethune cited cases in Canada, where some essentially Southern insects occur as *Aletia argillacea*, *Erebus odora*, *Sphinx ello*, etc. He

* For the benefit of those who have the opportunity of studying the fauna of our south-western frontier I append here the following statement by Prof. C. S. Sargent (Report on the forest trees of N. A., p. 6), as it may help to throw some light on the distribution of Mexican forms in Western Texas: "The Mexican forest belt of Texas extends from the valley of the Colorado River, near the 98th meridian to the Rio Grande. It touches the coast not far from the Nueces River and extends to the eastern base of the mountain ranges west of the Pecos; here the species of which it is composed mingle with those peculiar to the Pacific-Mexican forest."

would not omit them altogether but admit them as visitors. In the Florida fauna he thought it would be best to include all found there. He was of the opinion that any difficulty might be obviated by writers of Monographs stating on their title-pages that they treated of the insects inhabiting the Northern temperate region of the U. S. rather than "the U. S. north of Mexico" as is now customary.

Mr. Howard believed it best to separate mere captures from faunal lists which should be based on residence of a species, and inquired how such species could be a disturbing element in monographic works.

Mr. Schwarz replied that they represent groups of genera or species which have their nearest allies in the semitropics but not in our fauna. It is important to recognize them as belonging to a tropical fauna. Faunal limits are often very sharply drawn and we should exercise more care in defining such limits.

Mr. Smith stated that he agreed in the main with Mr. Schwarz. There is a difference in the semitropical and north temperate faunæ, some small part of our fauna belongs to semitropical but nearly all to the North temperate. There is no distinction between the United States and Canada but there is a very distinct difference between north temperate and semitropical faunæ. He would not exclude Mexican from American insects when they belong to the north temperate fauna. He thought we should define not the fauna of a political boundary but that of a zoological boundary.

Dr. Riley remarked that the trouble is there is no definite boundary. The people of this country desire to study insects occurring in the country, no matter what their relationship outside. Include them in our faunal studies but indicate their relations. In short, do with them as Mr. Schwarz has done in making a special study of their limits.

Mr. Osborn remarked that species of one fauna so lap over into the region of another that it is difficult to draw a line between zoological regions. Intermediate forms may occupy nearly equal territory in contiguous faunal regions. It is important that these intruding species should be included, perhaps with special note, for the very purpose of indicating their extreme limits.

Dr. Riley suggested the practical question, should a resident of Florida expect to find such species mentioned in a work on Florida insects or must he search in foreign works for them.

Dr. Peabody asked if the tropic of Cancer is a dead wall separating north temperate from tropical forms. He believed fixed lines do not exist in nature.

Mr. Smith said in certain species limitation is fixed by food-plant and that may be fixed by temperature as a wall.

Mr. Fletcher remarked that zoo-geographical lines are not strictly drawn like territorial boundaries but that such papers as the one by Mr. Schwarz are great helps in defining their limits.

Mr. Howard stated that in the *Coccidæ* a student would find representatives of the Australasian, Asiatic and European faunæ as well as the American represented here. This is an extreme case, but can we omit such species from monographic works?

Dr. Riley considered that introduced species become firmly established in our fauna and must be included in all monographic treatment.

Mr. Smith said the *Coccidæ* follow their food-plants when introduced and as they become established must be considered as part of our native fauna.

Mr. Westcott described a moth-trap by means of black-board figures and answered numerous questions as to its construction.

The Club then proceeded to the election of Officers for the ensuing year which resulted as follows: President, James Fletcher, Ottawa, Canada; Vice-President, L. O. Howard, Washington, D. C.; Secretary, D. S. Kellicott, Columbus, Ohio.

On motion the Club adjourned *sine die*.

HERBERT OSBORN, *Secretary*.

**"A Monograph of the Sphingidæ of North America,
North of Mexico. By JOHN B. SMITH."**

By PROF. C. H. FERNALD.

The above is the title of a very valuable paper in the Transactions of the American Entomological Society, Vol. XV, consisting of 194 pages and 10 plates of structural details. After a pretty thorough characterization of the family, in which the genitalia are described and published for the first time, so far as I know, Mr. Smith gives a comparatively full history of the publications on this group, from the time of Linnæus down. In this I fear Mr. Smith has been too much governed by prejudices, for the work of Mr. Grote is handled without gloves, while my own little paper on the New England species certainly receives too great commendation. The work of P. Maassen receives no greater praise than it probably deserves.

The subfamilies *Macroglossinæ*, *Cherocampinæ*, *Sphinginæ* and *Smerinthinæ* are recognized and quite full characteristics given, but the lines of demarkation between them are not so clear but that some of the species may require further transposition. Mr. Smith does not seem to have found subfamily characters in the genitalia, which is quite remarkable since the *Tortricidæ*, in their genitalia, furnish subfamily, generic, and specific characters.

Keyes are given for the determination of the sub-families, genera and species, which will prove of great assistance. The genera are well characterized and the history of the name discussed more or less. A complete synonymy of each species is given and a full description, with the habitat. The early stages are not given but references are made to them.

The work is a model in its way, and a similar work on the *Noctuidæ* would be a god-send to American entomologists. A few typographical errors have crept in which will doubtless be corrected. By a slip of the pen (or types) the first two letters of the generic name *Aellopos* are contracted into a diphthong thus doing away with one syllable, and the specific name "*inscriptum*" should be in the feminine form to agree with that of the genus *Deidamia* under which it is placed.

Mr. Smith rejects the generic name *Phlegethonius* and adopts the later name *Protoparce*, because, as he says, "Hübner's term is not one expressing a distinct idea, and the three American species now referred as congeneric, were placed in three distinct coiti by him." What generic name over twenty-five years old in any department of zoology can stand under this ruling! It has been the work of modern zoologists to take the old generic names and selecting some species under each as a type, bring together under it the conspecific names and thus purify them. Mr. Smith appears to have an especial hatred for Hübner, but unfortunately there were Hübners in every department of zoology, so that there is now no course to pursue but to observe the rules closely, and treat all authors alike, for unless this is done, some later writer will overthrow the work. Zoologists have formulated and crystalized their ideas on nomenclature very much within the last ten years as is shown in the Code of the American Ornithologists' Union.

The genus *Daremma* is sunk as a synonym of *Ceratoma* which I believe to be correct. I could find no satisfactory characters to separate them and I think Mr. Smith is right in writing them. The system of venation adopted is that used by the entomologists on the continent of Europe and by most of the English and Americans. Dr. Packard claims that this method is unscientific and only used by amateurs. All I have to say on this point now, is that the professionals are in an exceedingly small minority.

At the close is given a List of the Sphingidæ of Temperate North America, which introduces some few changes from the body of the book. With such an admirable work on the Sphingidæ we can afford to let these insects take a long breathing spell.

Partial Preparatory Stages of *Dryopteryx rosea*, Wlk.

BY HARRISON G. DYAR.

Rhinebeck, N. Y.

Egg.—Elliptical, flattened above and below, 8 mm. long and 4 broad, finely punctured. Color white. Laid singly, or in twos or threes on either surface of the leaf. When more than one is laid at once they are in a line in the direction of their longest diameters.

Newly hatched larva.—Body somewhat wrinkled, swelled at joint 2 which has two short conical processes. A single process on top of joint 4. Body terminates in a single prolongation. Color brown, blackish laterally. Head rounded and black. Head and body thinly covered with very short and whitish hairs. The larva eats the upper half of the leaf at the edge, resting on this portion which becomes withered and brown, much resembling the color of the insect at this stage.

After 1st moult.—Transversely wrinkled, four wrinkles to each joint, and roughened with numerous small yellowish points. Color yellowish dorsally, brownish laterally; two conical processes on joint 2, one on joint 4. Head notched on top, roughened. Color brown.

After 2nd moult.—Similar to the preceeding. The larva now feeds on the entire leaf, but when not feeding rests on the withered portion

After 3rd moult.—Color more even uniform brown but lighter dorsally, the lateral color extending upward on joint 8. The yellowish points are now very numerous.

After 4th moult.—Similar, but nearly uniform brown, the head a little lighter and a narrow blackish dorsal line. Head surmounted by two conical processes, the process on joint 4 rather shorter in proportion than before, but the prolongation to the last segment one-third as long as the body. Body wrinkled as in the previous stages and rough.

After this moult the larvæ become lethargic and hibernate, resting on the stem of the plant. They spin a very slight web on the bark to which they cling. Their color closely resembles that of the bark.

Mr. Grote has given a description of the mature larva in Canadian Entomologist, Vol. XIX, p. 50. There are probably two broods of the insect in a season as the moths occur in June and August, but I have not found any larvæ of the first brood.

Food plants: *Viburnum cenicifolium* and *V. lentago*.

NOTICE TO SUBSCRIBERS.

The next number, January, 1889, will begin Vol. V, and the Volumes thereafter will correspond with the year. Vol. V will be composed of 12 numbers for which the usual subscription price of \$2.00 will be charged. Subscribers will very much oblige the Society by a prompt remittance for the Volume to the treasurer, CHRIS. H. ROBERTS, 11 West 123rd Street, New York.

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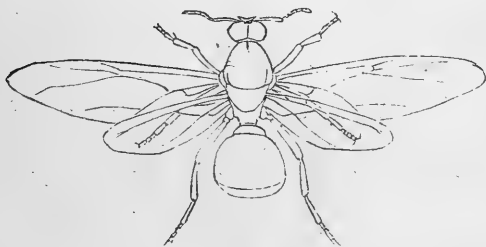
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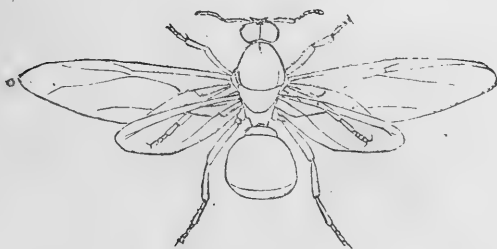
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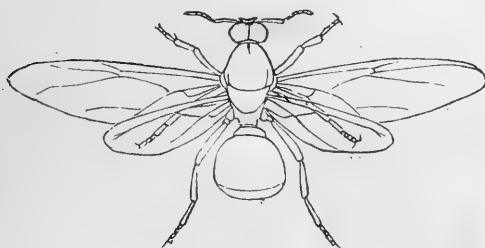
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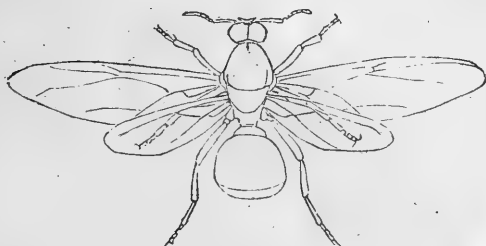
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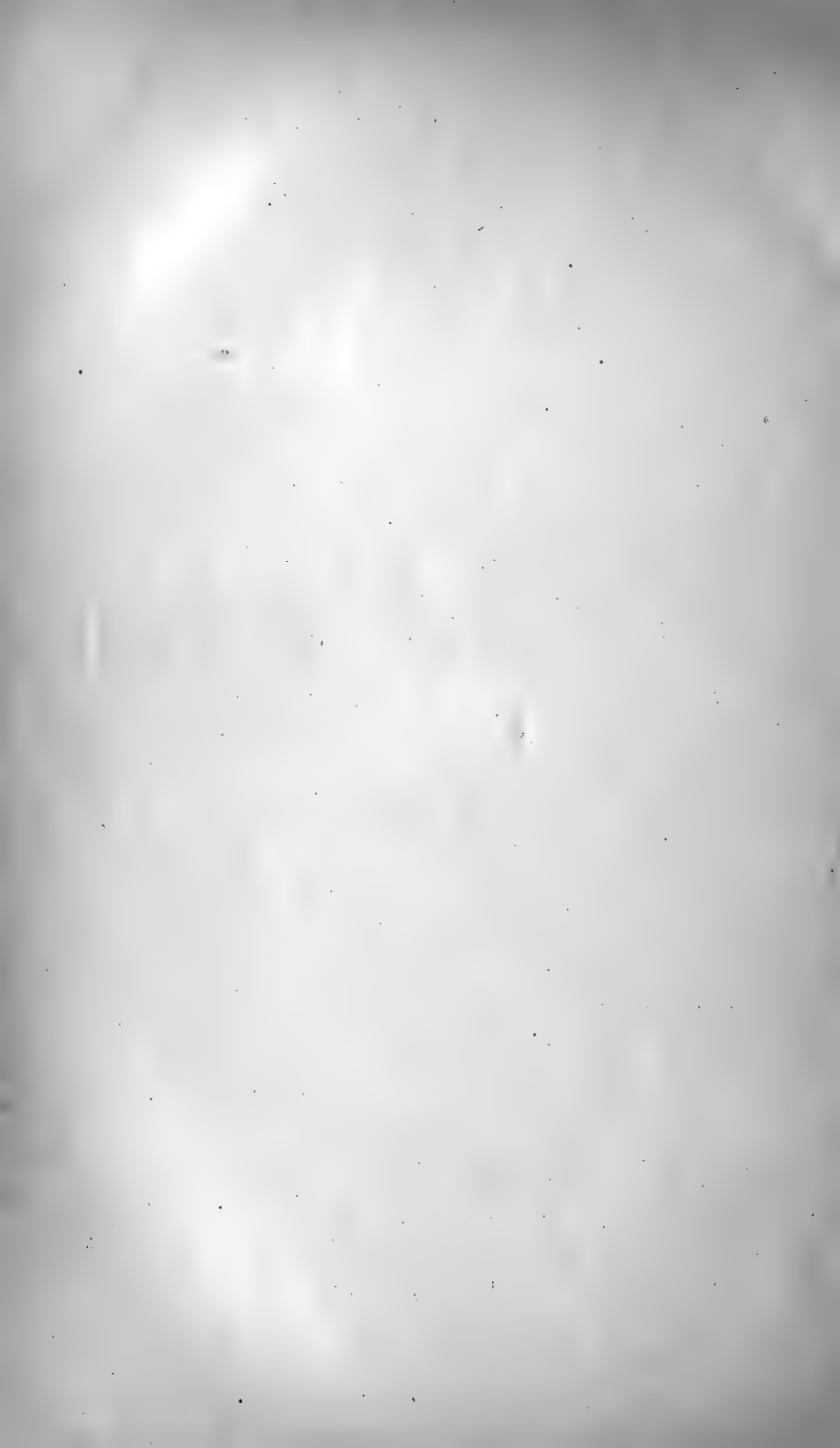
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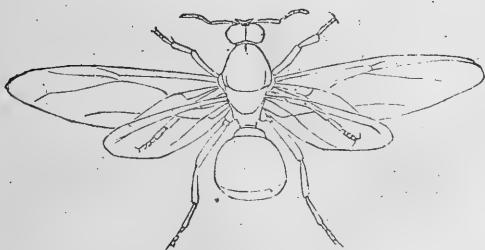
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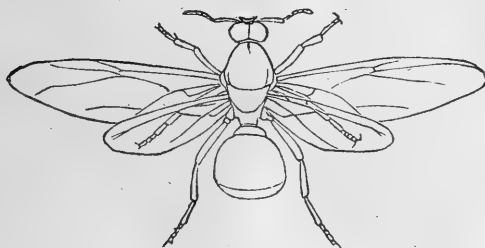
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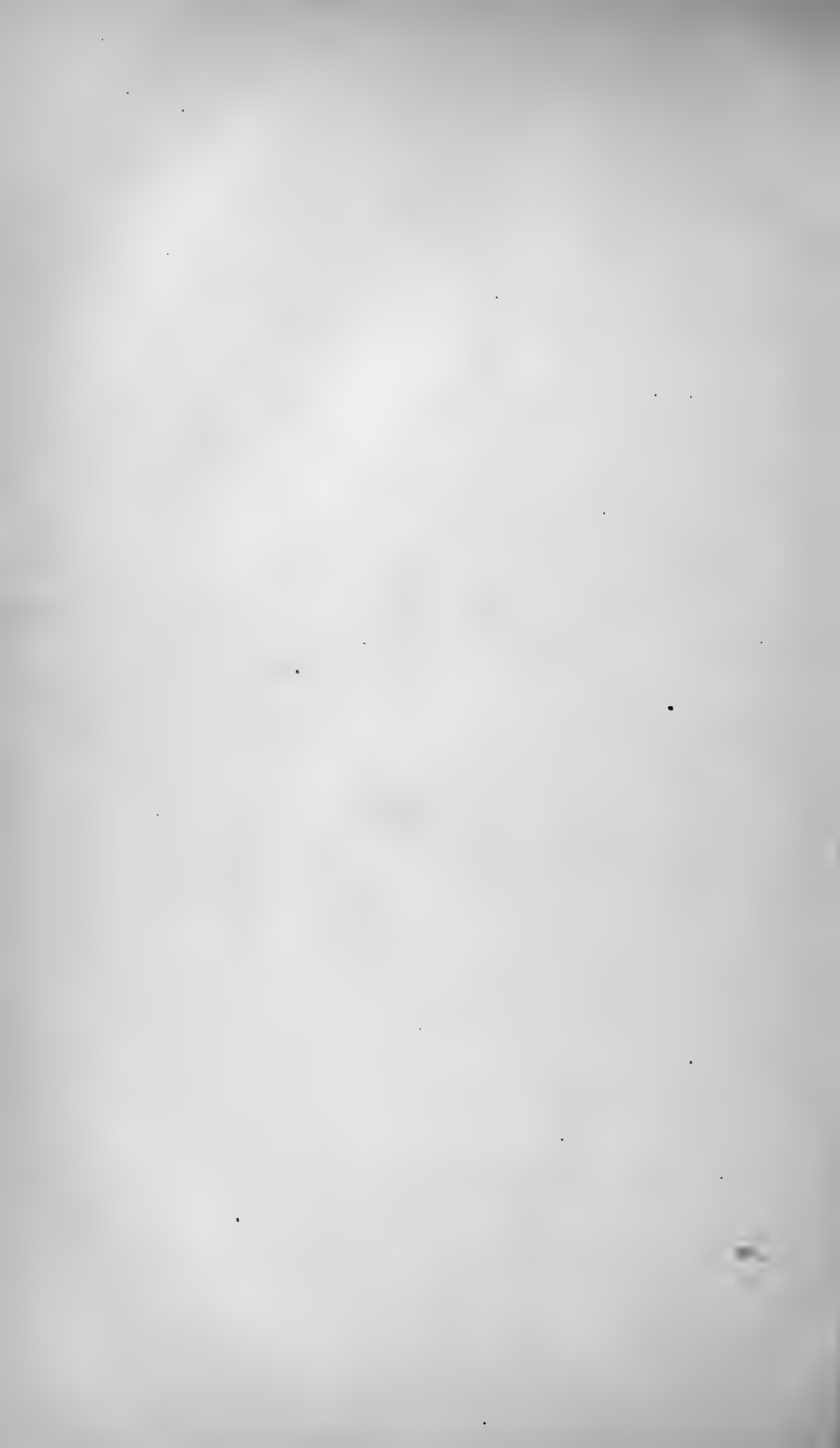
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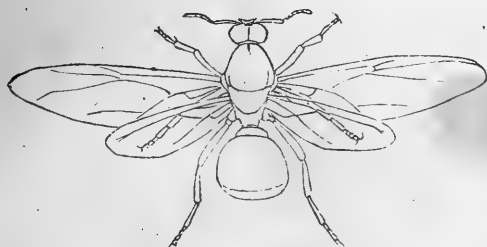
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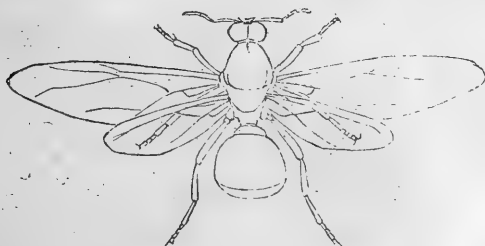
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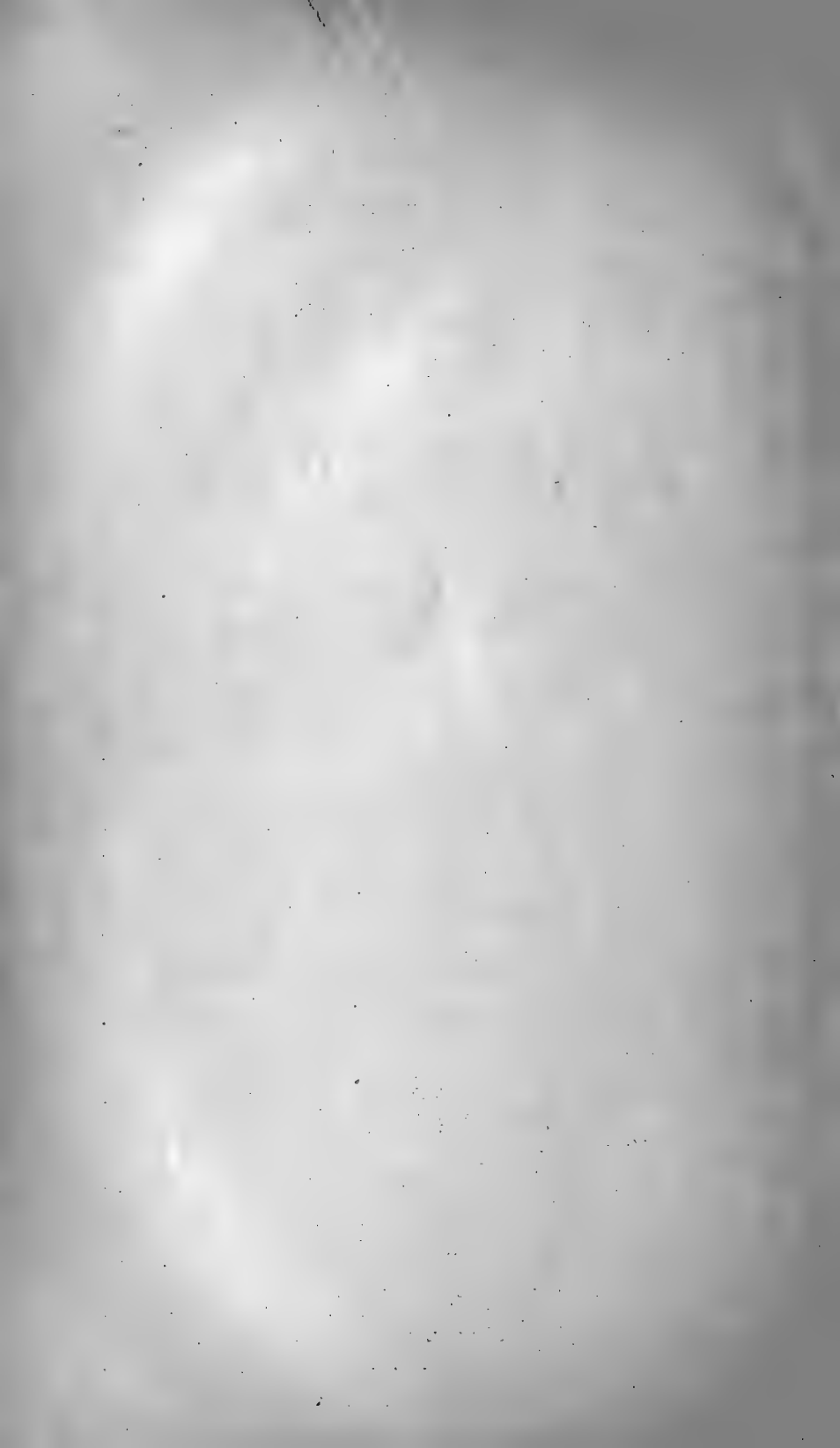
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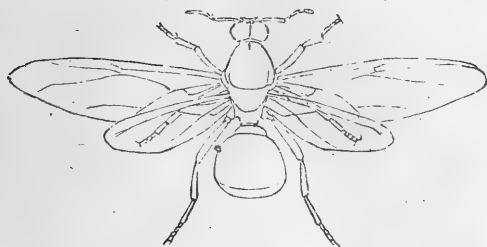


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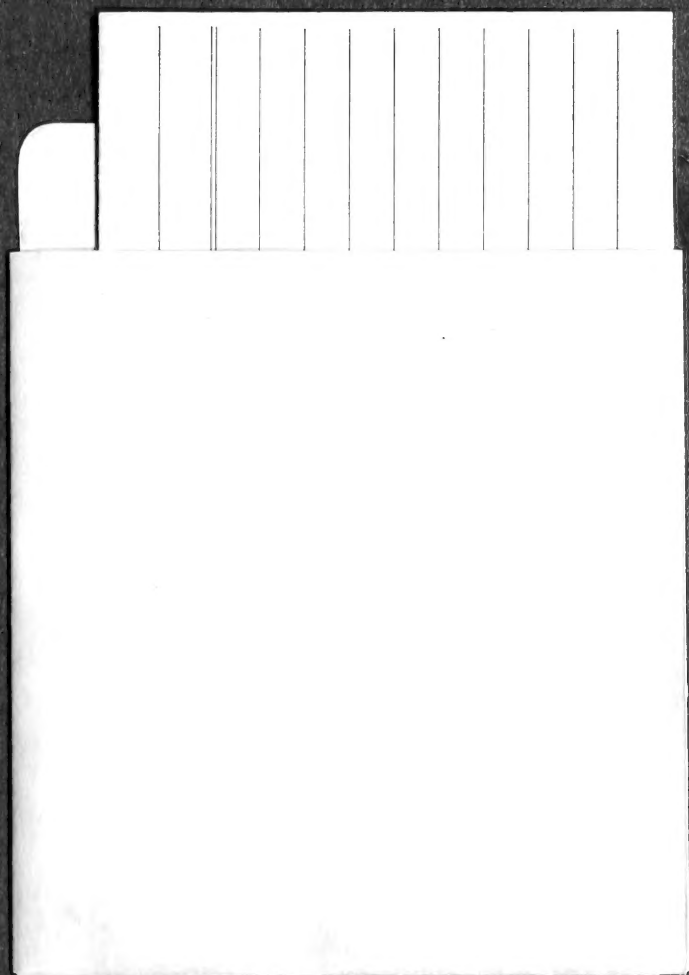
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