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ENTOMOLOGICA AMERICANA

VOL. I. BROOKLYN, APRIL, 1885. NO. 1.

ANNOUNCEMENT.

Experience has shown that the Entomologists of the United States have not been disposed to give that support, which would insure financial success to the various entomological journals that have been published, and the feeling among many, of late years, has been that in union there would be strength. At the meeting of the Entomological Club of the A. A. A. S., in September 1884, the desirability of a union of existing journals was unanimously conceded.

Negotiations between the representatives of the "Bulletin of the Brooklyn Entomological Society", and "Papilio", led to an arrangement by which these Journals were discontinued, and all intention of reviving them abandoned. In their stead, a new Journal—of which this is the first number—was created.

The new Journal will be devoted to Entomology in general, and the support of leading specialists in all orders has been promised. The effort will be to make it interesting and instructive to all persons in any way interested in entomology.

For many reasons the issuing of such a Journal as an individual enterprise was deemed undesirable, and the representatives of "Papilio" therefore became life members of the Brooklyn Entomological Society, which has been duly incorporated. Provision has been made for a permanent publication fund which, it is hoped, will place the new Journal on a sound financial basis.

The publication committee consists of the Editor and Messrs. B. Neumoegen, H. Edwards, E. L. Graef and F. Tepper; and the two journals are therefore represented in the management.

The Journal will be edited by Mr. J. B. Smith, who has heretofore had charge of the Bulletin, and we are glad to announce that Prof. C. V. Riley, U. S. Entomologist, who has also become a life member of the Society, has promised his assistance in making the Journal a success.

The proceedings of the Brooklyn Entomological Society, and of the Entomological Society of Washington, will be regularly published, and any other Entomological Society that will send us an abstract of its proceedings will receive like consideration.

We ask therefore that all interested in the advance of American Entomology give us their substantial and hearty aid in our new enterprise. THE PUBLICATION COMMITTEE.

Visit to an old time Entomologist.

BY DR. JOHN G. MORRIS.

One evening, some years ago, while sipping tea with the family of a friend in his garden in an interior Ohio village, I hastily and unceremoniously sprung up from my chair, much to the astonishment of my friends, and captured a beetle that was lazily flying by Well, I spilled my tea and dropped my flannel cake and tongue, (not my own, it was delicious beef tongue) but in the scramble, I secured the insect.

"You should visit Baron Jenison, before you leave Ohio", exclaimed the lady of the house, "he also catches bugs and is a queer specimen of a big-bug himself, and yet not a hum-bug either."

"Baron Jenison!" I replied, "I would go a hundred miles out of my way to see him, for I have heard of him as a man worth visiting."

Having received directions, behold me early next morning on my way to visit a foreign titled entomologist who had settled down in Central Ohio. I had never corresponded with him, but I had heard of him. I knew that he was closely allied to one of the proudest families of the English nobility, but he himself was a German by birth. For some years he had held a distinguished rank in the army of a German prince. He had enjoyed all the advantages of a German university education. He was a gentleman of refined manners and ornamental accomplishments,—he excelled in music and as a draughtsman he had few equals. His leisure

hours were devoted to Entomology and his ardor became so intense, that, having procured a furlough from military duty, he went to Africa on a collecting tour and visited most of the museums and large private collections of Europe.

An unhappy disagreement with some of his family led him to leave his native country and settle in the United States. He abandoned fortune and all prospects of preferment and came over with his wife as a poor man. He laid aside all his titular and aristocratic honors and was known among his neighbors as plain Mr. Jenison.

This was the gentleman whom I was going to visit. I was quite a young man and wanted to see and learn. I had never seen a live nobleman. Since that time, I have seen many with more names than dollars, and more titles than shirts.

On arriving at the village where the baron lived, I did not at once go to his house. I was covered with Ohio dust and I went to a hotel and spent more time in making my toilet than I had done for months. I thought my appearance should correspond to the occasion. The boot black said that if he rubbed *another* hour at my boots, they would be as thin as paper, and the chambermaid impudently asked me "whether I intended to wash my own shirt?". "Is soap scarce here?" I rejoined. "No Sir, but it will be if you stay here long" was the little minx's answer, as she bolted like lightning out of the room, just in time to escape a blow from my slippers which I hurled at her head.

After smoothing down every hair and adjusting my cravat very neatly, much to its astonishment, I ordered a coach and two. There was no such vehicle in the village. I was told that I must walk. Walk! to a nobleman's mansion? That was vulgar but I had to do it.

I went. The house was pointed out. It was not a palace, not even a splendid mansion; it was an ordinary house, very ordinary indeed. It was located on the muddy tow path of a canal; it was constructed of unpainted boards; pigs, fowls and dogs were enjoying themselves around unmolested. I thought my guide had made a mistake. My fancy had portrayed something different: I had thought of columned porticoes, massive gateways, a porter's lodge and liveried servants. My courage began to rise, for verdant as I was, I was intimidated at the idea of encountering a learned nobleman in his stately mansion, but if his residence is so unpretending, thought I, his manners must correspond. I knocked. A plain, farmer-like man in shirt sleeves, stubby red beard, coarse straw hat, shoes innocent of the stain of blacking and vest and pants that had seen long and severe service, appeared.

I inquired in English: "Is Mr. Jenison at home?"

"Yes Sir, walk in" was the reply in strong German accent.

"Please deliver this card", said I.

"I am Mr. Jenison, at your service, Sir!" he replied, straightening himself up with an air of dignity and polished refinement that bespoke the cultivated gentleman under this every day guise.

I was amazed and relieved. This then was the entomologist, Baron Jenison. I told him my errand in his native language and I was most cordially, almost enthusiastically received. There was the genuine German gush in his manner and in less than ten minutes, though he was twenty years older than I, we were on most familiar terms. We began at once and although it was before noon, I will not say how late it was at night, or rather how early next morning, before we parted.

It was indeed a glorious day. He of course, showed me all his collections in almost every department of Zoology, and presented me with some of his unequalled entomological drawings. He treated me most hospitably and regaled me with everything his own larder and a neighboring caterer could furnish. He displayed extensive reading and personal observation on various branches of Natural History and entertained me most instructively from his exhaustless stores of information. I humbly sat at the feet of this Gamaliel of science and hung upon his rich discourse with rapture. I started questions and suggested difficulties just to draw him out and he spoke like a book. He had met with no one for months who could speak with him on his favorite subject and he seemed greatly delighted. You may imagine what an exciting day I spent. The Baron was personally acquainted with many of the most distinguished naturalists of Europe and related many interesting anecdotes concerning them. He made me tell all I knew about our American entomologists of that day, when the brotherhood was yet small.

Long shall the events of that day be remembered by me. It was an intellectual feast rarely enjoyed. The final adieu long after midnight was impressive. I tore myself away bearing many specimens of the generous Baron's duplicate beetles and the profoundest respect for a truly accomplished gentleman and naturalist.

Baltimore, Febry. 1885.

Synonymical Notes.

By George H. Horn, M. D.

There have remained for a long time in our lists species described by Edward Newman which have for various reasons escaped identification. Several of these are Cerambycidæ which immediately obtruded themselves during a recent re-arrangement of my cabinet. Having satisfactorily determined those not previously settled it appeared to me proper to bring together in one list all of Newman's Cerambycidæ. These have been described either in the "Entomologist" bearing date 1840–2, or in the "Entomological Magazine" Vol. V, bearing date 1838. In the annexed list I have arranged the genera alphabetically, for easy reference, and opposite each of Newman's names the equivalent as now recognized. Those names opposite which no other occurs are still used.

In addition to the Cerambycidæ, Newman has described a large number of species in other groups: these are also brought together and similarly treated.

In conclusion will be found a number of notes referred to from the list by numbers in parenthesis.

By the method of treatment here adopted, priority is established, and the excuse of "long continued use" can not prevail in rejecting an old name for a new one.

CERAMBYCIDAE DESCRIBED BY EDW. NEWMAN, WITH THEIR SYNONOMY.

Callidium æreum Ent. Mag. V. 393.
" antennatum ed.
" cylindrides ed. 394 = Smodicum cucujiforme Say.
Chion rusticus Ent. 23 = Chion cinctus Drury.
Clytus humeralis Ent. Mag. V, 394 = Neoclytus scutellaris Oliv.
Curius dentatus Ent. 17.
" scambus Ent. 79 = Plectromerus dentipes Oliv.
Encyclops pallipes Ent. Mag. 392 = Encyclops cœrulea Say.
Elaphidion deflendum Ent. 6 = Stenosphenus notatus Oliv.
" sobrium Ent. 30 = " sobrius (1)
" mucronatum Ent. 27 = Elaphidion mucronatum Fabr.
" incertum Ent. 28.
" parallelum Ent. 29.
" arctum Ent. 29 = E. parallelum Newm.
" inerme Ent. 29.
" pumilum Ent. 29.
Glaphyra semiusta Ent. 19 = Molorchus bimaculatus Say (2).
Heterachthes ebenus Ent. 9.

Leptura badia Ent. 69 = Typocerus badius Newm.
" nobilis Ent. 69 = " velutinus Oliv.
" sinuata Ent. 70 = " sinuatus Newm.
" aurigera Ent. 70 = " zebratus Fab.
" bifaris Ent. 70.
" mutabilis Ent. 71.
" capitata Ent. 71.
" directa Ent. 71 = Acmæops directa Nm.
" indirecta Ent. 71 = Leptura lineola Say.
" interrupta Ent. 72 = " subhamata Rand.
" stictica Ent. 72 = " octonotata Say.
" vibex Ent. 72 (3).
" allecta Ent. 72 = Leptura sphæricollis Say (4).
" paupercula Ent. 72 = " "
" exigua Ent. 73 (5).
" hæmatites Ent. 73.
" nana Ent. 73 = Leptura exigua Nm.

Methia pusilla Ent. 18.
Obrium rubrum Ent. Mag. V, 395.
Oeme indecora Ent. 8 = Oeme rigida Say.
Pachyta Ione Ent. 30 = Gaurotes cyanipennis Say.
Phyton limum Ent. 18 = Phyton pallidum Say.
Saperda cretata Ent. Mag. V, 396.
" cana Ent. 12 = Stenostola pergrata Say.
" flammata Ent. 13 = Amphionycha flammata Nm.
Spalacopsis stolata Ent. 305 (6).
" suffusa Ent. 305.
Strangalia famelica Ent. 68.
" emaciata Ent. 68 = Strangalia acuminata Oliv.
" strigosa Ent. 69.
Toxotus dives Ent. 68 = Toxotus cylindricollis Say.
" rugipennis Zoologist Vol. 2, p. 476 (14).

The following other than Cerambycidæ are described in the Entomologist.

Lebia russata p. 31 = Pinacodera platicollis Say.
Plochionus amandus p. 32.
Hispa Bacchus p. 76 = Odontota bicolor Oliv.
" Ariadne p. 77 = Charistena Ariadne Nm.
" Erebus p. 77 = Microrhopala Erebus Nm.
" Pluto p. 77 = " excavata Oliv.
" Hecate p. 77 = " cyanea Say.

Cryptocephalus binominis p. 78 (7).
" quadriforis p. 78 (8).
" quadruplex p. 78.
" lateritius p. 78.
" sparsus p. 79 (8).

Species described in Entomological Magazine, Vol. V, 1838.

Trichius bistriga p. 170 = Trichius affinis Gory.
Penthe funerea p. 374 = Penthe pimelia Fab.
Pogonocerus concolor p. 375 = Dendroides concolor Nm.
" bicolor p. 375 = Dendroides canadensis Latr.

Pedilus fulvipes p. 375 = Corphyra fulvipes Nm.
" rufithorax p. 375 = " collaris Say.
" imus p. 375 = " lugubris Say.
" guttula p. 375 = " terminalis Say.
" lugubris p. 375 = " Newmani Lec.
Myodes stylopides p. 376 = Myodites stylopides Nm.
Emmesa connectens p. 376.
Hypulus simulator p. 376.
Cephaloon lepturides p. 377.
Macratria linearis p. 377 = Macratria murina Fab.
Ischnomera carmata p. 378 = Asclera ruficollis Say.
Synchroa punctata p. 378.
Bolitophagus silphides p. 378 = Nosodes scabra Thunb.
" tetraopes p. 378 = Boletophagus depressus Rand.
Hydnocera serrata p. 380 = Hydnocera pallipennis Say.
Opilus castaneus p. 380 = Priocera castanea Nm.
Degrapha typica p. 380 = Calopteron reticulatum Fab.
" discrepans p. 381 = " "
" dorsalis p. 381 = " terminale Say.
" divisa p. 381 = " "
Cænia scapularis p. 381 = Cænia dimidiata Fab.
Eros præfectus p. 382 = Eros thoracicus Rand.
" lictor p. 382.
" alatus p. 382 = Plateros canaliculatis Say.
" oblitus p. 382 = Eros sculptilis Say.
Polaclasis ovata, p. 383 = Polyclasis bifaria Say.
Rhipicera proserpina p. 383 Sandalus petrophya Knoch.
Onichodon orchesides p. 384 = Fornax orchesides Nm.
Necrophorus bicolon p. 385 = Necrophorus pustulatus Hersch.

Feronia atrata p. 386 = Pterostichus permundus Say.
" orbata p. 386 = Evarthrus orbatus Nm.
" spoliata p. 386 = Evarthrus spoliatus Nm.
" coracina p. 386 = Pterostichus coracinus Nm.
" monedula p. 386 = Pterostichus coracinus? Nm.
" lachrymosa p. 387 = Pterostichus lachrymosus Nm.
" moerens p. 387 = Pterostichus coracinus Nm.
" picipes p. 377 (9).
" relicta p. 387 = Pterostichus relictus Nm.
" interfector p. 387 = Pterostichus adoxus Say.
" rostrata p. 387 = Pterostichus rostratus Nm.
Amphasia fulvicollis p. 388 = Amphasia interstitialis Say.
Phymaphora pulchella p. 389.

Languria gracilis p. 390.
Hispa Xerene p. 390 = Microrhopala Xerene Nm.
" Philemon p. 390 = Odontota nervosa Panz.
" Baucis p. 390 = " "
Donacia cincticornis p. 391 (10).
" cataractæ p. 391 (11).
" rugifrons p. 391 (11).
Orsodachna costata p. 391 (12).
" ruficollis p. 391.
" inconstans p. 392.
Chlænius fulgiceps p 490 = Chlænius pensylvanicus Say.
" augustus p. 490.

MISCELLANEOUS PUBLICATIONS.

Anchomenus picticornis Zoologist, ii, p. 414 = Platynus picticornis Nm.
Hydnocera rufipes Charlesw. Mag. IV, p. 362 (13).
" ægra id. p. 364.
" curtipennis id. p. 364 = Hydnocera rusticalis Say.
Rhysodes aratus Charlesw. Mag. 1838, p. 664 = Rhysodes exaratus Serv.
" sculptilis id. p. 666 = Clinidium sculptile Nm.
Cryptocephalus bivius id. 1840, p. 249.
" larvatus id. p. 250 = Griburius larvatus Nm.
" lautus id. = Cryptocephalus guttulatus Oliv.
" limbatus id. = Pachybrachys limbatus Nm.
" mammifer id.
" geminatus id. = Cryptocephalus lituratus Fab.
" lixus id. = ?Cryptocephalus trivittatus Oliv.
" luteolus id. unknown.

NOTES.

1.—*Stenosphenus sobrius* Nm., does not occur within our faunal limits It is abundant in Mexico.

2.—*Glaphyra semiusta* Nm , is that variety of *M. bimaculatus* Say, with the greater portion of the surface rufo-testaceous.

3.—Subsequently described by me as *L. nitidicollis*.

4.—*Leptura allecta* Nm., is that form of *sphaericollis* with red thorax. *paupercula* with black thorax.

5.—Synonymous with this species is *L. saucia* Lec. *L. exigua* Nm. is recognized as variable. The typical form is black, the basal joint of antennæ and front legs pale; *L. nana* has the mouth pale, also the front legs and the bases of the middle and hind femora; *L. saucia* Lec., has the legs similar to *nana*, the thorax yellow with a large discoidal black spot; sometimes the angles only are yellow. In my cabinet is a specimen similar to *nana* with the head rufo-testaceous.

L. subargentata Kby. Under this name I propose to include several forms which have been separated on color variation. These are *ruficeps* Lec., *similis* Kby., and *rhodopus* Lec. The differences between these forms are given by Dr. Leconte (New Species, 1873, p. 217) the last named, accidentally omitted, being very like the normal *subargentata* except that the legs are all rufo-testaceous.

6.—It is probable that these are merely sexes of one, *stolata* being the male, *suffusa* the female.

7.—This is, without much doubt, that called by the later name *distinctus* Hald.

8.—These two have not been certainly identified.

9.—"The type of *F. picipes* Nm., in the British Museum belongs to this (*stygicus* Say) species, but the description does not agree and seems to refer rather to *P. submarginatus*." Leconte. In either case the name is a synonym and should be dropped.

10.—This is the species known by the more recent name of *lucida* Lac.

11.—These two seem to be forms of the variable *cuprea* Kby.

12.—After an examination of a large series of *Orsodachne* from all parts of our country I can see no reason why they should not be considered as one species. There is even greater variation in color than the names now known will cover. The published names in the order of date are as follows:

O. ATRA Ahrens, Neue Schr. Ges. Halle, 1811, 1, p. 46.
vittata Say, Journ. Acad. iii, 1823, p. 430.
armeniacæ Germ., Ins. spec. nov. 1824. p. 526.
hepatica Say, Journ. Acad. V, 1827, p. 281.
Childreni Kby., Faun. Bor. Am. 1837, IV, p. 221, pl. 7, fig. 6.
tibialis Kby., id. id.
inconstans Nm. Ent. Mag. V, 1838, p. 392.
costata Nm., *ruficollis* Nm., id. p. 391.
trivittata Lac., Mon. Phytop. 1845, i, p. 71.
luctuosa Lac. id. p. 72.
tricolor Mels., Proc. Acad. 1840, p. 160.

From this it seems that our species has quite as much synonymy as has been admitted for the two principal European species.

13.—*Hydnocera rufipes* has been placed as a variety of *humeralis* Say, but incorrectly, it is a much paler blue than that, the legs entirely pale rufo-testaceous and the elytra are densely and finely punctured.

14.—This species has since been re-described by Dr. Leconte (New Species, 1873, p. 207) as *Pachyta rugipennis*, he being apparently unaware of Newman's previous description.

On the classification of North American Diptera.

(Second paper.)*

By Dr. S. W. Williston.

The limits of the two following families, as here given, are narrower than those now accepted by Osten-Sacken, whose authority in dipterological matters I need not say is among the very highest. For convenience sake, however, I exclude certain disputed genera, to be discussed elsewhere, thus rendering the forms given in this paper more certainly recognizable. In this, as in the following papers, I introduce genera from Mexico and the West Indies, wherever I can do so with clearness; such will be printed in italics. Genera unknown to me will be preceded by an asterisk.

TANYSTOMA.

Tarsi with three membranous pads at the tip (the empodium developed pulvilliform); body and legs wholly without macrochætæ (*diptera eremochæta* Osten-Sacken); eyes of male holoptic (Osten-Sacken), rarely narrowly seperated; two sub-marginal, five posterior cells in the wing, fifth posterior cell not contiguous at its base with the discal cell; the marginal vein encompasses the whole wing; some or all the tibiæ with spurs.

TABANIDÆ.

Proboscis of the male with four, of the female with six bristles; third joint of the antennæ annulate, never with differentiated style or bristle; tegulæ rather large.

Species never very small, often among the largest in the order; never thickly pilose; in life the eyes usually brilliantly colored and marked. Head short, broad, eyes large. Antennæ porrect, the third joint composed of from three to eight annuli or segments. Thorax not very convex, scutellum without spines on its border. Abdomen broad, moderately elongate or short, never slender or contracted. Legs moderately stout, the front and middle tibiæ sometimes dilated, the middle tibiæ always with spurs. Veins of the wings distinct; first posterior cell (and fourth in exotic species) rarely closed.

Early stages passed in the water or earth; larvæ carnivorous; with a distinct head; pupæ free. The females are blood-sucking, usually found in the neighborhood of pastures, in sunny open parts of woods, during the hot sun-shiny days of summer. The males are much more rarely met with, and will be found usually in sweepings of meadow lands, on flowers, etc.

* The first paper of the series is in Bull. B'kl. Ent. Soc. VII, p. 129.

1.—Hind tibiæ with spurs at their tips (sometimes small). (*Pangoninæ.*) 2
Hind tibiæ without spurs; ocelli absent. (*Tabaninæ.*) 5

2.—Third joint of the antennæ composed of eight annuli, the first of which is only a little longer than the following ones 3
Third joint composed of five or fewer segments, the first of which is much longer than the following; ocelli present 4

3.—Front of female narrow, without denuded callus; ocelli rarely absent..**Pangonia.**
Front of female broad, with a large, broad, denuded callus; ocelli present.....
Apatolestes, g. n.

4.—Second joint of the antennæ about half as long as the first; wings hyaline or with small spots; eyes in life with numerous small dots.....**Silvius.**
Second joint as long, or but little shorter than the first; wings with a dark picture; eyes in life with fewer, larger spots .....**Chrysops.**

5.—Front of the female as broad as long; callus transverse; front tibiæ a little dilated; base of third antennal joint not dilated.....**Hæmatopota.**
Front of female narrow..... 6

6.—Front tibiæ very much dilated; third antennal joint not strongly angulated above ..... *Lepidoselaga.*
Front tibiæ moderately dilated; face short.....**Diachlorus.**
Front tibiæ not dilated..... 7

7.—A small ocelligerous tubercle present in the female; eyes pubescent, more distinctly in the male..... **Therioplectes.**
Ocelligerous tubercle absent; eyes pubescent.....**Atylotus.**
Ocelligerous tubercle absent; eyes bare.....**Tabanus.**

LEPTIDÆ.

Third joint of antennæ simple; with a simple, or thickened styliform, bristle; tegulæ rudimentary.

Rather small to rather large species; thinly pilose, with short thorax, elongate abdomen and large wings. Head short, eyes of male contiguous or approximate; ocelli present. Antennæ mostly short, never elongate, the third joint with a terminal or dorsal bristle, or terminal slender style. Face small, excavated. Proboscis short; palpi slender, porrect, often bushy pilose. Abdomen elongate, broadest toward the base, composed of seven segments; the female ovipositor pointed. Legs slender, the hind pair somewhat elongate; some or all the tibiæ spurred. Posterior cells of wings all open.

Larvæ carnivorous, living in earth, decaying wood, dry sand, in moss or in water. The flies are usually found about meadow and low woodlands, on bushes, etc., and prey upon other insects. Some western species of Symphoromyia, according to Osten-Sacken, suck blood, as do the horse-flies.

1.—Front tibiæ with terminal spurs; face without swelling in the middle (*Dialysis* Walk., teste Osten-Sacken)..... Triptotricha.
Front tibiæ destitute of terminal spurs..... 2

2.—Third joint of antennæ, round, oval, or pear-shaped, the bristle distinctly terminal..... 3
Third joint kidney-shaped, arista more dorsal..... 5

3. Anal cell open..... Leptis.
Anal cell closed..... 4

4.—Third joint of antennæ with a slender arcuate bristle..... Chrysopila.
Third joint with a shorter, slender style..... *Spania. *Ptiolina.

5.—Anal cell open..... Symphoromyia.
Anal cell closed..... Atherix.

Apatolestes, n. g. ♀. Head broad; eyes bare, elliptical, angulated above. Front broad, its least width (at the vertex) about a third of the length, below with a large, transverse, denuded callus. Ocelli distinct. Antennæ situated below the middle of the head in profile, short, small, first joint thickened, but little longer than broad; second joint very short, simple; third joint twice as long as the first two together, only a little thickened at the base, cylindrical, composed of eight annuli, the first only a little longer than the following ones. Proboscis short, scarcely extending beyond the tip of the palpi, the second joint of the latter moderately thickened. Abdomen a little wider than the thorax, the sides nearly parallel to the tip of the fourth segment. Legs simple, the front tibiæ very slightly dilated, hind tibiæ with spurs. All the posterior cells open; anterior branch of third vein with a stump near its origin.

Apatolestes comastes, n. sp. ♀. Black, thickly bluish gray pollinose. Front shining black; face whitish gray; palpi light yellow; wings with stigmatic spot and brownish spots on the cross veins; tibiæ brownish yellow. Length 11 mm., of wings 9 mm.

Front shining black, on each side of the ocelli faintly brownish pollinose, below the callus, the first two antennal joints, and on the face densely nearly white pollinose; third antennal joint black. Thorax nearly uniformly clothed with bluish gray pollen, thicker on the pleuræ; on the dorsum with sparse white pubescence, the pleuræ with moderately abundant white pile; dorsum with three slender whitish stripes. Abdomen opaque brownish black, the first segment and the posterior margins of the following segments grayish and clothed with sparse white hairs. Legs black, the tibiæ brownish yellow; front tarsi blackish, middle and hind pairs brown. Wings lightly infuscated, the stigma and narrow clouds on the cross-veins brownish.

Two specimens. California. This species in size and general appearance resembles *Tabanus pumilus* Macq.

Gen. nov. A female specimen of a species, yet unnamed, from Florida,

may belong to a new genus. The species is the smallest with which I am acquainted in the family, measuring only 6 mm, and has the appearance of a small Tabanus. The hind tibiæ have minute spurs. The head is that of *Tabanus* (sensu strict.), except that there is no callus, the front is rather broader, and the antennæ have only two very small terminal annuli of the third joint, the basal segment of which is large, only a little longer than broad, gently convex below and obtusely angulated in the middle above. The body is light yellowish brown, thickly pollinose, the wings hyaline with a brownish stigmatic spot. The eyes in life apparently had the upper half green and the lower purple.

Noctuids common to Europe and North America.

By John B. Smith.

In the "Verh. k. k. zool. bot. Gesellschaft in Wien" 1874, pp. 273 to 319, is a paper on the above subject, by Mr. H. B. Mœschler, than whom perhaps no one has a better collection of Insects from boreal america. From Labrador especially he seems to have sources of supply not open to the majority of collectors, and not a few of the species described by him are unknown to the American student. To the courtesy of Mr. Mœschler, who at the request of Mr. A. W. P. Cramer sent me for study a small lot of northern species, and among them his types, I am in a position not only to speak intelligently as to his species; but also to correct some errors which have crept into his article. As the heading to this article implies, I speak of the Noctuids alone, and more particularly of the species of *Agrotis*.

Agrotis augur Fab. = *haruspica* Grt. Mr. Mœschler refers approvingly to Speyer's note on this species. Speyer calls them varieties, naming the american form *grandis*. Grote had previously named the species *haruspica* and retains the name as referring to a distinct species, and in my opinion correctly. *Augur* is uniformly smaller and with very distinct maculation, and is distinguishable at a glance from its European ally. Not that alone would afford reason for their distinctness; but the fore tibiæ are much more heavily spinulated in the American form, and the genital organs of the ♂ are obviously different. In *haruspica* the side piece is wider at the middle, and narrows rather abruptly to an obtuse tip. The clasper is short, stout, with an abrupt curve forming one quarter of a circle. In *augur* on the contrary the side piece is much

longer, tapering regularly and evenly from base to tip: the clasper is much longer, more slender, gracefully curved, and terminating in a hook curved into a semi-circle. These characters are constant and reliable, and indicate a good species, however closely related. The western form *sierræ* differs from *haruspica* less than that species does from *augur*, and is yet a fairly good species.

Agrotis sincera H. S. This species I have not been able to compare with European material, but doubt its identity.

Agrotis Wockei Mœschl. This species has been hitherto unidentified by American Lepidopterists, and is said, *fide* Staudinger, to occur also in Central Asia. Comparisons of types prove that *scropulana* Morr. is a later name for *Wockei*, and not for *carnea*, as Mr. Grote puts it. *Okakensis* Pack, is suspected by Mr. Mœschler as identical with either *Carnea* or *Wockei*, but without reason: it has bipectinate antennæ, while those of *Wockei* are simple. I may be permitted to doubt the identity of the Central Asia specimen with our American form.

Agrotis festiva var. *conflua*. Mœschler speaks of a ♀ recently received, and in his lot is a specimen marked var. *conflua*: but which is certainly not that species. I have *conflua* and *festiva*, and compared with them, this species differs in having a protuberant, roughened clypeus, very heavily armed fore tibia, and entirely different genitalia. I have named the species *solitaria*, and feel certain that Mr. Mœschler has allowed a superficial resemblance to mislead him.

Agrotis simplonia Hb. G. Mr. Mœschler mentions two specimens, and especially a ♂ which is distinguished by a rusty spot before the reniform: this identical specimen is now before me, and is certainly nothing more nor less than a large ♂ of Mr. Mœschler's own species, *dissona* which is also in the same lot. Compared with alpine *simplonia* which I have at hand the differences are so radical and obvious, that it is really a mystery how Mr. Mœschler could overlook them. *Simplonia* need not yet be added to our faunal lists.

✓ *Agrotis Islandica*. This Mr. Mœschler claims is found in Labrador; but not like the type form. Two specimens, one from Iceland, and one marked var. *Labradorensis* are in Mr. Mœschler's lot. This variety is certainly the *opipara* of Mr. Morrison, and in my opinion fully distinct from the type Islandica. I have seen numerous specimens of *opipara* which showed very little variation, and decline to believe that it is a variation of *Islandica*, which is closely allied to *sexatilis* or *obeliscoides*. I would much rather believe it a form of *ochrogaster* Gn., which varies enormously.

Agrotis segetum = *texana* Grt. This reference is doubtfully made *fide* Grote in his list of 1875, and *texana* is not known to Mr. Mœschler in nature. I have seen both sexes of *segetum* as well as *texana* and find them totally different. Mr. Grote's reference was probably made on the faith of erroneous information as to the European species. I do not believe that *segetum* occurs in our fauna.

There are eleven other species of *Agrotis* cited as common to both continents—viz: *Chardinyi*, *baja*, *speciosa*, *C. nigrum*, *plecta*, *fennica*, *ravi*, *saucia*, *ypsilon*, *prasina*, and *occulta*, and as to those I believe him correct, though all the references had been previously made.

At some future date I shall have some criticisms to make of others of Mr. Mœschler's original references. I would here simply call attention to the fact that all is not done when it has been determined that there are no constant differences in color and maculation between species on both sides of the Atlantic. All those forms which are at home in North America are presumably distinct, and only the most careful comparisons of structure should determine whether the species are really alike. A certain amount of exception to this applies in the case of the circumpolar fauna, and of species which extend far northwardly. The great similarity of surroundings, and the extreme probability that at some time a connection existed between the circumpolar countries, gives countenance to the idea that the fauna is largely identical, and to this opinion I am led by what I have thus far seen of that fauna.

As to Mr. Mœschler's paper as a whole, it bears evidence that the author is a firm believer in the identity of a large percentage of the Lepidoptera found in Europe and North America, and his comparisons are all made with a view to prove identity. Too much importance is placed on color and maculation, and not enough on structure. Mr. Mœschler's references, where they are original, must be carefully verified before they are accepted.

Eyes of Insects.

In No. 2 of the Journal of the N. Y. Microscopical Society, is an article on "compound eyes and multiple images", interesting as well to the Entomologist as to the Microscopist. There is considerable information about the general structure, and especially interesting are the notes on the differences of size in the facets of some *Tabanidæ*, and the probable difference of function. Mr. Williston's paper on *Syrphidæ* shows that this difference in size of facets occurs also in that family, and also that it has some generic value. J. B. S.

Water Beetles.

Looking over several collections of Water Beetles recently, I was surprised to see how poorly they are usually represented. Mr. Roberts and myself last season took numerous species, most of them in large numbers, out of a single pond, and in fact a very limited tract of that pond; and that in mid-summer. April and May are the best months to collect those insects, and any moderate sized pool in which there is some vegetation is sure to yield an abundant harvest. A stout net ring is required, the bag to be of coarse cheese cloth, and the vegetation should be swept nearly to the bottom: not once only, but half a dozen times. In a single haul over a hundred specimens, representing ten or a dozen species have been taken. Rather sluggish ditches in meadows form excellent collecting grounds. J. B. S.

Oviposition in Agrion.

Mr. McLachlan has noticed *Agrion mercuriale*, ("a very local British species") with a part or the whole of the abdomen incrusted with mud, caused by its sinking its eggs in the mud left from the dried up pools. He is not aware that this species descends beneath the surface of the water. (Ent. Mo. Mag. Vol. XXI, p. 211.) Remembering the same thing, on referring to my collection, I find a few females of our common *Agrion civile* with mud on a part of the abdomen. The egg laying habit of this species is to sink about the last four segments beneath the water, generally on grass. I know only one species of North American *Agrion* to descend beneath the surface of the water, viz: our common *A. exulans*. I have noticed it a foot or more beneath the surface, fastening its eggs to the stems of water grass, and remaining submerged a long time during the operation. When a stick is thrust near it, or a slight commotion caused that will shake the grass stalk, it will let go, rise quickly to the surface and as quickly take wing.

ACAD. NAT. SCI. PHILA. S. Frank Aaron.

In June 1870 I took about sixty cocoons of *Samia Cynthia* to Newburgh, N. Y., and there freed them. In August 1884 I found on Eagle Cliff, Lake Mohawk, some distance west of Newburgh, several cocoons of *S. cynthia* on Sassafras. These were evidently the descendants of those I had freed in 1870. *Ailanthus* is not found on Eagle Cliff, and the species has evidently adopted the food plant of its near ally, *promethea*.

Chas. A. A. Düring.

New Bombycidae from Colorado.

By Henry Edwards.

Notodonta notaria, n. sp.

Primaries mouse-color, with the nervures, three apical streaks, and a dentate, marginal line, brown. At the base, from near costa to near internal margin is a clear and very distinct white streak. Secondaries sordid white, with brownish dentate marginal line, and a large brownish blotch at anal angle, enclosing a whitish sublunate mark. Thorax concolorous with primaries. Abdomen yellowish brown at base, whitish toward the tip. Antennæ dull fawn-color. Underside of primaries sordid white, clouded with brownish, of secondaries sordid white, margins only brownish.

Exp. wings 50 mm. Length of body 24 mm. Colorado (D. Bruce.) 5 specimens ♂ ♀.

A very fine insect, undoubtedly belonging to the European genus, and in its general aspect recalling *N. tremula*, S. V., and *N. torva*, L.

Janassa lignicolor, var. **Coloradensis,** n. var.

This is probably a new species, but for the present I prefer to regard it as a variety only. The primaries are however much less produced than in *J. lignicolor* and the tint is grey, with little or no wood-brown shade. The coloring is more diffusely disposed over the wing surface, giving an indistinctness to the markings, and there is a great difference in the general appearance, difficult to define in words. The anal cloud on the secondaries is decidedly smaller, while the whole insect has a shorter and stouter appearance.

Several examples. ♂ ♀. Denver, Colorado (D. Bruce), Salt Lake (Hy. Edwards).

Icthyura Brucei, n. sp.

Ground color of primaries sordid white, with the lines and marks, rich brown. A basal and sub-basal line, the former whitish, edged with brown, and dentate in the middle, the latter almost straight. Behind the middle is a broad brown shade, through which from costa to internal angle runs a clear white line, which on costa is broadly produced into the distinct white mark usual in the genus. Between this and the margin a row of seven brown spots in the middle of which is a brownish cloud resting on posterior margin, which with the fringe is brownish. Secondaries wholly mouse-color. Thorax sordid white at the sides, the centre broadly brown. Abdomen dull sordid white. Antennæ and palpi brown, the shaft of the former whitish. Underside, mouse-color, with darker bent median band common to both wings, and the white costal mark on primaries indicated by a pale dash.

Exp. wings 30 mm. Length of body 12 mm. Colorado, 1 ♂.

A very characteristic and distinct species which I dedicate with great pleasure to my good friend, Mr. David Bruce, its discoverer. It differs exceedingly from any form previously known to me.

The breeding habits of some of our Dragonflies.

By Wm. T. Davis.

In the March number of the American Naturalist, Mr. F. E. Todd gives an interesting account of the breeding habits of some Dakota dragonflies. A species closely resembling *Lestes unguiculata* was observed by him crawling down the stems of plants to a depth of several feet in a clear pool.

I myself have observed various species of "mallet-headed" dragonflies under water, clinging to plant stems, and once—but only once—I saw a female *Aeschna* go below the surface of a slow flowing spring. It was on the 21st of October and about 4 o'clock in the afternoon, when I observed this dragonfly partly immersed, but it soon crawled further down the stick until it was entirely under water and near the bottom of the pool which was quite shallow. This insect I have before me now and I take it to be *Aeschna verticalis*, Hagen. It is a bedraggled specimen and probably was near the end of its days even if had not so unkindly terminated them.

Some of the species of *Aeschna* seem partial to running water and I have noticed many flying up and down a brook in the fall, but have never noticed the same insects about the ponds in the vicinity. It is probable, however, that only a few of the large headed dragonflies go below the surface to lay their eggs, as we often see them dipping their abdomens as they fly close to the water.

Mr. Uhler says: "*Libellula auripennis* I have often seen laying eggs and I think I was not deceived in my observation that she dropped a bunch of eggs into the open ditch while balancing herself just a little way above the surface of the water."

Are Curculio Larvae Lignivorous?

Dear Sir:

Mr. Knaus, in the last Bulletin, p. 150, seems rather to enquire whether curculio larvæ live upon dead or decaying wood, than to question their feeding upon the woody tissues of living plants. So far as my experience goes, it seems beyond doubt that, in addition to such genera as *Hylobius* and *Pissodes* which infest living plants, there are species which breed in dead wood. I have observed *Magdalis barbita* ovipositing in fallen hickory (*Carya amara*) and have taken larvæ, pupæ, and

imagos of same species from trees that had evidently been felled more than one season. *Acoptus suturalis* may also be found in dead stumps. In the following family *Eupsalis minuta* breeds frequently in old stumps and logs of maple, etc., while in the *Calandridæ* I think there are undoubtedly lignivorous species. *Cossonus platalea* has been found by me in large numbers under the the bark of a poplar which had been some years dead and was partly decayed. The beetles had evidently emerged from the wood, which was penetrated by numerous small holes. *Rhyncolus* and *Stenoscelis* of this family also apparently breed in dead wood. I have taken specimens of *S. brevis* both from old poplar and from maple stumps.

Ottowa, March 11, 1885. W. Hague Harrington.

Society News.

Brooklyn Entomological Society, March 3d. Twenty-six members and visitors present, the President Mr. Cramer in the chair. The reports of the officers for 1884 were read and approved. Mr. A. Sallé of Paris, France; Baron C. R. von Osten-Sacken, Heidelberg, Germany; and Dr. John G. Morris, Baltimore, Md., were on motion of Mr. J. B. Smith elected honorary members of the Society. Prof. C. V. Riley of Washington, D. C., was elected a life member. Mr. A. E. Brunn was nominated for membership by Mr. E. L. Græf, and Mr. W. H. Danby of Brooklyn, and Mr. Eugene M. Aaron of Philadelphia were nominated for membership by Mr. John B. Smith.

On motion, the Secretary was instructed to offer to the Agassiz Association the aid of the Society in the way of determinations and in such other ways as might best further the ends of both Societies.

Mr. Smith introduced Dr. Horn of Philadelphia, honorary member of the Society, and Dr. S. W. Williston of New Haven, who had come on to attend the meeting of the Society. Dr. Williston was invited to sit as a corresponding member of the Society.

Mr. Smith described a monstrosity of a ♂ *Lucanus cervus*, the left mandible of which was modified into an imperfect ♀ head.

Dr. Horn gave a short account of several monstrosities known to him, and stated that the *Lamellicornia* were especially rich in monstrosities. The antennæ were very often the subject of abnormal variations. Frequently there would be an unequal number of joints in specimens of the same species, or even in the same specimen. The *Carabidæ* stood next in the order of frequency. This led him to speak of variations of color and sculpture, and their value in systematic work. The sexual organs of the ♂ are among the most absolutely invariable structures, and are the most reliable in the separation of species among the *Staphilinidæ*. Mr. Smith gave it as the result of his studies in the *Noctuidæ* that the genitalia of the ♂ afforded the best possible specific characters. In the species of *Mamestra* especially, every species nearly has a very distinct and peculiar structure. Identity of type always indicates close relationship, while identity of form in his experience, proves specific identity, no matter how much maculation

or color may differ. The variations of *M. olivacea* were alluded to, and though he had separated two species on apparently excellent characters of maculation, yet he fully expected that they would ultimately prove varieties or races of the same species.

Dr. Williston stated that the result of his studies in *Diptera* had led him to hold views in accordance with those of Dr. Horn. He had been much interested in the results, recently published, reached by Dr. Horn and Mr. Smith in reference to the value of sexual characters. In the Diptera the range of color variation was very wide. Specimens of the same species in his cabinet ranged from clear yellow to deep black. They were undoubtedly the same species because he had every intergrade in his series; yet some writers would be apt to make four of five distinct species out of them. Species should be very cautiously described on color characters alone, no matter how well marked they appeared to be. The time for indiscriminate description had passed, and comparative Entomology must now be specially studied.

Dr. Horn then spoke as to genera. The variation of species was almost universally admitted, and by the theory of evolution was explained. But genera varied also—they so gradually intergraded that there were but very indistinct lines of demarcation. However disinclined workers might be to affirm their belief in evolution, all the best work done was wittingly or unwittingly based on it. Keeping that as a guide permanent arrangement of groups of genera and species can be made. An illustration was drawn from the *Meloidæ* in the highest type of which the claws were distinctly bifid, the parts equal, the upper portion pectinated. These varied gradually to the perfectly simple, single claw. By reasoning from the theory of evolution he sometime since predicted the occurrence of two further genera that would fill gaps left in the series by the then known forms. One of these predicted genera has been since discovered. He confidently expected the occurence of the other. Mr. Smith spoke as to the generic divisions of the Lepidoptera. The hairy eyed genera of the Noctuidæ especially afford an instance. *Mamestra*, *Tæniocampa* and *Xylomiges* though widely separated in the lists yet ran so close that it was next to impossible to draw a distinct line between them. Species occur which might with almost equal propriety be referred to either genus.

Mr. Hulst spoke on this subject. In his opinion nature must be taken as we find it, and whatever our opinion on the theory of evolution, in practice it would be found that nature had certain gaps that could be utilized in systematic work. The chain was nowhere complete, and with the amount of material that falls to the lot of the ordinary collector no trouble is experienced. He alluded to the inconstancies of characters used in separating families, in the *Geometridæ*. The venation, which forms the basis for the highest divisions in Lepidoptera, often in the Geometridæ varies essentially in one and the same species.

The remainder of the evening was spent in informal discussion, during which Dr. Horn illustrated three varieties of ♂♂ found in *Cryptobium*. Nearly every species has these varieties, one of which, Dr. Horn calls a complete ♂, another an incomplete ♂, the third an imperfect ♂. A paper now in press will completely illustrate these forms.

The Treasurer reported the amount of the Publication fund $150 as follows: Life membership fees from E. L. Graef, John B. Smith and Prof. C. V. Riley, each $50 = $150.

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Classification of Hemiptera.

By Herbert Osborn.

Authors are by no means agreed as to the exact limits of the order *Hemiptera* or rather as to the number of groups to be included in this varied order. Neither are they agreed as to the natural affinities or the relative rank of the groups and sub-groups they place in it.

Mr. P. R. Uhler, our best American Hemipterist includes in the group only the *Heteroptera*, *Homoptera* and *Parasita*, excluding the *Mallophaga* and the *Thysanoptera*: these latter groups have been included by many authorities and Mr. Packard still maintains on embryological grounds that they should be included.

This being the condition, and as many more observations both embryological and morphological seem necessary to definitely settle the question at issue, we are forced to content ourselves with systems more or less artificial.

In undertaking to present a synoptical arrangement of the group therefore, I shall not consider it in place to discuss these doubtful matters, but simply endeavor to present in condensed form what seems to me the most natural grouping, and that which will afford students the most ready means of arranging their collections.

I have followed most nearly the arrangement given by Mr. Uhler in his chapter on Hemiptera in the "Standard Natural History" but am indebted also to the works of Westwood, Packard, and others. While I have verified all points possible, I have in many instances been obliged to rely upon various authorities, well aware that the discovery of new species must frequently modify the definition of the groups to which they naturally must be referred, and while finding occasion to introduce occasional characters in separating the families, based on observations of

the material in my own hands, it would of course be useless and out of place to attempt to designate such portions, since originality can not be claimed for any such work, though the author may rightly be held responsible for presenting the matter as a whole.

The arrangement given is in descending order, but it will be impossible to follow this in the order of giving the generic synopses.

Including the *Mallophaga* and the *Thysanoptera* (*Physapoda* of Packard) we have no comprehensive definition of the group. Excluding these, we may say the *Hemiptera* include those insects provided with a rostrum or beak formed from the labium and enclosing four extensile setæ which form a sucking tube, along with wings usually four in number which are either all membranous, or the fore ones partially or entirely coriaceous. (In *Coccidæ* there are two in the males only, and in some other groups they are absent or rudimentary in one or both sexes.)

This group which we may call *Hemiptera genuina* is clearly divided by the position of the head and the structure of the wings into two sub-orders, the *Heteroptera* and *Homoptera*.

A third sub-order, *Parasita*, includes the suctorial lice infesting mammals, these apparently having about equal affinities for the two other sub-orders, but combining with neither in being wingless and the beak not jointed.

The other groups are at present most conveniently grouped here, and may be ranked also as sub-orders though structurally there can be little question that they must bear a more distinct relation to the *Hemiptera* proper.

The *Thysanoptera* (or *Physapoda*) are minute insects usually less than 2 millimeters in length; with four very narrow delicately fringed wings which lie flat on the back, with free palpigerous mouth parts, and tarsi without claws; the terminal joint being vesicular.

The *Mallophaga* are wingless parasitic insects living on birds or mammals, with free biting mouth parts, antennæ of three to five joints and presenting some resemblance to the wingless Psocidæ, and by some authors grouped with the Pseudo-Neuroptera.

It is intended to include in these synopses only the North American genera, and the tables must not be considered as applicable in a larger range. The characters also, here mentioned are those of most importance as related to the groups to be here included.

Perhaps in no other order of insects is there such diversity of modification in the several structural elements, and this diversity is accompanied with extreme lack of constancy, so that the clear definition of groups is rendered difficult.

The *body* varies in form from the most elongated and thread like to short or circular, from the thickest to forms so flattened that they may live in the narrowest crevices. They are convex above and below, or flattened or concave above and convex below.

The *head* serves by its position to separate the two leading suborders but aside from this it is subject to most extreme modification. It is cylindrical, often elongate in *Reduviidæ* and *Nabidæ*, decidedly flattened in *Coreidæ* and allied families. In the *Homoptera* the front is very often produced, the most extreme modification of this part occuring in the *Fulgoridæ*.

The *eyes* are usually prominent organs, standing out at the sides of the head; they serve rather as land marks—by which to locate the other organs of the head—than as distinctive in themselves.

The *ocelli* are commonly present and by their absence or by their relation to the eyes serve to define some minor groups.

The *antennæ* are never particularly elongated, usually composed of few joints and as a rule but slightly modified. They run from filiform in the lower *Homoptera* to setiform in *Cicada* and allies: and are mostly filiform, with the terminal joints either slender or else slightly enlarged in the *Heteroptera*. In a few cases the joint next the last is much flattened and broadened or otherwise modified. They are truly capitate only in the *Liotheidæ*.

The *labrum* is usually very small, but occasionally with the clypeus furnishes good characters for separation of genera and species. The setæ of the mouth vary greatly in length, but are of little value in determining the relation of groups.

The *labium* is an important structural element. It forms the sheath for the setæ, and is termed the beak or rostrum. It consists of three or four joints except in the *Pediculidæ* where it is apparently devoid of articulation. By its origin at the front of the head indicating the horizontal position, or at the sternal border of the head indicating the vertical position, it serves to distinguish the *Heteroptera* and *Homoptera* and by its separation from or apparent union with the sternum it serves to divide the *Homoptera* into two minor groups. Furthermore the form of the basal joint and the comparative length of the joints are points of great value in determining relationships.

The *thorax* in its modifications corresponds in general with the habits of the groups, whether aquatic, terrestrial or aerial.

The *prothorax* is often minute and weak, again enormously developed and overshadowing all other parts as in *Membracidæ*. It is transversely sutured in *Reduviidæ*.

The *mesothorax* contains in the higher *Homoptera* and in nearly all *Heteroptera*, a well developed scutellum, situated between the bases of the fore wings. Its form and size assist in distinguishing some important groups. The metathorax is often reduced in size, forming a thin plate between mesothorox and abdomen. The *legs* vary in size and length and in the structure of the tarsi. A part or all of them are ciliated in most aquatic species; they are strong and spiny in most of the raptorial groups; pulvilli are in some groups present between the claws of the tarsi. The *wings* are quite characteristic. In *Homoptera* they are generally membranous and veined, or the fore ones as in *Cercopidæ* and allies uniformly coriaceous. In the latter case they do not overlap at the tips but unite on the median line as the elytra of Coleoptera. In *Heteroptera* the fore wings are divisible into three parts: a basal thick portion, the corium; a transparent apical portion, the membrane, which is veined; and a portion bordering the scutellum, the clavus. In some groups, notably the *Phytocoridæ* there is a triangular part between the corium and membrane, the cuneus. They usually lie flat on the back, the membranous portions overlapping each other. The hind wings present less differences in structure, in both groups; but their venation is often important in distinguishing minor groups.

The *Parasita* and *Mallophaga* as well as one sex in many of the other groups, and occasionally both sexes are wingless or have these organs represented by mere rudiments. In *Thysanoptera* they are very delicate with a very broad and delicate fringe.

The *abdomen* presents many modifications of form, some of which are quite constant. It is quite commonly concave above for the reception of the wings, but seldom so concave as not to be filled by the flatly folding wings. The spiracles are, except in *Parasita*, situated below the margin. The margin is quite generally sharp and either horizontal or slightly elevated. The genital organs are in some groups external and furnish valuable characters for separating groups, but more commonly they are hidden in both sexes so as to furnish little aid without dissection and frequently the distinction of the sexes is impossible by external characters. In the higher *Homoptera* and in a few groups of the *Heteroptera* the ovipositor of the female is received into a slit on the underside of the abdomen and serves to readily distinguish the sexes and affords useful characters in systematic arrangement.

The following analytical tables will assist in placing the various subgroups, and also show the arrangement which seems to me at present most satisfactory.

In the synopses of families many groups are given that rank for

convenience, which by good authorities, and very properly I think, are given the rank of super-families. These groups will be discussed more particularly along with the characters of sub-family and generic importance in the synoptical tables of genera, which it is intended shall follow this paper.

SYNOPSIS OF SUB-ORDERS.

A.—Labium forming a beak and enclosing setæ.
B.—Labium jointed, spiracles inferior, wings usually present.
C.—Head horizontal, beak arising anteriorly, fore wings, coriaceous at base..... **Heteroptera.**
CC.—Head vertical, beak arising postero-inferiorly. Wings uniformly membranous or coriaceous ..... **Homoptera.**
BB.—Labium not jointed, spiracles superior. Wings always absent..... **Parasita.**
AA.—Labium not forming a beak, mouth parts free.
B.—Wings present, narrow, delicately fringed; tarsi vesicular (frequenting blossoms)..... **Thysanoptera.**
BB.—Wings never present; tarsi with claws. (Parasites on birds and mammals).... **Mallophaga.**

SYNOPSIS OF FAMILIES.

HETEROPTERA.

* ANTENNAE ALWAYS PROMINENT.

† *Legs ordinary, adapted to terrestrial life. Never inhabiting water or wet places.*

A.—Head usually flattened or triangular, closely joined to body, often immersed to the eyes, basal joint of the rostrum straight.
B.—Bodies usually rather thick and flattened or convex above, convex below.
C.—Ocelli usually conspicuous.
D.—Scutellum very large.
E.—Scutellum quite convex, covering nearly the whole abdomen..... **Scutelleridae.**
EE.—Scutellum nearly flat, attenuated posteriorly..... **Penlatomidae.**
DD.—Scutellum ordinary.
F.—Antennæ inserted above a line drawn from eyes to base of beak.... **Coreidae.**
FF.—Antennæ inserted on or below lateral margin of head and on a line drawn from eyes to base of beak..... **Lygaeidae.**
CC.—Ocelli absent or inconspicuous. Bodies rather soft.
G.—Terminal joint of antennæ not slender..... **Pyrrhocoridae.**
GG.— " " " " long and slender..... **Phytocoridae.**
BB.—Bodies decidedly flattened or else decidedly concave above, beak 3-jointed.
H.—Antennæ tapering. Body very flat..... **Cimicidae.**
HH.—Antennæ enlarging at tip or clubbed.
I.—Wings more than covering abdomen, gauze like..... **Tingitidae.**

II.—Wings not covering the abdomen.

J.—Margins of thorax and abdomen elevated, angular, head not flattened..... Phymatidae.

JJ.—Thorax and abdomen exceedingly depressed, (live under bark).. ..... Aradidae.

AA.—Head cylindrical, distinctly separate from body, base of rostrum curved. Antennæ usually tapering, prothorax with transverse suture.

K.—Rostrum long, slender..... Nabidae.

KK.—Rostrum short, stout ... . Reduviidae.

** ANTENNAE (EXCEPT IN GALGULIDAE) PROMINENT.

†† *Legs usually very long and slender, the tarsi variously modified for locomotion on surface of water or life in marshy places.*

A.—Antennæ very conspicuous.

B.—Antennæ slender. Bodies linear..... ..... Hydrometridae.

BB.—Antennæ short and thick or with basal joint stout and outer joints slender..... Velliidae.

BBB.—Antennæ long, conspicuous.

C.—Ocelli and scutellum apparently absent..... ..... Hydrobatidae.

CC.—Ocelli present, size small ..... Saldidae.

AA.—Antennæ inconspicuous, ocelli present..... ..... Galgulidae.

*** ANTENNAE ALWAYS CONCEALED IN CAVITIES OF THE HEAD.

††† *Legs often ciliated.* (*Aquatic forms.*)

A.—Head inserted in prothorax, fore tarsi normal.

B.—Bodies flat oval or ovate.

C.—Without caudal setæ .... Naucoridae.

CC.—With strap-like caudal appendage..... .. .. Belostomidae.

BB.—Bodies flat, oval, ovate or elongated, with long respiratory caudal setæ..... Nepidae.

BBB.—Bodies thick, usually soft, convex above..... Notonectidae.

AA.—Head overlapping the prothorax, fore tarsi flattened and ciliated.... Corisidae.

HOMOPTERA.

* BEAK DISTINCTLY SEPARATE FROM STERNUM.

Tarsi three-jointed. Antennæ minute, setiform.

A.—Wings more or less opaque, usually narrow, sometimes very broad.

B.—Prothorax well developed. Antennæ placed between the eyes. Scutellum triangular.

C.—Bodies usually rather slender, front little, if any, produced or carinated.

D.—Ocelli on vertex..... Tettigonidae.

DD.—Ocelli on front..... ..... Jassidae.

CC.—Bodies usually stout, ocelli on vertex, front usually carinate.... Cercopidae.

BB.—Prothorax weak, often but slightly developed, antennæ and ocelli placed beneath the eyes, front often produced, scutellum inconspicuous.. Fulgoridae.

AA.—Wings entirely membranous, strongly veined.

D.—Prothorax normal, not covering wings. Wings broad, size large, males musical..... Cicadidae.

DD.—Prothorax greatly enlarged, covering the wings and often the entire body .... Membracidae.

** BEAK APPARENTLY ARISING FROM STERNUM.

Tarsi one- or two-jointed. All of small size. Antennæ prominent, usually filiform.

A.—Tarsi usually 2-jointed, wings, when present, four.

B.—Beak 3 or 4-jointed.

C.—Antennæ 10-jointed ..... Psyllidae.

CC.—Antennæ 3 to 7-jointed ..... Aphididae.

BB.—Beak 2-jointed ..... Abyrodidae.

AA. Tarsi one-jointed. Males with two wings, females never winged. Enclosed in waxy scales closely adherent to bark or leaves, or clothed with cottony down. ..... Coccidae.

PARASITA.

The American species are contained in one family ..... Pediculidae.

MALLOPHAGA.

A.—Antennæ filiform. Maxillary palpi absent, tarsi short ..... Philopteridae.

AA.—Antennæ capitate. Maxillary palpi conspicuous, tarsi long. ..... Liotheidae.

THYSANOPTERA.

These are conveniently grouped in one family ..... Thripidae.

An abnormal Lucanus cervus *

At the January meeting of the Society Mr. L. C. Schenk exhibited a ♂ specimen of *Lucanus cervus* with apparently somewhat aborted mandibles. It seemed at first as if here was only a case of accidental injury in an early stage; but more careful study has developed a very interesting malformation. In size the specimen rather exceeds the average ♂ of *cervus*, and up to the head, is normal. The right side of the head to the mandible, is normal, the antenna complete. The mandible is distorted, lacking the teeth, and the point bent inwardly and joining the front under the labrum. It is perfectly immobile, and forms an irregular loop. The left side of the head is shorter than the right; but retains the normal sculpture to the front. The antenna is aborted, the basal joint much shorter than that of the opposite side, the remaining joints irregular, the club wanting. The eye is irregular in shape, and somewhat flattened. The front is oblique, the clypeus twisted sideways by the right mandible. The left mandible is wanting, its place occupied by an imperfect female head, with two perfect though immobile mandibles. The palpi and labrum are aborted and form a queer intergrade between ♂ and ♀ and appear partly to belong to the ♂ and partly to the ♀ head. The palpi are hardly half the length of those of a normal ♂. Altogether this is the most remarkable abnormity it has been my fortune to see. J.B.S.

* Read before the Brookl. Ent. Soc. March 1885.

Synopses of Cerambycidae *

By Charles W. Leng, B. S.

GNAPHALODES, *Thoms.*

A species belonging to this genus has occured in Texas. It should be placed before *Chion* with the following definition:

Prothorax with lateral spine behind the middle; antennæ densely fringed beneath, inner angle of joints 4-7 spinose; elytra bispinose at tip, episterna of metathorax wide, scent pores distinct.

The scutellum is triangular, larger than in *Chion*, and the eyes are less coarsely granulated; the prosternum is perpendicular behind, and the mesosternum convex. The body is brown, uniformly clothed with gray brown pubescence, paler and more dense on the scutellum. The species may be considered an occasional visitor rather than a permanent addition to our fauna.

G. trachyderoides Thoms. Class. Long. p. 236; *acuticornis* Chev. Dej. Cat. page 152.

CHION, *Newm.*

Contains one species, a large grayish brown insect with rounded prothorax, spined at sides and bispinose elytra. It varies greatly in color and may or may not bear a yeliowish arcuate blotch on each elytron before the middle. Length 25—37 mm. = 1—1.5 inches. Hab. America borealis.

C. cinctus, Drury, Ill., 2. 1773. Ind. I, p. 85, t. 37, f. 6. Harris, Inj. Ins. 81; *ruricola* Gmel. ed Linn. I, 4, p. 1860; *rusticus* Fab. Sp. Ins. I, 228; *balteatus* Deg. Mem. V, 111, t. 14, f. 3; *garganicus* Fab. Syst. Ent. 178; *4 spinosus* Hald. Tr. Am. Phil. Soc. X, 32.

EBURIA, *Serv.*

Contains several species of moderate size readily distinguished by the two pairs of ivory spots on the elytra. We reproduce the Synopsis offered by Dr. Leconte in 1873, and published in S.M.C., No. 264.

A.—Middle and hind femora produced at tip into two acute spines; elytra bispinose at tip;

a.—Front coxæ not angulated, fissure completely closed; prothorax abruptly constricted before and behind, tuberculate and strongly armed on the sides; color piceous;

Body glabrous above, slightly pubescent beneath, prothorax feebly grossly punctured, elytra with very small ivory spots of which the medial pair and the outer basal one are frequently wanting.....**Ulkei.**

Body densely and finely pubescent, prothorax with a few very large punctures; elytral spots small, distant, outer basal one sometimes wanting, elytral spines small.....**stigmatica.**

* Synopses of the preceding genera will be found in the Bull. Brookl. Ent. Soc. Vol. VII.

b.—Front coxæ angulated; prothorax densely and coarsely punctured, sides subtuberculate in front, lateral spine small, acute, dorsal callosities denuded, color testaceous;

Lateral tubercle of prothorax very distinct; elytra with outer spine shorter, and ivory spots smaller ..... **Haldemani.**

Lateral tubercle of prothorax feeble, elytra with outer spine longer, and ivory spots larger ..... **4-geminata.**

c.—Front coxæ angulated; prothorax densely and finely punctured, transversely impressed before and behind the middle, lateral spine acute, color testaceous;

Ivory spots very unequal, thoracic spine strong ..... **stigma.**

Ivory spots equal, large; thoracic spine very small, femoral spines very long. ..... **distincta.**

B.—Femora with short apical spines; elytra obliquely truncate inwards at tip, prothorax coarsely and densely punctured, rounded on the sides, with two denuded dorsal callosities; color testaceous; front coxæ distinctly angulated.

Ivory spots of elytra unequal ..... **ovicollis.**

C.—Femora without spines, apical angles obtuse; elytra transversely subtruncate; prothorax with four dorsal callosities before the middle, lateral spine very small; front coxæ not angulated;

Abdomen densely, but equally and less finely punctured; sides of prothorax much rounded in front of the spine, ivory spots small ..... **tumida.**

Abdomen unequally punctured, sides of prothorax very feebly rounded in front;

Ivory spots geminate, apex of elytra truncate ..... **mutica.**

Ivory spots single, apex of elytra nearly rounded, with a small sutural spine... ..... **manca.**

E. Ulkei Bland, Proc. Ent. Soc. Phila., I, 270.
Length 27 mm. = 1.08 inch. Hab. Lower Cal.

E. stigmatica Chevr. Col. Mex. fasc. 3, 1834, No. 60; *perforata* Lec. S.M.C. No. 264, p. 180.
Length 23—30 mm. = .92—1.20 inch. Hab. Tex.

E. Haldemani Lec. J.A.P. ser. 2, II, p. 102.
Length 19—30 mm. = .75 to 1.20 inch. Hab. Texas, Florida.

E. 4-geminata Say, J.A.P., V, 2, 1827, p. 275. Lec. J.A.P. ser. 2, II, p. 11. Chev. Ann. Fr. 1862, p. 265.
Length 23—30 mm. = .90—1.20 inch. Hab. Atlantic States.

E. stigma Oliv. Ent. IV, 67, p. 126, t. 23, f. 180.
Length 18.5 mm. = .70 inch. Hab. Cuba, Florida.

E. distincta Hald. Proc. A. P. III, 1845, p. 150; Dej. Cat. 3d ed. p. 351.
Length 22—25 mm. = .90—1.00 inch. Hab. Ga. and Miss.

E. ovicollis Lec. S.M.C. No. 264, p. 180.
Length 18—23 mm. = .72—.92 inch. Hab. Texas.

E. mutica Lec. Proc. Ac. Phil. VI, 1853, p. 233.
Length 17—21 mm. = .60—.80 inch. Hab. Texas.

E. manca Lec. S.M.C. No. 264, p. 181.
Length 15—20 mm. = .60—.80 inch. Hab. Texas.

ROMALEUM, *White.*

The species of this genus differ from *Elaphidion*, with which they have been united, by the more robust form and by the episterna of the

metathorax being distinctly though slightly wider in front, and gradually narrowed behind. The femora are not spinose and the spines of the antennæ are never long. The antennæ are longer than the body in ♂, the prothorax is very densely punctured with a posterior medial channel and dorsal cicatrices. In ♀ the antennæ are shorter and the prothorax coarsely punctured with a medial and two dorsal callosities. The species are separated as follows:

Body uniformly finely pubescent:
  Both angles of 3d and 4th joint of antennæ spinose ..... **procerum.**
  Outer angles only spinose ..... **simplicicolle.**
Body irregularly pubescent, with spots of coarser and denser hair;
  Pubescence mottled irregular ..... **atomarium.**
  Pubescence uniform, fulvous ..... **rufulum.**
  Sparsely pubescent, elytra very coarsely punctured before the middle, with an irregular transverse patch of white pubescence at the middle ..... **taeniatum.**

R. procerum Lec. Proc. Ac. Phil. 1859, p. 88.
Length 37.5 mm. = 1.5 inch. Hab. New Mexico, Cal.

R. simplicicolle Hald. Proc. Ac. Phil. III, p. 151; Lec. Journ. Acad. Nat. Sci. Phil. ser. 2, II, p. 12; *pulverulentus* Hald. Trans. Am. Phil. Soc. X, p. 32; *Lecontei* Dej. Cat. 3d ed. p. 352; Chev. Journ. of Ent. I, p. 243.
Length 44 mm. = 1.75 inch. Hab. United States.

The two species above mentioned are very close, and separable only by characters given in the table. The species of this and the succeeding genus are founded on structural differences, in which the family Cerambycidæ is so rich. In the present and in other instances these differences are so slight as to indicate that the species are either of very recent origin or are now tending to coalesce. We fail however to find intergrades which would justify us in uniting the species and merely caution the student that the table must be followed very literally to correctly identify specimens. *R. aperarium*, White, = one of the above species.

Since the above was in type, Dr. Horn writes as follows: "After examining my series, I can *not* separate *procerum* and *simplicicolle*, and would advise their union under the former name. The arrangement of the antennal spines is an illusory and evanescent character."

R. atomarium Drury, Ill. II, 1773, Ind. I, p. 93, t. 41, f. 6; Lec. J.A.P. ser. 2, II, p. 177; *marylandicus* Fab. Syst. Ent. p. 179; Oliv. Ent. IV, 70, p. 6, t. 1, f. 5; *multicolor* L. ed. Gmel. I. 4, p. 1857; *pulverulentus* De G. Ins. V, p. 118, t. 14, f. 12.
Length 22—31 mm. = .88—1.22 inch. Hab. Middle and Southern States.

R. rufulum Hald. Trans. Am. Phil. X, p. 32.
Length 22—28 mm. = .88—1.15 inch. Hab. Middle States.

These are again closely related. The fulvous color will distinguish *rufulum* as well as the uniform pubescence: *atomarium* being darker in every specimen we have seen.

R. taeniatum Lec. Proc. Ac. Phil. VII, 1851, p. 81.
Length 20—25 mm. = .80—1.00 inch. Hab. Texas.

A very distinct species, intermediating somewhat in appearance between this and the following genus.

ELAPHIDION, *Serv.*

In this genus the metathoracic episterna are scarcely wider in front than behind. The prothorax in sculpture and form and the spines of thighs, elytra and antennæ vary in every conceivable degree and are the basis upon which most of the numerous species have been erected. In general the species of *Elaphidion* are more slender and smaller than those of *Romaleum*. The species require renewed and careful study, which can only be made however, with Dr. Leconte's types at hand for comparison.

SYNOPSIS OF ELAPHIDION.

A.—Antennæ and elytra with very long spines; thighs spinose at tip; prothorax perpendicular behind, mesosternum gibbous; prothorax ♂ ♀ similar with several callosities;

Antennæ ♂ longer than the body;

Above glabrous, with patches of white hair ..... **irroratum.**

Above clothed irregularly with gray pubescence ..... **mucronatum.**

Antennæ ♂ not longer than the body;

Uniformly pubescent, scarcely mottled on the elytra ..... **tectum.**

B.—Antennal spines small; elytra rounded at tip, sutural spine distinct; prothorax broadly rounded at sides, coarsely and deeply punctured with three narrow smooth spaces;

Rather slender, piceous, thinly clothed with long flying hairs ..... **alienum.**

C.—Antennal spines small; prosternum rounded behind, mesosternum obliquely declivous; thighs not spinose at tip; prothorax ♂ finely, ♀ more coarsely punctured; (scent pores indistinct in *a*, *b*, or very obvious *c*, or wanting *d*);

a.—Prothorax rounded on the sides with several dorsal callosities, elytra truncate and strongly bispinose at tip;

Pubescence grayish brown, mottled ..... **incertum.**

b.—Prothorax feebly rounded on the sides, elytra uni- or not spinose at tip, pubescence grayish brown, mottled;

Thorax with a medial smooth space, and no dorsal callosities; tip of elytra truncate inwards, not spinose ..... **inerme.**

Thorax with a medial smooth space and two small discoidal callosities; tip of elytra subtruncate, sutural spine distinct ..... **truncatum.**

Thorax more rounded on the sides, dorsal space coarsely punctured; tip of elytra rounded, suture not spinose ..... **spurcum.**

c.—Prothorax scarcely rounded on the sides, nearly cylindrical (except in *pumilum*); elytra bispinose;

Pubescence mottled, flying hairs not very obvious; elytral spines long; legs densely punctured and pubescent;

Prothorax scarcely longer than wide.....**villosum.**
Prothorax distinctly longer than wide.....**parallelum.**
Pubescence mottled, flying hairs very long and numerous on legs and antennæ; legs very sparsely punctured;
Elytral spines very short.....**pumilum.**
Pubescence sparse, coarse, uniform; body very long and slender, coarsely punctured; legs coarsely punctured;
Flying hairs sparse; antennal and elytral spines moderately long.....**subpubescens.**
Flying hairs long; spines long.....**aculeatum.**
Body shining testaceous, sparsely punctured and nearly glabrous;
Flying hairs sparse; elytral spines long.....**unicolor.**
d.—Prothorax rounded on the sides, coarsely punctured (♂♀) without callosities; body more robust, uniformly coarsely and sparsely pubescent, elytra rounded at tip; legs coarsely punctured.....**moestum.**
D.—Antennal spines completely wanting; thighs not spinose; pubescence uniform, sparse; form slender, prothorax feebly rounded on the sides;
Pubescence intermixed with long flying hairs; elytra rounded at tip, legs very finely pubescent, scarcely punctured; metasternum without odoriferous pores.....**punctatum.**
Thinly clothed with long flying hairs; elytra rounded and slightly truncate at tip; thighs finely punctulate with sparse setigerous punctures; metasternum with distinct odoriferous pores.....**imbelle.**
Pubescence without long flying hairs; elytra truncate at tip, legs very coarsely punctured; punctuation of prothorax ♂♀ dissimilar.....**cinerascens.**

E. irroratum Linn. Syst. Nat. ed XII, p. 633; Drury, Ill. I, p. 92, t. 41, f. 3; Hope, Trans. Zool. Soc. I, p. 107; Jacq. Duv. Hist. Club, 1857, p. 266, t. 10, f. 7.
Length 19 mm. = .75 inch. Hab. Cuba, New York, Ills.

The thighs are distinctly spinose in all that we have, but two specimens from Illinois which are otherwise similiar have the antennal spines moderate.

E. mucronatum Say, J.A.P. III, 1823, p. 427; Newn. Ent. p. 27; *muricatum* Hald. Trans. Am. Phil. Soc. X, p. 33; *nebulosum* Guer. Ic. regn. anim. III, p. 255: Dej. Cat. 3d ed. p. 352.
Length 15—19 mm. = .60—.75 inch. Hab. Mass. to Florida and westward to Missouri.

A common and distinct form.

E. tectum Lec. Proc. Am. Phil. Soc. XVII, 413.
Length 15.6 mm. = .62 inch. Hab. Florida.

We have not seen this species.

E. alienum Lec. Tr. Am. Ent. Soc. V, 173.
Length 14.5 mm. = .58 inch. Hab. Arizona.

Dr. Leconte's description does not describe the thighs, and having no specimen before us we are unable to place it in any previous division. It appears to be a quite distinct form from characters given in table.

E. incertum Newn. Ent. p. 28; Lec. J.A.P. ser. 2, II, p. 13; *aspersus* Hald. Trans. Am. Phil. Soc. X, 1847, p. 32; *vicinum* Hald. Tr. Am. Phil. Soc. X, 33; *neglectum* Lec. Journ. Ac., N. Sc., Phil. ser. 2, II, 13.

Length 17.5 mm. = .70 inch. Hab. New York.

E. inerme Newn. Ent. p. 29.

Length 12—15 mm. = .5 —.6 inch. Hab. Pennsylvania, Tex.

All the specimens we have answering to the description are from Texas and are small and slender.

E. truncatum Hald. Trans. Am. Phil. Soc. X, p. 33; *debile* Lec. Proc. Ac. Sc. Phil. VI, 442.

Length 14 —19 mm. = .56 —.75 inch. Hab. Texas.

Our only specimen is large and robust.

E. spurcum Lec. Proc. Ac. Phil. VI, p. 422.

Length 14 mm. = .45 inch. Hab. Texas near Mexican boundary.

The pubescence is distinctly mottled.

E. villosum Fab. Ent. Syst. I, 2, p. 302; Newn. Ent. p. 28; *putator* Peck, Harris Ins. Mass. p. 81.

Length 18 mm. = .70 inch. Hab. Middle and Southern States.

E. parallelum Newm. Ent. p. 29; Lec. J.A.P. ser. 2, II, p. 103; Chev. Ann. Fr. 1862, p. 262; *murinus* Dej. Cat. 3d ed. p. 352; *pusillus* Dej. Cat. l.c.; *oblitus* Lec. J.A.P. ser. 2, II, p. 14; *arctus* Newn. Ent. p. 29; Lec. J.A.P. ser. 2, II, p. 16.

Length and Habitat same as *villosum*.

These common species differ markedly in the form of prothorax as well as in *parallelum* being usually much more slender. The 5th ventral segment in ♂ *villosum* is rounded at tip, while in ♂ *parallelum* it is truncate.

E. pumilum Newn. Ent. p. 29; Lec. J.A.P. ser. 2, II, p. 14.

Length 9 mm. = .36 inch. Hab. Georgia, Tex.

This species is easily identified by synopsis.

E. subpubescens Lec. Proc. Ac. Phil. XIV, p. 41.

Length 17.5 mm. = .70 inch. Hab. New Jersey, Tex.

E. aculeatum Lec. S.M.C. No. 264, p. 184.

Length 15 mm. = .60 inch. Hab. Texas.

These two species are closely allied and distinguished from other species by their very slender form.

E. unicolor Rand. Bost. Journ. II, 1838, p. 42.

Length 11 mm. = .45 inch. Hab. Atlantic States.

The slender scarcely pubescent body and elytra distinguish this species at once.

E. moestum Lec. Proc. Ac. Phil. VI, p. 442.

Length 13—15 mm. = .50—.60 inch. Hab. Texas.

Resembles *spurcum* in size and robust form, but differs in elytral spines and pubescence which is sparse, exposing the dark brown color of the body and elytra.

E. punctatum Lec. S.M.C. No. 264, p. 185.
Length 10—12 mm. = .40—.48 inch. Hab. Lower Cal.

E. imbelle Lec. Buff. Bull. IV, 27.
Length 17.3 mm. = .70 inch. Hab. California.

E. cinerascens Lec. Journ. Ac. Sc. Phil. ser. 2, II, p. 15.
Length 8.5—12.5 mm. = .35—.50 inch. Hab. Pa. Tex.

The three species above named are sufficiently characterised by the synopsis. *E. punctatum* we have not seen.

NOTE.—I shall be glad to see any specimens of *Elaphidion* which do not fall within the descriptions above given, or which seem to intergrade between them. Quite large series have served on the whole to confirm Dr. Leconte's views on this genus and specimens needing special attention will be therefore very interesting and meet with prompt recognition in these columns. Such may be sent to Mr. Chas. W. Leng, P.O. Box 3565, New York.

ANEFLUS, *Lec.*

This genus is rendered necessary for certain species which completely resemble the elongate forms of *Elaphidion* (*subpubescens etc.*) in appearance, but differ by having the joints of the antennæ from the 5th flattened and distinctly carinate along the middle of the flat sides.

SYNOPSIS OF ANEFLUS.

Prothorax distinctly dilated, and feebly angulated on the sides; elytra bispinose at tip; hind tibiæ scarcely carinate; palpi unequal, with the last joint dilated, triangular;
  Very large, spines of antennæ moderately long ..... **protensus.**
Prothorax cylindrical, sides nearly straight;
  Third joint of antennæ with a spine a little longer than that of 4th joint; palpi with last joint not dilated;
    Elytra emarginate at tip, slightly bispinose, flying hairs of tibiæ long, not very numerous ..... **linearis.**
  Third joint of antennæ with spine much longer;
    Elytra emarginate at tip, flying hairs of tibiæ not conspicuous, palpi with last joint not dilated ..... **tenuis.**
    Elytra truncate at tip, suture more prominent, flying hairs of tibiæ long, numerous; palpi very unequal, with last joint triangular, dilated; (antennal carinæ obsolete) ..... **volitans.**
  Antennal joints 3—6 with short spines, distinctly carinate; apex of elytra with two long spines; last joint of palpi elongate, triangular ..... **prolixus.**

A. protensus Lec. Proc. Ac. Nat. Sci. Phila. 1858, p. 82.
Length 30 mm. = 1.22 inch. Hab. Arizona.

A. linearis Lec. Proc. Ac. Phil. 1859, p. 80.
Length 10 mm. = .41 inch. Hab. California.

A. tenuis Lec. Proc. Ac. Phil. VII, p. 81.
Length 1.25 mm. = .50 inch. Hab. Texas and Arizona.

In this species, as in the preceding, the palpi are not dilated and are not very unequal: the hind tibiæ are however much more distinctly carinated, the spine of the 3d antennal joint is two-thirds as long as the 4th joint and the spine of the latter is quite small.

A. volitans Lec. S.M.C. No. 264. 1873, p. 186.
Length 10 mm. = .40 inch. Hab. Lower Cal.

In this species as in *prolixus* the first joint of the antennæ is longer and less thickened than in *linearis* and slightly curved, the outer joints are scarcely carinate, the spine of the 3d joint is two-thirds as long as the 4th joint and the spine of the latter is also long, being fully one third as long as 5th joint. The hind tibiæ are only feebly carinate.

A. prolixus Lec. S.M.C. No. 264, 1873, p. 203.
Length 25 mm. = 1 inch. Hab. Lower Cal.

The antennæ are very distinctly carinate, of ♂ nearly as long as body, ♀ scarcely two-thirds as long. The appearance of a transverse line on the disk of prothorax is the result of the arrangement of the pubescence rather than a positive elevation.

EXPLANATION OF PLATES I & II.

1 Tetropium cinnamopterum,
2 Opsimus 4-lineatus,
3 Smodicum cucujiforme,
4 Gonocallus collaris,
5 Physocnemum brevilineus,
6 " Andreæ (Elytra),
7 Rhopalopus sanguinicollis,
8 Hylotrupes bajulus,
9 " ligneus,
10 Phymatodes variabilis,
11 " dimidiatus,
12 " vulneratus,
13 " varius,
14 " decussatus and nitidus,
15 Merium proteus,
16 Callidium antennatum,
17 " hirtellum,
18 Xylocrius cribratus,
19 Malacopterus vittatus,
20 Oeme rigida,
21 " strangulata,
22 Eucrossus vilicornis,
23 Dryobius 6-fasciatus,
24 Haplidus testaceus,
25 Achryson surinamense,
26 Gracilia minuta,
27 Axestinus obscurus,
27*a* " " antenna,
28 Brothylus conspersus,
29 Osmidus guttatus,
30 Stromatium pubescens,
31 Antenna of *Aneflus*,
32 Gnaphalodes trachyderoides.

[By the error of the Photo Engraving Co., the plates were made rather smaller than ordered. The actual size of insects figured is therefore somewhat greater than indicated. Most of the species here figured were described in Bulletin, Vol. VII.]

Synopses of Butterflies.*

By Rev. Geo. D. Hulst.

EREBIA, *Dalm.*

1. **Tyndarus** Esp. Schm. I, 2, p. 97, pl. 67. *Callias* W. H. Edw. Trans. Am. Ent. Soc. 3, 274.

Above brown; on disk of primaries covering the discoidal and upper median interspaces a triangular castaneous patch enclosing a black duplex spot, both parts ocellated. Secondaries with three black spots each in a pale castaneous ring. Underside of primaries castaneous except the costal edge and apex which are gray; same markings as above. Secondaries gray with a brown tint; the disk crossed with a deeply crenated line, anterior to which near base is another similar line nearly obsolete: spots as above.

Expands 1.5 inches. Colorado.

2. **Haydenii** W. H. Edw. Rep. Hayden Exp. Montana, 1872, 467. Trans. Am. Ent. Soc. 5, 19.

Upper side fuscous, immaculate. Underside a shade paler, much marbled with gray scales; primaries immaculate; secondaries with a complete series of black ocelli along the edge of outer margin, one in each interspace, each ocellus narrowly ringed with ochraceous and having a minute white pupil.

Expands 1.6 inches. Taken at Yellowstone Lake.

3. **Epipsodea** Butl. Cat. Sat. B.M., p. 80, pl. 2, f. 9, *Rhodia* W. H. Edw. Trans. Am. Ent. Soc. 3, 273.

Body black. Wings above, uniform dark brown; the primaries generally have 3 ocellated submarginal spots, 2 towards the apex, the third post median; all are surrounded with bright reddish brown. There is a row of corresponding ocellated spots on secondaries, varying in number. Beneath primaries somewhat paler with spots repeated; secondaries paler on outer third, the ocellated spots not edged with reddish brown.

Expands 1.5 inches. Colorado, Montana.

4. **Magdalena** Streck. Bull. Brookl. Ent. Soc. 3, 35.

Upper surface of wings entirely and uniformly dark blackish brown. Beneath as above with the outer third a shade lighter.

Expands 2 inches. Colorado.

5. **Disa** *Var.* **Mancinus** Doub. Hew. Gen. Diur. Lep. II, p. 380, pl. 54.

Upper side deep sooty black; primaries slightly reddish towards

* These Synopses are continued from the "Bulletin". Descriptions of the species of the preceding genera will be found in Vol. I to Vol. VII of that publication.

outer margin; a submarginal row of reddish spots the two nearest the apex more distinctly pupilled. Beneath primaries as above: secondaries brown densely powdered with silvery white scales giving a grayish cast: there is a broad median band of sooty black, deeply indented towards base, regularly sinuate outwardly; at the costal margin and on the outer edge of this band is a triangular patch of white; also a white spot on second submedian nervule; a submarginal row of faint blackish lunules is also present.

Rocky Mts., Alaska.

6. **Rossii** Curt. App. Ross' 2d Voyage, p. 67, pl. A, f. 7.

Wings uniform dark reddish brown above and below, somewhat paler below. On the primaries towards apex are two ocellated spots close together which are repeated below.

Expands 2 inches. Arctic Am.

7. **Discoidalis** Kirb. Fauna Bor. Am. IV, p. 298, pl. 3, f. 2, 3.

Body brown. Wings brown: costa spotted with gray; a triangular obscure tawny reddish discoidal stripe from base to posterior margin on primaries. This spot is also on the underside of the primaries, and the wing is tipped with gray. Secondaries beneath distinctly marbled and clouded with gray and whitish.

Expands 1.5 inches. Arctic Am.

8. **Fasciata** Butl. Cat. S.B.M., p. 92, pl. 2, f. 8.

Wings above much as in *discoidalis*. Below the primaries are paler with three darker fasciæ: one basal indistinct; the second broadly median, broadest at costa: the third marginal. Secondaries beneath whitish cinereous with three darker fasciæ: the first basal, confused; the second median, undulating; the third marginal.

Expands 2—2.5 inches. Arctic Am.

9. **Sofia** Streck. Bull. Brookl. Ent. Soc. 3, 35.

Upper surface dark brown. Primaries crossed with a submarginal rusty yellow band, the same color evident in the discoidal cell. Secondaries with a submarginal row of four rust colored spots. Beneath primaries with band repeated but paler. Secondaries also lighter, the spots white.

Expands 1.5 inches. Ft. Churchill, Brit. Am.

VESAGUS Doub. Hew. Gen. Diur. Lep. 380, pl. 64, f. 3, has been catalogued as a N.A. species of *Erebia* and thus stands in Mr. W. H. Edwards' latest catalogue, 1885. But it undoubtedly does not belong to our fauna. In Doub. Hew., where it is figured and named without description, to the name is added, "Rocky Mountains", with an interrogation mark; showing the locality was uncertain. Kirby catalogues it p. 64, l. 36 with the ?. Dr. Morris in his catalogue, p. 10. leaves

the ? out, as does Weidemeyer p. 27, who gives it the locality "U. S.". W. H. Edw. in all his catalogues leaves out the ?, and in the one of 1877 adds to locality "(Prob. Brit. Am.)". All these were made without a personal knowledge of the insect. Strecker in his catalogue, 1878, p. 151, (probably under the suggestion of Hewitson), expresses his conviction that the species is not North American but South American. Kirby, Cat. of the Diur. Lep. in Coll. W. C. Hewitson 1879, p. 130, gives without any expression of doubt, locality "South America". Wether this is based on the previous knowledge of Mr. Hewitson, or on evidence gained by Mr. Butler by new material I do not know; but in view of it, the locality originally surmised must have been an error, and in the present state of the case, the species must be dropped from our lists. No authenticated specimen has ever been taken in North America so far as I can learn.

The most of our species of Erebia have been named on very limited material, not always in the best condition. It is probable a large gathering of material will very greatly modify our present list.

My thanks are given to Dr. H. A. Hagen of Cambridge, and Rev. W. J. Holland of Pittsburgh for very valuable assistance in the above Synopsis.

Notes and News.

STYLOPIDÆ.

The species of this family are very rare indeed in American collections, but seem more common in Europe. In an old number of the "Journal of Microscopy and Natural Science" is an article on the subject from which I quote: "On another occasion saw about 20 flying, but they were so high from the ground he could only capture half a dozen. The little animals are exceedingly graceful in their flight, taking long sweeps as if carried along by a gentle breeze, and occasionall yhovering at a few inches from the ground". They are in Europe parasitic on *Andrena*, which is a very early species, flying in April. The ♂♂ are said to emerge from the pupæ early in the morning—9 to 11 A.M.

Our species, *Xenos Peckii* is parasitic on *Polistes* and I have very often seen the head of the pupa projecting between the segments of the abdomen of our common species. In the "classification" it is stated that the head of the pupa case of the ♂ is convex; that of of the ♀ flat. Specimens of *Polistes* found with a ♂ pupa might be confined with proper food until the parasite emerges. Suppose some of our Collectors turn their attention to *Stylops* this spring! J. B. S.

* * *

Looking over the new edition of the "International Scientist's Directory" we find that out of 4821 names of Scientists from the U. S. and Can. 620 have Entomology specified as one of their studies. Of these, 229 have *Ent.* added as one of several branches in which they are interested. Among these there are a few well known Entomologists, but a large proportion consists of those omnivorous individuals for whom the circle of Sciences seems too small, and who have tacked on all the *ologies* besides numerous other things not ending in ology. 47 are Entomologists pure and unadulterated, apparently without specialty. The remainder express a preference for one or the other of the orders; and the Lepidopterists head the list with 129 devotees—some of them have *Lepid.* only as one of several other pursuits, but have no other specialty in Entomology. The *Coleoptera* follow with a company of 93—while the two orders; *Col.* et *Lep.* are combined by 73 individuals. A weakness for *Hymenoptera* is confessed by 10; for *Diptera* by 6; for *Hemiptera* by 5; for *Neuroptera* by 4, while Mr. Bruner as sole representative of the *Orthoptera* brings up the rear. 14 are interested in several orders. The *Lepidoptera* are combined with the *Diptera* three times; with the *Neuroptera* twice; with the *Orthoptera* once. The *Coleoptera* are combined with the *Hymenoptera* three times; once each with *Hemiptera*, *Orthoptera* and *Diptera*; while one ambitious individual collects; *Coleoptera*, *Lepidoptera* and General Curiosities. These figures are suggestive, and should induce young students to take up some of the neglected orders: there is an immense field for work in them, and "Entomologica" will do all it can to ease the work by presenting introductory synopses of families in all orders. Mr. Bruner, the single *Orthopterist* feels solitary, and to induce others to join him will prepare an outline synopsis of that order for an early No. of this Journal.

* * *

We hear that Dr. Horn has been elected on honorary member of the Entomological Society of France. They have but six honorary members outside of France, and to be ranked as one of them is of itself sufficient testimony of the high standing Dr. Horn has made for himself in the Entomological world. We know of none better deserving such a distinction.

* * *

Apropos of your notice on Water Beetles, I recollect being very much surprised not long since to notice some species, bobbing their heads against the ice (from below be it understood). I could hardly believe my eyes at first, but wherever I found a bit of transparent ice, I could with a little patience notice the insects swimming round below.

* * * C. W. Leng.

This is a good place to call the attention of readers to the fact that No. 3 of this Journal will be sent only to those who have sent in their subscription before that number is issued. We are sorry to make such a provision, but we have not yet been able to find a printer sufficiently interested in the advancement of Entomology to print our paper for less than regular price in "Hard Cash".

Society News.

Brooklyn Entomological Society, April 7th.—Twenty-one members, and one visitor present; the Vice-Pres. Mr. E. L. Graef in the chair. Messrs. A. E. Brunn and W. H. Danby of Brooklyn and Mr. E. M. Aaron of Philadelphia were elected members of the Society. Prof. F. Fillon of Brooklyn was proposed for membership by Mr. Cramer.

Letters from Messrs. A. Sallé, Baron C. R. von Osten-Sacken, and Rev. John G. Morris acknowledging their election as honorary members were read by the Secretary.

Mr. Smith presented his Report as Editor for Vol. VII of the Bulletin.

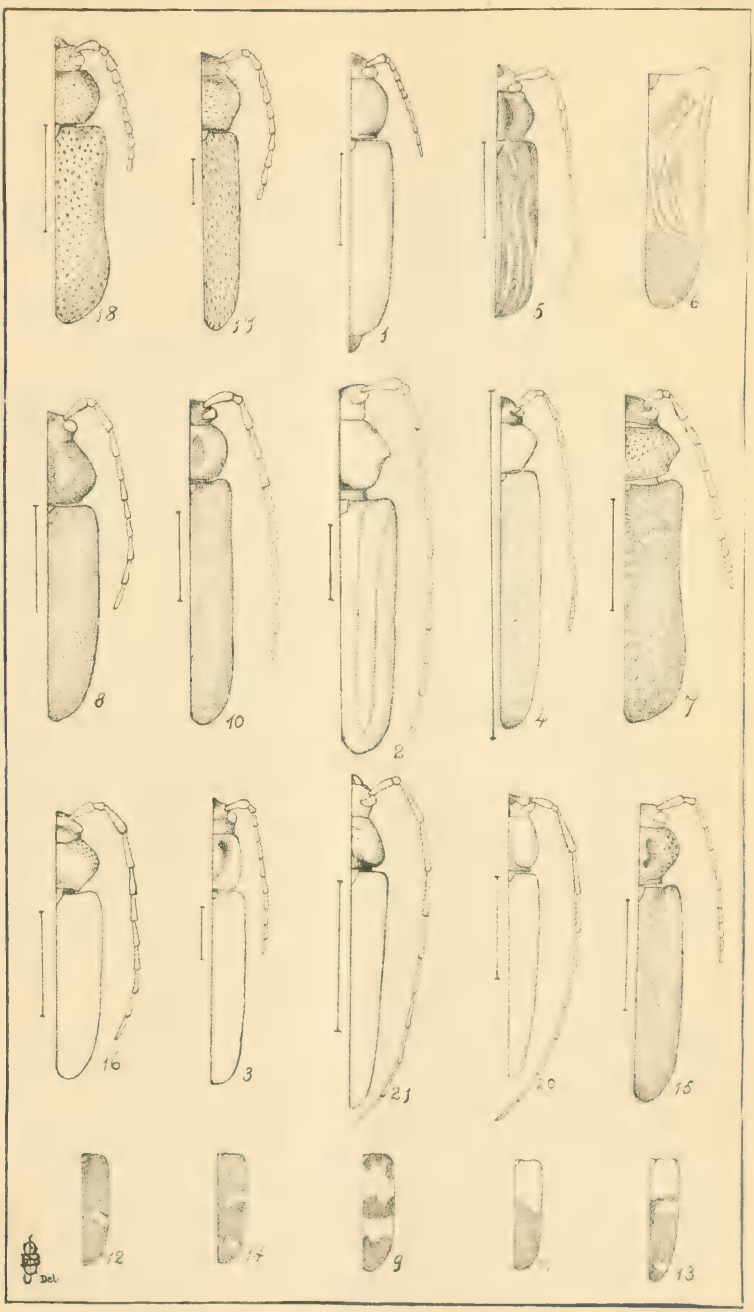
Entire cost of Vol		$325 45
Receipts from sale of back Volumes and subscriptions...	$157 75	
Extra pp. in Nos. 2 & 3. borne by Messrs. Hulst & Smith...	31 00	
Volumes furnished Members	35 00	
Exchanges	73 00	
Deficit, paid by Society	28 70	$325 45

Mr. Hulst called the attention of the members to a collection of *Coenonymphæ*, brought by Mr. Geo. Frank. He said that these specimens added considerable positive knowledge on the subject of the variation of the species. These specimens, undoubtedly *C. ochracea* Edw., varied in color of the upper surface of the wings from a dark brown to a very light buff, the males being darker than the females. There was also a variation in both sexes, some having ocelli, others wanting them. Beneath, there was just as wide variation in the ground color, and in the ocelli. The broken white band on the secondaries was about or quite obsolete in some, in others broad and definite. One specimen had a decidedly reddish brown submarginal band on the hind wings beneath.

The question was asked, "might it not be that these were separate species flying together"?

Mr. Frank said they were taken near St. Paul, Minn. Mostly on the same day in one small locality; that there was a continuous intergradation and that he found some widely differing in markings and color, in coitu.

Mr. Hulst spoke at some length upon the subject of the evening "the effect of external conditions upon Lepidoptera", remarking upon the three influences, temperature, humidity, and food, and took the ground that the most of direct and immediate changes in the appearance of the insect, resulting from these three causes, could be explained on the theory of impaired or redundant vitality. And in the most of cases where the changes did not apparently follow from impaired or redundant vitality, it was only fair, though our knowledge did not give proof, to suppose these were the operating causes. Considerable exception was taken to Mr. Hulst's views, but as the hour of adjournment had arrived, nothing but an expression of dissent could be given. It was especially thought by some, that food had often a direct modifying influence.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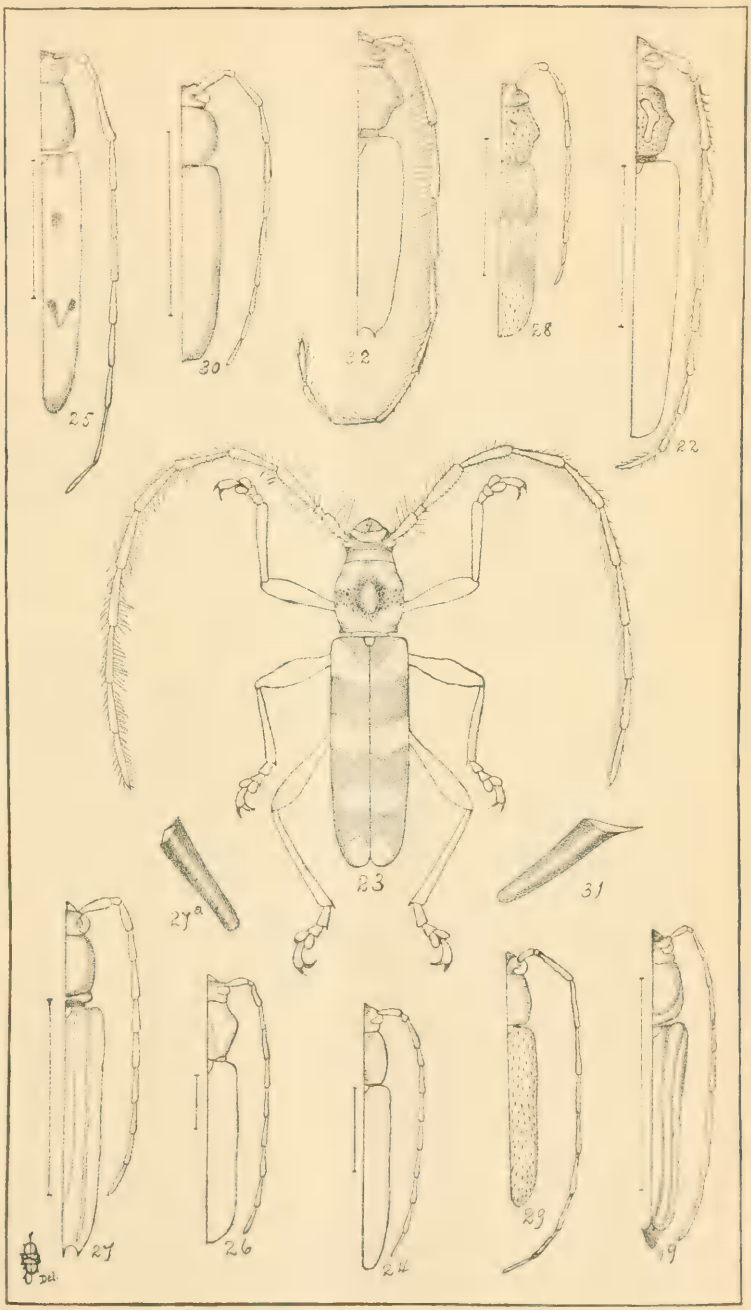
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ENTOMOLOGICA AMERICANA

VOL. I. BROOKLYN, JUNE, 1885. NO. 3.

Record of some Contributions to the Literature of North American Beetles, published in 1883—84.*

By Samuel Henshaw.

In II the first number (in heavy-faced type) refers to the author-list in I.

An examination of II shows that twelve (12) authors have described nine (9) new genera and three-hundred and ninety-five (395) new species.

PART I.

Anthony, A. C.

1 Lebia grandis in Massachusetts.
Quart. Journ. Bost. Zool. Soc. 1883, v. 2, p. 16.

Blanchard, F.

2 Note on the habits of Amphicoma vulpina.
Bull. Bkl. E. S. 1883, v. 5, p. 90.

3 Table of Balaninus Germ.
Bull. Bkl. E. S. 1884, v. 7, p. 106-8.

4 Note on the species of Gaurotes Lec.
Bull. Bkl. E. S. 1884, v. 7, p. 108.

Bowditch, F. C.

5 Notes on the habits of Hydrocharis obtusatus Say and Magdalis olyra Herbst.
Quart. Journ. Bost. Zool. Soc. 1884, v. 3, p. 1—7.

Bowles, G. H.

6 On luminous Insects.
Rept. Ent. Soc. Ontario for 1882. 1883, p. 34, figures.

Casey, T. L.

7 Notes on Coleoptera.
Bull. Bkl. E. S. 1884, v. 7, p. 64–67.

8 Revision of the Cucujidæ of America north of Mexico.
Trans. Am. Ent. Soc. 1884, v. XI, p. 99–112, plates 4–8.

9 Contributions to the descriptive and systematic Coleopterology of North America. Part I.
Phila. 1884, pp. 60, 1 plate.

10 Revision of the Stenini of America north of Mexico.
Phila. 1884, pp. 206, 1 plate.
(*See Science* 1884, *v.* 4, *p.* 561.)

11 (Malformation of Acmæops.)
Science 1884, v. 4, No. 96, p. 5 Bull.

Caulfield, F. B.

12 Remarks on Chrysomela scalaris Lec., Chrysomela labyrinthica Lec. and Physonota unipuncta Say.
Ca. Ent. 1884, v. 16, p, 226—7.

* This brings the Record of American Coleopterology from where it was left in the Bulletin, B.E.S., V, 69 –74 to Jan. 1, 1885. J. B. S.

Chaudoir, Max de.

13 Monographie des Oodides. Part. 2.
Ann. Soc. Ent. France 1882, (1883) ser. 6, v. 2, p. 485—554.

Clarkson, Frederick.

14 The dung pellet makers.
Ca. Ent. 1884, v. 16, p. 18—19.
Origin and limitation of the term Scarabaeus.

15 Prionus brevicornis Fabr.
Ca. Ent. 1884, v. 16, p. 95.
Habitats.

16 Galeruca xanthomelaena Schrank.
Ca. Ent. 1884. v. 16. p. 124—5.
Destructive to elms at Long Island.

Claypole, E. W.

17 The Colorado Potato-Beetle.
Amer. Nat. 1883, v. 17, p. 1174-75.
No second brood in 1883; *scarcity in the Middle States during* 1883. (*See Science* 1883, *v.* 2, *p.* 327.)

Coleman, N.

18 The Colorado Potato-Beetle pupating above the ground.
Quart. Journ. Bost. Zool. Soc. 1883, v. 2, p. 32.

Coquillett, D. W.

19 Descriptions of a few leaf-eating Coleopterous larvæ.
Ca. Ent. 1883, v. 15, p. 21—23.
Brief description of Chrysomela pallida, C. clivicollis, C. multiguttis, C. bigsbyana, C. similis, Lema collaris, Doryphora juncta, and D. 10-lineata.

20 Notes on the early stages of Xylotrechus annosus Say.
Ca. Ent. 1883, v. 15, p. 31—32.

21 Notes on the early stages of Calopteron reticulatum Fabr.
Ca. Ent. 1883, v. 15, p. 97—98.

22 Descriptions of a few Elaterid and allied larvæ.
Ca. Ent. 1883, v. 15, p. 101—2.
Describes Elater nigricollis, Androchirus fuscipes, Athous cucullatus.

23 Notes on the early stages of Lixus macer Leconte.
Ca. Ent. 1883, v. 15, p. 113.

Deveraux, W. L.

24 Coal tar for the Plum weevil.
Ca. Ent. 1883, v. 15, p. 236.
Ineffectual.

25 Weevil versus Curculio.
Ca. Ent. 1884, v. 16, p. 27—29.
Application of the terms.

Dimmock, A. K.

26 Sexual attraction in Prionus.
Psyche, 1884, v. 4, p. 159.

Dimmock, George.

27 Scales of Coleoptera.
Psyche, 1883, v. 4, p. 3—11; 23-27; 43—47; 63—71.
Describes and figures the scales of species of Cicindelidæ, Dermestidæ, Scarabæidæ, Buprestidæ, Elateridæ, Ptinidæ, Cerambycidæ, and Curculionidæ. Literature of the subject. See Science 1883, *v.* 1, *p.* 203; 1884, *v.* 3, *p.* 127—28.

28 Coleoptera.
Stand. Nat. Hist. Bost. 1884, v. 2, p. 297—402, figures.
Popular illustrated account of the order.

Doll, J.

29 (Habits of Dynastes.)
Science, 1884, v. 4. No. 97, p. 6, Bull.

Duges, E.

30 Métamorphoses du Lyctus planicollis Lec.
Ann. Soc. Ent. Belg. 1883, v. 27, p. 54—59, plate.

Duvivier, Antoine.

31 Énumération des Staphylinides décrits depuis la publication du Catalogue de MM. Gemminger & de Harold.
Ann. Soc. Ent. Belg. 1883, v. 27, p. 91—215.

Evans, John D.

32 Remarkable gathering of beetles.
Ca. Ent. 1883. v. 15, p. 237—38.

Forbes, S. A.

33 Insects injurious to the Strawberry.
Trans. Miss. Valley Hort. Soc. 1883, v. 1, p. 50—85.
Describes the habits, early stages

&c. of Lachnosterna sp., Colalpa lanigera, Paria 6-notata, P. aterrima, Otiorhynchus sulcatus and Tyloderma fragariæ.

34 The food relations of the Carabidæ and Coccinellidae.
Bull. Ill. State. Lab. N. H. 1883, No. 6, p. 33–64.
See also Science 1883, *v.* 1, *p.* 317; *Am. Nat.* 1883, *v.* 17, *p.* 417—19.

35 Twelfth Report of the State Entomologist on the noxious and beneficial Insects of the State of Illinois.
Springfield, Illinois, 1883.
Not seen. Gives notes on the Corn-root worm, Diabrotica longicornis and the Strawberry Crown borer, Tyloderma fragariæ. Also remarks on the food relations of predaceous beetles.

36 Thirteenth Report of the State Entomologist on the noxious and beneficial Insects of the State of Illinois.
Springfield, Illinois, 1884.
Includes notes on Diabrotica longicornis injuring Corn and on the following Strawberry pests, Lachnosterna sp., Colalpa lanigera, Allorhina nitida, Scelodonta pubescens (= nebulosus), Paria 6-notata, P. aterrima, Colaspis brunnea, Otiorhynchus sulcatus, Anthonomus musculus and Tyloderma fragariæ. Figures of several of the above are given.

37 On the life-histories and immature stages of three Eumolpini.
Psyche, 1884, v. 4, p. 123–30, pl. 1.
Relates to Colaspis brunnea, Paria aterrima, Scelodonta pubescens (= nebulosus) all of which injure the roots of the Strawberry.

38 On the life-histories and immature stages of three Eumolpini. Corrective Note.
Psyche, 1884, v. 4, p. 167—168.

39 Insects affecting the Strawberry.
Trans. Wisc. State Agr. Soc., v. 21.
Not seen.

French, G. H.

40 Preparatory stages of Epilachna borealis Fabr.
Ca. Ent. 1883, v. 15, p. 189—91.

Fuchs, C.

41 A lost locality.
Bull. Bkl. E. S. 1883, v. 5, p. 81.
Near Brooklyn, N. Y.

Gerstaecker, A.

42 Ueber die Stellung der Gattung Pleocoma Lec. im System der Lamellicornier.
Stett. Ent. Zeit. 1883, Jahrg. 44, p. 436—50.

Godman, F. Ducane & Osbert Salvin.

43 Biologia Centrali-Americana.
London.
Parts 21—34 *Jan.* 1883–*Decemb.* 1884 *contain portions of Adephaga by Bates, Staphylinidæ by Sharp, Malacodermata by Gorham, Phytophaga by Jacoby and Tenebrionidæ by Champion.*

Hagen, H. A.

44 Lawsuits against grubs and grasshoppers.
Science, 1884, v. 4, p. 168—71.
Partial reprint of paper with same title which was first printed in 1881.

45 Chrysomela scalaris.
Ca. Ent. 1884, v. 16, p. 120.
Abundant on elms at Cambridge, Mass. during May.

46 Scolytus rugulosus in branches of Pear-trees, which were killed by Pear-blight.
Ca. Ent. 1884, v. 16, p. 161—63.

47 Note on Chalcographa scalaris Lec.
Ca. Ent. 1884, v. 16, p. 225—26.

48 Note on the habitat of Xyloryctes satyrus.
Ca. Ent. 1884, v. 16, p. 239—40.

Hamilton, John.

49 Observations on Anthrenus varius Fabr., Anthrenus musaeorum Lin., Trogoderma ornata Say, and Sitodrepa panicea Lin.
Ca. Ent. 1883, v. 15, p. 90—93.

50 Notes on a few species of Coleoptera which are confused in many collect-

ions, and on some introduced European species.
Ca. Ent. 1884, v. 16, p. 35—38.

51 The survival of the fittest among certain species of Pterostichus as deduced from their habits.
Ca. Ent. 1884, v. 16, p. 73—77.

52 On Valgus canaliculatus and squamiger, Elleschus bipunctatus, Xyloryctes satyrus.
Ca. Ent. 1884, v. 16, p. 105 8.

53 On Trogoderma ornata, Physonota unipunctata and Tanysphyrus lemnae.
Ca. Ent. 1884, v. 16, p. 133 – 36.

54 Coleoptera in September on Brigantine Beach, N. J., on the Atlantic Coast.
Ca. Ent. 1884, v. 16, p. 186 90.

Hanham, A. W.

55 Entomological Notes.
Ca. Ent. 1884, v. 16, p. 98 - 99.
Notes on a few species eaten by toads.

Harrington, W. H.

56 (Beetles injurious to men.)
Ca. Ent. 1883, v. 15, p. 59—60.
Acmaeops pratensis in the ear, Melanophila longipes biting the neck.

57 (Notes on Beetles.)
Ca. Ent 1883, v. 15, p. 79—80.
Records and habitats of a few species.

58 Variations in markings of Cicindela sex-guttata.
Ca. Ent. 1883, v. 15, p. 239.

59 Chrysomelidae. Leaf-Eaters.
Rept. Ent. Soc. Ontario for 1882, 1883, p. 53—62, figures.

60 Injurious Insects affecting the Hickory. Coleoptera.
Rept. Ent. Soc. Ontario for 1883, 1884, p. 42 –52, figures.

61 List of Ottawa Coleoptera.
Trans. Ottowa Field, Nat. Club, 1884, v. 2, p. 67—85.
Introductory comparing previous Canadian and a few local lists with the present. List of 1003 species included in 524 genera and 67 fam. 110 species are new to Canadian lists. See Science 1884, v. 3, p. 235.

62 (Gathering of beetles.)
Ca. Ent. 1884, v. 16, p 17—18.

63 Additions to Canadian lists of Coleoptera.
Ca. Ent. 1884, v. 16, p. 44 47: 70 to 73; 96—98; 117—19.

Harrington, W. H., James Fletcher and J. B. Tyrrell.

64 Coleoptera.
Trans. Ottawa Field Nat. Club. 1884, v. 2, p. 137—39.
Notes on a number of species.

Hayward, R.

65 A note on Acmæodera culta.
Quart. Journ. Bost. Zool. Soc. 1883, v. 2, p. 56.
On the flowers of Hypoxys erecta.

66 On the sexual characters of Boletotherus bifurcus.
Quart. Journ. Bost. Zool. Soc. 1884, v. 3, p. 16—17.

Hayward, R. and H. Savage.

67 A catalogue of the Coleoptera of the Green Mountains.
Quart. Journ. Bost. Zool. Soc. 1883, v. 2, p. 12—15; 24—29; 36—38.

Hill, F. C.

68 On the antenna of Meloe.
Am. Journ. of Sc. 1883, ser. 3, v. 25, p. 137—38, figures.
Describes the distortion of the male antenna and its use during copulation.

Holland, W. J.

69 (Use of the jaws of the male Eupsalis minuta.)
Bull. Bkl. E. S. 1883, v. 6, p. 46.

Horn, G. H.

70 Synoptic table of Pseudomorpha.
Bull. Bkl. E. S. 1883, v. 6, p. 16.

71 Synoptic table of Tachycellus.
Bull. Bkl. E. S. 1883, v. 6, p. 51-2.

72 The species of Discoderus.
Bull. Bkl. E. S. 1883, v. 6, p. 52-3.

73 Synoptic table of Mallodon.
Bull. Bkl. E. S. 1884, v. 7, p. 9.

74 Notes on Chrysomela.
Ca. Ent. 1884, v. 16, p. 127—29.

Calligrapha multiguttis Stal. = *scalaris Lec.*; *C. multiguttata Stal*, *C. opifera Stal recorded from Arizona*; *C. labyrinthica Lec. Ms.* = *C. pnirsa Stal*; *C. limbaticollis Stal not N. American*; *Doryphora melanothorax Stal recorded from N. Mexico, and Plagiodera floscullosa Stal from California.*

75 Synonymical Notes.
Ca. Ent. 1884, v. 16, p. 147–48.
Possible identity of Lamesis, Westw. and Xenorhipis Lec.; *Cyrtophorus gibbulus Lec.* = *Microclytus gazellula Hald*; *Leptura coccinea Lec.* = *testacea Linn.*, *L. atrata Lec.* = *proxima Kirby.*

76 Miscellaneous notes & short studies of North American Coleoptera.
Trans. Am. Ent. Soc. 1883, v. 10. p. 269–312, plate 9.

77 (Poecilobrium n. g. proposed for species included in Callimus.)
Trans. Am. Ent. Soc. 1883, v. 10, p. 11, Proc.

78 (Method of mounting dissections of the mouth parts of beetles.)
Trans. Am. Ent. Soc. 1883, v. 10, p. 13, Proc.

79 (Outer lobe of maxilla present in the Gyrinidae.)
Trans. Am. Ent. Soc. 1883, v. 10, p. 16, Proc.

80 (Work of Attagenus megatoma in ticking.)
Trans. Am. Ent. Soc. 1883, v. 10, p. 17, Proc.

81 Notes on the species of Anomala inhabiting the United States.
Trans. Am. Ent. Soc. 1884, v. 11, p. 157–64.

82 Synopsis of the United States species of Notoxus and Mecynotarsus.
Trans. Am. Ent. Soc. 1884, v. 11, p. 165–76.

83 Synopsis of the Philonthi of Boreal America.
Trans. Am. Ent. Soc. 1884, v. 11, p. 177–244.

Hubbard, H. G.

84 (Habits of Mallodon melanopus.)
Science 1884, v. 4, No. 96, p. 5, Bull.

Jones, A. W.

85 Notes on the habits of Cicindelidae.
Bull. Bkl. E. S. 1884, v. 7, p. 74–6.

Kellicott, D. S.

86 Psephenus Lecontei, on the external anatomy of the larva.
Ca. Ent. 1883, v. 15, f. 191–98, figs.
See Science, 1883, *v.* 2, *p.* 337.

Kilman, A. H.

87 Phytonomus punctatus Fabricius.
Ca. Ent. 1884, v, 16, p. 144–45.
Abundance in Canada, description and habits.

Lameere, Aug.

88 Addenda et corrigenda a la liste des Cérambycides décrits postérieurement au catalogue de Munich.
Ann. Soc. Ent. Belg. 1883, v. 27, p. 104–5, C. R.

89 Contributions a l'histoire des métamorphoses des Longicornes de la famille des Prionidae.
Not seen.
Describes and figures pupa of Parandra polita Say.

Leconte, J. L.

90 Synoptic table of Stenolophus.
Bull. Bkl. E. S. 1883, v. 6, p. 13–25.

91 Synoptic table of Acupalpus.
Bull. Bkl. E. S. 1883, v. 6, p. 15.

92 Synoptic table of Calathus.
Bull. Bkl. E. S. 1883, v. 6, p. 49.

93 Synoptic table of Agonoderus.
Bull. Bkl. E. S. 1883. v. 6, p. 53–54.

94 Lists of Coleoptera collected in 1881 by Dr. Bell and others in the Lake Superior district and in the Northwest Territories, east of the 112th meridian and south of the 60th parallel.
Geol. and Nat. Hist. Surv. of Ca. Rept. of Progress for 1880-81-82, p. 29c—39c.

Leconte, J. L. & G. H. Horn.

95 Classification of the Coleoptera of North America.

Smithsonian Misc. Coll. 1883, v. 26, pp. 38 and 567.

Leng, C. W.

96 Synopses of Cerambycidae.
Bull. Bkl. E. S. 1884, v. 7, p. 7–11; 57—64; 95—101; 112—16; plate 2.

97 (Notes on a few beetles.)
Bull. Bkl. E. S. 1884, v. 7, p. 76–7.

Lugger, Otto.

98 Spread of the 12-punctured Asparagus beetle.
Am. Nat. 1883, v. 17, p. 199.

99 Food-plants of beetles bred in Maryland.
Psyche, 1884, v. 4, p. 203—4.

100 List of Coleoptera found in the vicinity of Baltimore.
Johns Hopkins Univ. Circ. v, 3, No. 30, p. 78—79.
Not seen.

Matthews, A.

101 On the classification of the Coleoptera of North America by Dr. J. L. Leconte and Dr. G. H. Horn.
Ann. and Mag. N. H. 1883, ser. 5, v. 12, p. 167—72.

102 Synopsis of North American Trichopterygidae.
Trans. Am. Ent. Soc. 1884, v. 11, p. 113—56.

Merriam, C. H.

103 Ravages of a rare Scolytid Beetle in the Sugar Maples of Northeastern New York.
Am. Nat. 1883, v. 17, p. 84–6, figs.
Concerning Corthylus punctatissimus Zimm.

Moffat, J. A.

104 (Notes on Calopteron reticulatum.)
Ca. Ent. 1883, v. 15, p. 179—80.

Osborn, H.

105 The Corn-root worm (Diabrotica longicornis.)
Bull. Iowa, Agric. Coll. Dept. Ent. 1884. No. 2, p. 61—69.

Packard, A. S.

106 Descriptions of the larvæ of injurious forest insects.
Third Rept. U.S. Ent. Comm. 1883 p. 251—62, plates 6—15.
Concerning Buprestidæ and Cerambycidæ.

107 The development of the bark-boring beetles Hylurgops & Xyleborus.
Third Rept. U.S. Ent. Comm. 1883 p. 280—82, plate 22.

108 Mode of oviposition of the common pine borer (Monohammus confusor).
Am. Nat. 1884, v. 18, p. 1149—51.

109 Egg-laying habits of the Maple-tree borer (Glycobius speciosus.)
Am. Nat. 1884, v. 18, p. 1151—52.

Patton, W. H.

110 Sound-producing organs in Anomala, Anthonomus and other Coleoptera.
Psyche, 1884, v. 4, p. 146.

Pergande, T.

111 (Ptinus brunneus bred from rat dung.)
Science, 1884, v. 4, No. 96, p. 5, Bull.

Regimbart, M.

112 Essai monographique de la famille des Gyrinidae.
Ann. Soc. Ent. France 1882, ser. 6, v. 2, p. 379—458, plates 10—12; 1884, ser. 6, v. 3, p. 121—90, plate 6; p. 381—482, plates 11—14.

Reinecke, O.

113 Longevity of beetles.
Bull. Bkl. E. S. 1883, v. 6, f. 36.
Microclytus gazellula alive after immersion in alcohol for several hours.

114 Invasion of Phytonomus opimus, Leconte.
Buffalo Freie Presse, Aug. 12, 1884, Bull. Bkl. E. S. 1884, v. 7, p. 76.

Reitter, Edw.

115 Platypsylla castoris Rits., als Vertreter einer neuen europaeischen Coleopteren-Familie.
Wien. Ent. Zeit. Jahrg. 3, p. 19–21.
Not seen.

Rey, Cl.

116 Description de la larve de l'Anthicus floralis.
Ann. Soc. Linn. Lyon. 1883, new ser. v. 29, p. 141—42.

Ricksecker, L. E.

117 On the occurrence of Amphicoma.
Bull. Bkl. E. S. 1883, v. 5, p. 83.
Flying over sand dunes near San Francisco.

Riley, C. V.

118 On a gall-making genus of Apioninae.
Bull. Bkl. E. S. 1883, v. 6, p. 61—2.

119 Food habits of Megilla maculata.
Am Nat. 1883, v. 17, p. 322—23.

120 Damage to silverplate by insects (Niptus hololeptus).
Am. Nat. 1883, v. 17, p. 420.

121 Number of moults and length of larval life as influenced by food.
Am. Nat. 1883, v. 17, p. 547—48.
Observations upon Tenebrio molitor, T. obscurus and Trogoderma tarsale.

122 Insects affecting stored Rice.
Am. Nat. 1883, v. 17, p. 790.
Mentions several beetles.

123 Hypermetamorphoses of the Meloidae.
Am. Nat. 1883, v. 17, p. 790—91.
Revision of the nomenclature of the larval forms.

124 Enemies of the Egg-plant.
Am. Nat. 1883, v. 17, p. 1070.
Mentions Cassida texana, Doryphora juncta.

125 Habits of Murmidius.
Am. Nat. 1883, v. 17, p. 1071.
Lives in old rice and straw; spins a cocoon; names several cocoon-spinning beetles.

126 Cantharis Nuttalli injuring wheat.
Am. Nat. 1883, v. 17, p. 1174.

127 Hymenorus rufipes as a myrmecophilus species.
Am. Nat. 1883, v. 17, p. 1176.
In nests of Formica fusca.

128 Report of the Entomologist.
Rept. Comm. Agric. 1883, p. 99 to 180.
Pages 159—70, *plate* 12, *fig.* 3, *give descriptions and figures of all stages of Galeruca xanthomelæna; also remedial recommendations.*

129 Hitherto unknown mode of oviposition in the Carabidae.
Science, 1884, v. 4, p. 342.
Chlænius impunctifrons traced from egg to beetle.

130 The insects of the year.
Science, 1884, v. 4, p. 565 –68.
The seasonal occurrence of insects.

Riley, C. V. & H. G. Hubbard.

131 (Habitats of Mezium.)
Science, 1884, v. 4, No. 96. p. 5, Bull.

Roberts, C. H.

132 (Notes on beetles.)
Bull. Bkl. E. S. 1884, v. 7, p. 77–9.

Saunders, William.

133 Insects injurious to the White Pine Pinus strobus.
Rept. Ent. Soc. Ontario, for 1883, 1884, p. 52—59.
Several beetles are reported upon.

Saunders, W. E.

134 Insects injurious to drugs.
Ca. Ent. 1883, v. 15, p. 81—83.
Rept. Ent. Soc. Ontario for 1883, 1884. p. 29—30.
Mentions six beetles.

Schaupp, F. G.

135 On the occurrence of Amphicoma (lupina).
Bull. Bkl. E. S. 1883, v. 5, p. 83.
Flying over the sand at Coney Island, New York.

136 Hints for raising Coleopterous larvae.
Bull. Bkl. E. S. 1883, v. 6, p. 11; 16—19.

137 List of Carabidae, found in the neighborhood of New York City.
Bull. Bkl. E. S. 1883, v. 6, p. 29 to 32; 71—72.
Annotated list of about 214 *species.*

138 Sea-shore collecting.
Bull. Bkl. E. S. 1883, v. 6, p. 36.
Notes on a few Carabidæ.

139 Synoptic table of Bradycellus.
Bull. Bkl. E. S. 1883, v. 6, p. 50.

140 Larva of Galerucella sagittariae Gyll.
Bull. Bkl. E. S. 1883, v. 6, p. 54.

141 The species of Cicindelidae.
Bull. Bkl. E. S. 1883, v. 6, p. 73 to 108, plates.

142 Remarks and descriptions of new species (of Cicindelidae).
Bull. Bkl. E. S. 1884, v. 6, p. 121 to 124, figures.

Schwarz, E. A.

143 Insects affecting drugs.
Ca. Ent. 1883, v. 15, p. 140; Rept. Ent. Soc. Ontario for 1883, 1884, p. 30.
Adds Lasioderma serricorne and Cryphalus jalappæ to the list given by W. E. Saunders.

144 Injury done by Colaspis tristis.
Am. Nat. 1883, v. 17, p. 978.
Destruction of the terminal shoots of the pear and peach.

145 Coleoptera infesting Prickly Ash.
Am. Nat. 1883, v. 17, p. 1288—9.

146 Habits of Blaps and Embaphion.
Am. Nat. 1884, v. 18, p. 76.

147 Carabidae confined to single plants.
Bull. Bkl. E. S. 1884, v. 6, p. 135-6.
Morio monilicornis and ? Psydrus piceus under pine bark, Dromius atriceps in stems of grass and Onota floridana between leaf-ribs of Cabbage palmetto.

148 Notes on the food-habits of some N.A. Rhynchophora.
Bull. Bkl. E. S. 1884, v. 7, p. 84-5.

Sharp, D.

149 Revision of the species included in the genus Tropisternus (fam. Hydrophilidae.
Trans. Ent. Soc. London, 1883, p. 91—117.

Shufeldt, R. W.

150 Observations upon a collection of Insects made in the vicinity of New Orleans, La., during the years 1882 and 1883.
Proc. U.S. Nat. Mus. 1884, v. 7, p. 331—38.
List of species, copy from Riley of notes and figures of a luminous larva.

Smith, J. B.

151 New Mordellidae and Notes.
Bull. Bkl. E. S. 1883, v. 5, p. 80-1.

152 Mordellidae, Notes & Descriptions.
Bull. Bkl. E. S. 1883, v. 6, p. 3—5.

153 Synopsis of the Apioninae of North America.
Trans. Am. Ent. Soc. 1884, v. 11, p. 41—68, plate 3.

Snow, F. H.

154 Additions to the list of Kansas Coleoptera in 1881 and 1882.
Trans. Kans. Acad. v. 8, p. 58.
Not seen.

155 Trogoderma tarsale as a Museum pest.
Am. Nat. 1883, v. 17, p. 199, (from Psyche v. 3).

Stejneger, L.

156 Contributions to the history of the Commander Island.
Proc. U.S. Nat. Mus. 1883, v. 6, p. 58—89.
A few families and genera are mentioned.

Stone, George H.

157 Epilachna corrupta as an injurious insect.
Am. Nat. 1883, v. 17, p. 198—99.
Feeding on blackwax beans.

Townsend, C. H. T.

158 On the variation of the elytral markings in Cicindela sexguttata.
Ca. Ent. 1883, v. 15, p. 205—8.

159 Further remarks upon the variation of the elytral markings in Cicindela sexguttata.
Ca. Ent. 1884, v. 16, p. 125—27.

160 The proportion of the sexes in Cicindela vulgaris Say and other notes on the species.
Ca. Ent. 1884, v. 16, p. 227—31.

161 Note on the inequality of the elytra in Alaus oculatus.
Ca. Ent. 1884, v. 16, p. 238—39.

Troop, James.

162 Strawberry Pests.
Science, 1884, v. 4, No. 91, p. 6, Bull.
Notes on Tyloderma fragariæ and Otiorhynchus ligneus.

Van Wagenen, G. H.

163 (Abundance of Galeruca xanthomelaenae in New York;
Ca. Ent. 1883, v. 15, p. 160.

Williston, S. W.

164 Protective secretions of a species of Eleodes.
Psyche, 1884, v. 4, p. 168—69.

(To be continued.)

New species of Californian Moths

By Henry Edwards.

FAM. ÆGERIADAE.

Pyrrhotaenia Elda, n. sp. (?)

Closely allied to *P. helianthi*, *P. fragariæ* and *P. Behrensii*. The forewings are bright bluish green, with the internal margin fiery copper red, this color being broadest at the base, ceasing before reaching the interior angle. The lower wings are fiery copper red, the fringes of both pairs golden purple. Front, pectus, palpi, sides of thorax and abdomen, caudal tuft, three posterior segments of abdomen, fore femora, and all the tibiæ fiery copper red. Both pairs of wings are quite opaque. Beneath there is on secondaries a black discal spot, and the upper wings are coppery red with a purple flush, and purplish toward the posterior half.

It is by no means unlikely that this is the ♀ of *P. Behrensii*, the lower wings of which are transparent, and should this prove to be the case it may also be concluded that *P. helianthi* with opaque wings is the ♀ of *P. fragariæ*, in which the wings are transparent. The fact of the different disposition of the abdominal band is against this conclusion, but a careful study of the group has convinced me that the sexes differ considerably, and in *P. animosa* Hy. Edw., described in Papilio, Vol. 3, p. 156, they are distinguished by the character referred to, the lower wings of the ♂ being transparent, while those of the ♀ are opaque. In other of the genera this peculiarity appears, especially so in *Sannina exitiosa* Walk., and in *Fotua denudata* Harr., and I shrewdly suspect that *Melittia* (*Sesia*) *grande* Streck. will prove to be the ♂ of *M. gloriosa* Hy. Edw. I have seen none but ♂♂ of the former of these species and none but ♀♀ of the latter. But further observation is needed, and we may have some time to wait for definite conclusions as the insects are remarkably rare. *P. Elda* is the size of *P. Behrensii* (20 mm.) and is described from 2 ♀ taken in Siskiyou Co., California, by Mr. James Behrens.

FAM. BOMBYCIDAE.

Nadata Behrensii, n. sp.

Paler in color than either *N. gibbosa* or *N. Doubledayi*, the markings therefore standing out in bolder relief. The apex of the primaries greatly produced and the scalloped margins strongly defined. The anterior line is more bent in on the costa towards the base, thus leaving a much wider space between it and the posterior line than in either of the other two species. The white discal spots are ovate in shape, not round as in *N. gibbosa*, and they are surmounted by a very conspicuous dusky shade. The secondaries have a well defined median band, which in the ♂ is paler than the ground color of the wing, but in the ♀ somewhat darker. The underside is very pale buff, almost sordid white, a reddish shade on apex of primaries, and a pale brown median band common to both wings. Antennæ tawny. Thorax, legs, abdomen and palpi all sordid white, the latter without black tips.

Exp. wings ♂ 45 mm:, ♀ 52 mm. Length of body 24 mm., ♀ 26 mm. 1 ♂ Butte Co., Cal. (R. H. Stretch). 1 ♀ Siskiyou Co., (J. Behrens).

FAM. NOCTUIDAE.

Catocala Andromache, n. sp.

Allied to *C. Desdemona* Hy. Edw. (Papilio, Vol. 2, p. 15) but much smaller, and with confused and indistinct markings to the upper wings. Their color is greenish drab, the lines all with darker shadings above and below them, and more regular in their outline than in *C. Desdemona*. The basal half-line is almost obsolete, the t-a much produced outwardly in the middle, while the t-p has a strong tooth outwardly on the third subcostal vein. Reniform and subreniform almost lost in the speckled surface of the median space. Secondaries dull orange, dusky at base and along the abdominal margin. Median band as in *C. Desdemona*, widest in the centre, and sharply produced into a hook, which reaches the abdominal edge. Marginal band white at the apex, narrowing suddenly in the center, and abruptly and broadly cut by the orange field leaving an ovate black spot at the anal angle. Underside dull orange, the primaries bearing a broad black median band, the apex also being broadly black. In the specimen before me, the marginal band is divided by an orange dash as it approaches the internal angle. Band of secondaries as on upper side.

Exp. wings 44 mm. Length of body 20 mm.

1 ♂ near San Bernardino, Cal. Collection of J. Akhurst.

No other yellow winged Catocala is known to me from California except *C. Zoe* Behr., which belongs to another section of the genus.

FAM. GEOMETRIDAE.

Triphosa pustularia, n. sp. (?)

In this singular form the primaries are blackish brown, with the posterior margins, a square patch in the middle of the dark posterior space, and three or four large patches on the costa, pale fawn color. These marks are in very strong contrast with the ground shade. The secondaries are also pale fawn color, with the lines dark brown, and the abdomen is brown with fawn colored band. Underside with reddish tint, strongly marked discal spot, and the lines all rather indistinct.

Exp. wings 45 mm. Length of body 18 mm.

1 ♂, 1 ♀. Summit, Sierra Nevada, (Hy. Edw.). 1 ♂ British Columbia, (J. J. Rivers). 1 ♀ Soda Spring, Shasta Co., (J. Behrens).

This may possibly prove to be an extreme variety of the well known *T. dubitata*, but it is so distinct in its markings as to deserve at least a varietal name.

Triphosa badiaria, n. sp.

Ground color of both wings bright yellowish brown, with the lines, bands and discal spot of a very dark brown shade. The median dark band is of almost equal width throughout, and only slightly dentate on its edges. The base and costa are also dark brown. Above the posterior margin, which is black, are some brown lunules, the same ornamentation being carried around the margin of the secondaries, which are dusky for their basal half. Underside dull fawn brown, discal spots very distinct, but the lines only faintly marked. Thorax and abdomen yellowish brown.

Exp. wings 40 mm. Length of body 16 mm.

1 ♀. Shasta Co., Cal., (Hy. Edw.).

Certainly a distinct species, which cannot, I think, be at all referred to any known form.

A note on Scotocryptus.

By George H. Horn, M.D.

The above genus was indicated by Girard (Ann. Ent. Soc. Fr. 1874, p. 574) for a blind *Silphide* but was not sufficiently described to enable me to place it with certainty in my tables of genera. Recently Dr. Sharp has received a second species and realizing the difficulty above alluded to deals more fully with the generic characters (Comptes-rendus. Soc. Ent. Belg. Feb. 1885).

The anterior coxæ are transverse and moderately prominent and their cavities enclosed by the meeting of the epimera and prosternum. By the system suggested by me these characters place the genus in the *Anisotomini* as indicated in my Revision (Trans. Am. Ent. Soc. 1880, p. 319) and with the help of Dr. Sharp's notes its place seems immediately after *Agaricophagus* and before instead of after *Liodes*. The absence of eyes is otherwise unknown to me in the *Anisotomini* and it would be interesting to know whether the posterior coxæ are separated as is often the case in blind insects, although no mention of this is made either by Sharp or Girard and the very poor figure given by the latter seems to indicate that they are contiguous.

The tarsi on all the feet are three-jointed. To this character Dr. Sharp attributes considerable value and makes it the sole groundwork for the separation of a tribe which he places between the *Anisotomini* and *Cholevini*. From my own studies this numerical reduction of the several joints is only another step in the direction so plainly indicated in the genera already known. In order that the idea may be more readily grasped the genera may be disposed in the following order, the numbers referring to the tarsal joints:

Triarthron	5—5—5,	♂ ♀.	
Stereus	5—5—5,	♂ ♀.	
Hydnobius	5—5—5,	♂ ♀.	
Dietta	5—5—5.	♂ ?.	
Anogdus	5—5—4,	♂ ♀.	
Anisotoma	5—5—4,	♂ ♀.	
Colenis	5—5—4,	♂ ♀.	
Cyrtusa	5—5—4,	♂ ♀.	
Isoplastus	5—5—4,	♂.	
	5—4—4,	♀.	
Liodes	5—5—4,	♂.	
	5—4—4.	♀.	
Amphicyllis	5—5—4,	♂.	
	5—4—4.	♀.	
Agathidium	5—5—4,	♂.	
	5—4—4.	♀.	
	4—4—4.	♀.	
Agaricophagus	4—3—3,	♂ ♀.	
Aglyptus	4—3—3,	♂ ♀.	
	3—3—3,	♀.	
Scotocryptus	3—3—3.	♂ ♀.	

In a study of the above arrangement it will be seen that *Scotocryptus* follows naturally the course indicated by the genera which precede it. In order that the numerical combinations shall be complete several new

genera will have to be discovered, and the missing genera may be hypothetically indicated as far as the tarsal structure by any one whose inclinations run that way.

In the tribe *Clambini* the tarsi are 4–4–4 in both sexes in the three genera known to me.

The antennæ of the *Anisotomini* exhibit a somewhat similar tendency to numerical modifications: first, by having nine or ten joints; second, by the variation of the number of joints composing the club, being either three, four or five.

In view of the facts above presented I cannot adopt the course of Dr. Sharp in separating *Scotocryptus* as a distinct tribe based on the number of tarsal joints, while the absence of eyes is but rarely of generic value and in some instances merely sexual.

SYNONYMICAL NOTES.

My attention has been called by Mr. S. Henshaw to the omission of the following species from my list of those described by Mr. Newman. GEORGE H. HORN.

Catogenus puncticollis, Ann. Mag. N. H., 1839, p. 399 = C. rufus Fabr.
Endomychus perpulcher, Ent. Mag. V, p. 390 = Mycetina perpulchra Newm.
Schizotus cervicalis, Ent. Mag. V, p. 374.
Cicindela ventralis, Ent. Mag. V, p. 414.

The species is not recognizably described, the name is preoccupied and should be dropped.

A. A. A. S.

The next meeting of the American Association for the Advancement of Science will be held at Ann Arbor, Mich., commencing August 26th, 1885. The Entomological Club will meet at that place on August 25th according to its by-laws: exact locality not yet determined.

Will those members of the Club, or other Entomologists who expect to be present, please notify one of the undersigned, and also send in the title of any papers they expect to read, and the length of time they expect to occupy, so that a programme can be arranged. The exact place and hour of meeting, as well as the programme so far as fixed, will be published later.

Chairman: John B. Smith, Brooklyn, N.Y.
Herbert Osborn, Ames, Iowa.
B. Pickman Mann, Washington, D.C.
Committee.

On the identity of Cyaniris ladon of Cramer with C. pseudargiolus of Boisduval and Leconte.

By Arthur G. Butler, F.L.S., F.Z.S.L.

In the third volume of his "Description de Papillons exotiques", pl. cclxx, d, e; Cramer figures a blue *Lycænid* under the name of *Papilio ladon*; in his text p. 141 he says—"*On l' a trouve* au Cap de bon Espérance".

In his Encyclopédie Méthodique, vol. ix, p. 678, Godart describes the species and repeats Cramer's locality.

Mr. Trimen, "Rhopalocera Africæ Australis" p. 252, again describes the species but says at the end of his description—"The only example I have seen is the ♂ specimen in the British Museum".

The specimen mentioned by Trimen bears a label referring to the Old Museum Register in which I find *P. Ladon* Cram. a. S. Africa?, the locality having evidently been assumed from the fact that Cramer gives Cape of Good Hope as the habitat of the species.

The specimen described by Mr. Trimen is the form of *C. pseudargiolus* to which Mr. W. H. Edwards has given the name of *Lycæna marginata*; it does not wholly agree with Cramer's figure, the latter being represented by a form nearer to the *Lycæna violacea* of Edwards and differing from *L. marginata* in the absence of the brown marginal suffusion only; a series of this—the typical form of *C. ladon*—was in the 'Zeller' collection labelled as *Lycæna lucia*; two specimens of typical *L. lucia* stood with the series, which was obtained from Maine, U.S.A.

The date of publication of Cramer's species is 1782, that of the description of *pseudargiolus* is 1833; so that there can be no question as to the priority of the name *C. ladon*, the only pity is that M. Boisduval should have failed to recognize the species owing to the false locality given by Cramer.

Notes and News.

In No. 1, Vol. VIII of the Journal of the Cincinnati Soc. of Nat. Hist. p. 49 is a translation of an article from the "Bulletin de la Societe Geologique de France" 3me series, Vol. XII, p. 676, *et seq.*, entitled "On the tracks of Insects resembling the impression of plants'. In it are described the tracks or tunnels made by a species of mole cricket just under the surface of a clay soil, and the superficial resemblance of these elevations to stems of certain species of plants is pointed out. It is suggested that if by any chance such a track were preserved in, or impressed on sandstone, it might very easily be mistaken for a fossil *Brachy-*

phyllum or *Phymatoderma*. The article is of great interest, presenting another difficulty to the student of fossil remains.

* * *

Mr. L. O. Howard writes us that during the month of December enormous numbers of the great water-bug—*Belostoma grandis*—were attracted to the electric lights in New Orleans. In the late evening the pavements along Canal Street were seen almost swarming with disabled specimens of this insect, and many thousands were destroyed by being crushed under foot. He states that he was well aware of the readiness with which this species is attracted by light, but was hardly prepared for such a scene as this. The large water beetle—*Cybister fimbriolatus*—was also attracted with the Belostoma, but in smaller numbers.

* * *

Dr. Hagen informs us that the Collection of Lepidoptera heretofore at the Peabody Museum, Salem, Mass., is now in his charge at Cambridge. The move is a good, and very necessary one. The collection contains many of Dr. Packard's and some of Mr. Morrison's types, and was slowly going to dust and *Anthrenus* when last we saw it.

* * *

Lt. Casey has also donated his collection to the Museum at Cambridge. Having been ordered to California on military duty he was unable to take the collection with him and thus disposed of it. With Coleoptera, the Museum is now fairly well supplied.

* * *

The American Entomological Society has appointed Mr. S. F. Aaron its curator for the balance of the year, at a salary. This is a timely action, for the collections of that Society are too valuable to be allowed to go to ruin. It will be a comfort also for visitors and students to find some one that knows which family of *Lepidoptera* is concealed in the boxes marked *Hymenoptera* etc.

* * *

We understand that Prof. Baird, Director of the U.S. National Museum has decided to appoint an assistant Curator of the Department of Insects in that Museum, at a salary of $1500 per annum, and that Prof. Riley the Honorary Curator, in view of the fact that this action will secure the permanent care of collections, in case of his death or removal from Washington, has decided to turn over to the Museum all his own collections, the larger part of which are already deposited in the Museum. Also that increased attention will be given this Department after July first. Prof. Riley is now looking for a competent man to take the place and will be glad to receive applications.

* * *

It may be of some interest to learn how much of a collection the National Museum can at present boast of From data kindly furnished by Prof. Riley, the following has been compiled.

1st: Collection, C. V. Riley, 17,725 species with 115,058 specimens, divided as follows: Hymenoptera 2,550 species, 24,796 spec.; Coleoptera 9,058 species, 48,618 spec.; Diptera 699 species, 5,646 spec.; Lepidoptera 2,368 species, 17,098 spec.; Hemiptera 1,134 species, 8,862 spec.; Orthoptera 560 species, 6,903 spec.; Neuroptera 160 species, 868 spec.; Arachnidæ and Myriapoda 110 species, 425 spec.; Galls and Gall insects 734 species, 4,152 specimens; the balance miscellaneus and Insect Architecture.

There is also an alcoholic collection, principally of adolescent states, containing 2,850 vials, and a collection of some 3000 slides of minute insects and larvæ mounted in Canada Balsam.

2nd: Collection of Department of Agriculture. Containing a large lot of material accumulated in the practical work of the division, and by the collections of its employees. It contains about 5000 species—mostly exotic—not in the Riley collection.

3rd: Collection of the National Museum. This is the poorest of the lot, and consists principally of the material sent in during the past three years from all sources. There are about 2000 species not in either of the other collections.

4th: The exhibit collection of Economic Entomology prepared for the New Orleans Exhibition, valuable for its economical interest. A catalogue of this has been printed.

This forms a good nucleus, and in charge of a competent and enterprising curator it will quickly take rank as one of the most important in the country. The large collection of larvæ forms a distinct and decided addition to its value.

* * *

In the Proc. Ac. N. Sc. 1885, p. 24, Mr. Strecker describes a new *Colias* (*elis*), from the Rocky Mts. on the boundary between the U. S. and British America. Mr. Strecker says: "It is an act of temerity to describe a Colias as new under any circumstances in these days, and doubly so to describe it from examples of the female sex alone, yet I have no apprehension that the above insect will not stand as a valid species."

Mr. Strecker is usually not much of a splitter, and it is somewhat curious that he should feel so positive of his new species, while Mr. W. H. Edwards, who has been strongly suspected of a leaning to numerous species, contends that it is nothing but a slight variation of a well known western form—*Meadii* I believe. It will be something new to find Mr. Edwards trying to prove species identical.

* * *

Mr. Strecker also (loc. cit. p. 26) describes a specimen of *Cecropia* with an extra primary, or rather the rudiment of one. Rather an interesting and rare monstrosity!

* * *

In the May No. of the "Correspondenzblatt des Entomologischen Vereins 'Iris' zu Dresden", Mr. J. Röber describes a similar monstrosity of *Limenitis populi*; the specimen is a ♂, and has besides four normally complete wings an additional left secondary, equal to a fragment containing the first three veins.

*

Mr. Hulbert writes us from New Britain Conn. that *Antho haris genutia* is not uncommon near that place on rocky hills. It flies with a jerky motion, which renders it easily distinguishable from *Pieris rapæ* with which its white color might cause it to be confounded.

* * *

Lt. T. L. Casey in his new location is not idle—he has sent us some "Miscellaneous Notes", from which we cull the following:

The description of a somewhat singular deformity may be of some interest. The specimen is one of a large series and of a species of Eleodes, very common about San Francisco; it is remarkably uniform in sculpture, being very smooth and polished with minute and sparse punctuation. In this specimen, however, the left elytron is entirely covered with a regular series of small closely placed costæ which are confusedly and conspicuously though minutely rugulose, and separated by well-marked striæ; the right elytron is of the normal smoothness. The contrast between the two is so great that it almost seems as if the left elytron had been removed and another of exactly the same form but of a roughly sculptured species had been substituted.

I cannot account for this eccentricity except possibly that in bygone ages the species was roughly sculptured, and that by reason of comparatively recent changes of condition and modification of surroundings it has become smooth. The phenomenon could then be considered to be the result of an effort on the part of nature to bring to light its pristine features, in the same manner as in the human species, where as is well known, characteristics of ancestors long since passed away, frequently re-assert themselves in the children of after generations.

Involuntary Movement after Death.

A chicken jumping spasmodically about after its head has been severed and after actual death has taken place is a familiar sight to most of us. These movements are simply the result of involuntary contract-

ions and relaxations of the muscles, and are analogous to a phenomenon which I have noticed in beetles, but of course on a much more extended scale. On several occasions while examining minute Staphylinidæ which had been dead thirty hours or more, with ordinary powers of the microscope, I was surprised to find a feeble motion in the outer joints of the antennæ. This motion was a gentle and irregular waving to and fro, the base of the organ being perfectly rigid, and reminding me of similar twistings often to be observed in the tip of a cat's tail when the base of that appendage is entirely motionless. These movements have undoubtedly been noticed and recorded before, and they are simply mentioned here because it may be supposed that so small and slender an insect, having been in alcohol for twelve hours and gummed for about the same or longer period subsequently, would have become so dry and rigid as to prevent any such movement.

I was very careful to see that no draughts or other disturbing causes could give rise to this singular action. T. L. C.

* * *

In our next number we shall commence a very interesting article on "Bees and other hording insects; their specialization into females, males and workers". For the Lepidopterists, who may perhaps think their interests rather neglected thus far, we have a supply of literature, which we shall present at an early date.

Book Notices.

Report of the Entomologist, Charles V. Riley, M. A., Ph. D., for the year 1884. Washington, Govt. Printing Office, 1885. From the Report of the Dept. of Agriculture for 1884, pp. 285—418 and plates I to X.

The public is accustomed to careful and valuable Reports from Prof. Riley, and this is not behind the others. As usual, a number of new species of economic interest are described and illustrated and the life historjes of quite a number are worked out. Cabbage insects are prominently treated of and the life history of several Noctuid species is given. Reports on special subjects studied by field agents during the summer of 1884 occupy a portion of the Report and treat of pests that for some reason have attracted unusual attention. Ten plates illustrate the insects treated of and their life habits, and still further enhance the value of the Report.

"**Descriptions of North American Chalcididæ** from the collections of the U.S. Department of Agriculture, and of Dr. C. V. Riley, with Biological Notes. Together with a list of the described North American Species of the Family, by L. O. Howard, M. Sc., Assistant, Bureau of Entomology."

This paper is issued as Bulletin No. 5 of the Bureau of Entomology and its scope is sufficiently set forth in its title. Mr. Howard has for some time past made a special study of the parasitic Hymenoptera, and we are pleased to see some of the results of his patient and persistent labor. Six sub-families are embraced in the present paper. All the genera and a large number of new species are described. The paper is a valuable addition to the literature of this most interesting order.

Catalogue of the Exhibit of Economic Entomology at the World's Industrial and Cotton Centennial Exposition, New Orleans 1884—85. Washington, (Dept. of Agriculture) 1884, pp. 1—95.

Boletin de la Academia Nacional de Ciencias en Cordoba (Republico Argentina) Tome VII, Entraga 1, 2 et 3. Buenos Aires 1884, pp. 1—392. [All occupied by an article on the Staphylindæ of Buenos Aires, by Félix Lynch Arribálzaga].

Contributions to the Descriptive and Systematic Coleopterology of North America. Part II. By Thos. L. Casey, Lieut. of Eng'rs, U. S. A. Philadelphia, December 1884. pp. 61—198.

Mr Casey has here given us a pamphlet, for which, with the best possible intentions, it is impossible to say a word of praise. He describes 93 new species, several of them in genera that have not yet been worked up. Thus there are several new species of *Bembidium*, or as Mr. Casey calls it "*Bembidion*"; a new *Tachys* which it takes over a page of brevier type to describe, which is two millimeters long, and is unique. Such descriptions are aggravating, for their minuteness of detail, and after all they amount to nothing but additional names for the lists.

There are also three new species of *Cratacanthus* based on color and proportion of parts. This, in our opinion is unwarranted; *dubius* is an exceedingly variable form, and every species described by Mr. Casey is represented in our series.

Mr. Casey in his introductory remarks, stated that he used a binocular microscope with mechanical universal-jointed stage clip for holding the pin. This as we can testify from personal inspection is a fine instrument, but the great difficulty is that it exaggerates unimportant characters—every individual has peculiarities, in which it differs from other individuals of the same species, and Mr. Casey's careful descriptions are individual, and not characteristic of species. Mr. Casey entirely fails to make any allowance for variation. His illustration in reference to astronomical minutness of detail is totally inapplicable. This science has for its aim the discovery of the *laws* regulating stellar motions. These laws are immutable—there is no allowance to make for variations; while in the Coleoptera there are scarcely two specimens exactly alike.

We think a great deal of Mr. Casey, and believe him to be a close observer, a careful and conscientious student, and able to take a high rank as a coleopterist; nevertheless, or for that very reason, we are very sorry to receive such a paper from him It is an obstacle, rather than an aid to students, and we think that some day Mr. Casey will say of this as Dr. Leconte did of one of his early papers—I quote from memory—"One of the crude results of my earlier studies was a monograph of the genus *Pasimachus*, where, being then inexperienced in the recognition of species, individual characters were given a value which subsequent studies and material proved they did not possess". He adds that he should have considered it a favor, had the manuscript been returned to him for revision or declined. J. B. S.

Revised Catalogue of the Diurnal Lepidoptera of America, North of Mexico, by W. H. Edwards. Trans. Am. Ent. Soc. XI, 1884, pp. 94, [Issued February 18th, 1885].

This brings the list of species to the beginning of 1885. A notable feature is an index to genera and species, but altogether the work is hardly an improvement over the previous edition. Of course Mr. Edwards allows none of the conclusions of recent writers on butterflies to influence him in his estimation of species.

Notes on the Systematic Position of some North American Lepidoptera, by John B. Smith. Trans. Am. Ent. Soc. XII, pp. 77—84, pl. III. [February 1885].

Discusses the genera classed as *Zygænidæ* in the lists.

On the North American Asilidæ (Part II). By S. W. Williston, M.D., Trans. Am. Ent. Soc. XII, pp. 53—76, (January 1885).

Contains synopses of *Liphria*, *Mallophora*, *Promachus*, *Erax*, and *Proctacanthus*. Dr. Williston here continues his monographic work, and there is now no reason, why, in the families thus classified, students should not be able to collect and arrange intelligently.

Society News.

Brooklyn Entomological Society. May 5th, 1885. Twenty-one members present, Mr. Cramer in the chair. The Secretary reported the correspondence with the President of the Agassiz Association, and submitted a proposition for a course of Introductory Lessons to be prepared by Members of the Society. It was resolved that the annual excursion of the Society be to Passaic Falls, Patterson, N. J., on May 30, 1885, and Mr. Roberts was appointed a committee to arrange details and notify members. Prof. F. Fillon was elected a member.

Mr. Angell read a paper on some variations of *Chrysomela philadelphica* Lec. and *Scalaris* Lec., leading to a belief in their specific identity. This was illustrated by drawing of the varieties showing the gradual change of maculation

from that typical of one form, to that typical of another.* Mr. Smith added that these variations were largely selected from material obtained by him, and there were some interesting facts as to the localities from which those specimen came. In Cambridge he collected several hundreds of *C. scalaris*, all perfectly alike. In the pineries of New Jersey he collected *C. philadelphica*, slightly variable but with no particular tendency toward *scalaris*. In Cape Cod both species were found, and both somewhat variable, showing a tendency to an obliteration of the lines of demarcation between species. Specimens from the Adirondacks further close the gap, while material received from Canada showed a surprising range of variation and furnished most of the interesting forms completing the links between the species. This was interesting because he had found that in both Coleoptera and Lepidoptera, species that elsewhere were constant enough showed a decided tendency to variation in the same localities. The fauna of Northern New York and Canada is one of extreme interest and deserves careful study.

Mr. Waters exhibited a specimen of *Anisota Heiligbrodtii* together with the cocoon from which it was obtained. Mr. Hulst remarked on this, that all the other species of *Anisota* had naked pupæ and were subterranean, while here was a species apparently congeneric, which had a *double* cocoon like *Cecropia*, spun on mesquit: not a solid cocoon, but net-like, so as to show the pupa. Mr. Doll said that the geometrid *Eucaterva variaria* raised by him, spun a very similar cocoon, also double. Mr. Hy. Edwards joined the meeting after adjournment and remarked on this subject that under some circumstances the species of *Datana* will spin a light cocoon among *debris*, so also as to most of the other *Bombycidæ* that are usually subterranean.

Entomological Society of Washington. April 2, 1885. Mr. Schwarz exhibited specimens of *Rhopalopus sanguinicollis* Horn and remarked that this Cerambycid is one of the few species peculiar to the mountainous regions of the Alleghanies. He contrasted this scarcity of peculiar mountainous species with the rich montane and colline faunæ of Europe, given as the reason of the difference, the long-established cultivation of the soil in Europe by which the fauna and flora of the plants have become differentiated from those of the less cultivated hills and the uncultivated mountains.

Mr. Howard made a statement in regard to the parasites of *Thyridopteryx ephemeræformis*. He had found the larvæ of *Hemiteles thyridopterigis* being eaten by a Chalcid larva, presumably that of the *Pteromalus* commonly bred from the bags of the *Thyridopteryx*. He generalized on the difficult distinction between primary and secondary parasites.

Dr. Marx read a paper on the Arachnidæ collected by Dr. Turner in Northern Labrador. The best presented families are the *Lycosoidæ*, the *Drassoidæ* and *Tomisoidæ*.

May 6.—Mr. Schwarz exhibited newly hatched specimens of *Epicærus imbricatus*, still possessing the mandibular appendages. One specimen illustrated the process of losing these appendages. They do not break off in one piece, but the basal third remains attached to the mandibles and must be lost at a later time.

A discussion took place between Dr. Barnard and Messrs. Stewart, Schwarz and Howard respecting the collection of Neuroptera.

* The paper with plate illustrating the varieties will appear in an early number.

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Bees and other Hoarding Insects.

Their Specialization into Females, Males and Workers.*

By Edwin A. Curley.

I beg that you will note the order in which I have mentioned the sexes. It is females and males, and not males and females. In a scientific discussion, I feel constrained to tell the unvarnished truth regardless of the consequences to the social fabric; and among the *Hymenoptera*, it is most certainly a fact, that the ladies are all-important, and the gentlemen approach as closely to perfect insignificance as it is fairly possible to conceive. The happiness of a hundred thousand most willing slaves depends upon the mother-bee of the hive, while three thousand lle males do nothing but eat and loaf, and flit in the sunshine, in the hope of that hymenial favor which only one of their number is destined to receive; while to the one that attains the one short flight in the sunshine of wedded bliss, which is the sole object of his existence, the immediate consequence is the sharp pain of mutilation, and then a lingering death to be promptly followed, or perhaps to be accompanied by the execution of his 2,999 insignificant and now worse than useless rivals.

In discussing the differentiation of bees into females, males, and workers, I shall have no need to call your attention to any new discoveries in the world of wonders among those minute creatures that we have had with us for all ages, and whose life we are just now beginning faintly to understand. My illustrations will be drawn mainly from other orders, in which it will be impossible for me to make a mistake without its being readily seen by some of the general public as well as the specialists.

* Read before the Brooklyn Ent. Soc., Dec., 29, 1884.

The limits of this paper will not permit elaborate definitions, or fine discriminations, and I have therefore to ask that you will kindly make your own definitions, taking care to give to my words in general, the narrowest sense compatible with the use to which I apply them.

From the creatures and the plants, that man has domesticated for his use, we have learned nearly all of the lessons in heridity, which we have no good reason to unlearn, and my first illustration shall be from one of these, the barn yard fowl.

If we mate a Black Spanish fowl with a Buff Cochin, and hatch out the eggs as the bees do theirs, in an incubator, till we have a hundred chicks, among these we shall find a very great diversity. Some when fully grown will be nearly, if not quite as heavy as the Buff Cochin, and some will weigh little, if any, more than the Black Spanish. Their respective weights will probably vary between those natural to their sex in the two varieties to which their progenitors belong, but much the larger number will be very nearly half way between. And as color is not necessarily correlated with weight, it is quite possible that the heaviest chick will be the blackest; that is to say, that he may take his color almost entirely from one parent, and his weight and form from the other. In color every one of tne hundred chicks will, when fully grown, be in some degree distinguished from every other; and if we take color, size and form together for our guide, there will not be one among the whole number that we cannot readily distinguish from every other. Now this particular cross from the great difference in size, form and color of the parent stock enables us to see very clearly a fact which the closest and most careful investigation shows to be a general law It is this:

All offspring are variable by heridity. And under some circumstances the variations are wide.

Nearly every youth, who has amused himself with an aquarium, knows that he can dwarf his fish if he chooses to do so. Other things being equal, the weight of a fish depends upon the amount of food it is allowed to consume. This variability is so great among fishes, that of two as nearly alike as possible, either one may be fed so that he shall exceed a pound in weight, before the other, receiving very little food, shall turn the scale at an ounce.

Thus insufficiency of food affects the development of all organs. All breeders of animals have some knowledge of this fact as applied to their own business, and of which our fish merely affords a striking example. It is an inevitable deduction, that when the food is of the general quality which is suitable for the due nourishment of all the organs but is insufficient in amount, the stronger organs, if such there be, will take

more than their share, and the weaker organs will go to the wall. From this matter of food supply we have a general law, which may be stated as follows:

Living creatures are variable from the amount and quality of their food. And among some orders the limits of this variation are wide.

It is scarcely necessary for me to go into the fact, that the insects being exposed to more extreme vicissitudes than the larger orders of animal life are much more variable in almost every respect. It will be interesting, however, and it may be instructive in the line of our inquiry to point out some powers of variation in sex in a very common plant, which, while they are very much greater than those of the bee, have some points of striking resemblance.

Indian Corn is pictured to the unobserving mind, as a plant bearing something good to eat at the side, and a tassel on the top. The botanist tells us that the tassel on the top is a male plant, that at the side is a female plant, or perhaps more than one, that all these are joined upon one stalk, and that the something good to eat, is the product of the female plant, fertilized by the pollen of the male. All this is fact as far as it goes; but it gives us no conception of the whole truth.

On going into the field in bloom, we find that nearly all of the stalks have tassels on the top; they are male plants. In a good field we shall find perhaps half of them with reproductive females at the side, say two good ears of corn to a hill. There are therefore nearly twice as many perfect males as there are of perfect females. We find also, that the undeveloped females are very numerous, from one to half a dozen on a stalk. And a close examination shows that the number of females that become developed is almost entirely a matter of food. Such an investigation shows also some plants bearing only a female on the stalk and some that are entirely undeveloped in both sexes.

Thus in our field of Indian corn we have male stalks, male and female stalks, female stalks, neuter stalks. And the stalks that bear developed male and developed female individuals all have, (*a*) a male individual on the top, (*b*) one, two, or three females at the side, (*c*) one to six undeveloped females at the side, and possibly with, possibly instead of (*c*) they may have, (*d*) one to half a dozen buds and germs of females at the side.

If, when the corn is ripe, we go with the farmer and gather a basketful, we shall invariably find that on each ear there are kernels less perfectly developed than others, and we shall have every reason to believe that in the basketful there are some kernels that could not reproduce, that some kernels would reproduce, but would, under the most favorable

circumstances give but imperfect offspring, and that there would be a very wide range in the degrees of the imperfection of the plants produced from these imperfect kernels.

As a matter of fact, the farmer in planting, selects with care the most perfect ears, and the most perfect parts only of the ears so selected, and yet we have the males, the females, and the neuters or undeveloped, for the result, as I have described them.

Indian corn is so extremely variable in this matter of sex, that careful experimenting in this direction would be likely to give most interesting results in a single lifetime.

Having now illustrated some principles of variability, and given some idea of the extent to which it may go, under our own observation, we must deal with the question before us by way of hypothesis.

Let us suppose a primitive or typical Bee among the honey seeking insects of early days. She is necessarily a creature having such attributes as are common to all species of bees which are her offspring, but in many respects she is very unlike our Hive Bee of to-day We see her at a time when this typical species has already learned the wonderful lesson of thrift. She stores honey in times of plenty to provide for times of want. She is feeding her offspring from her stores. As the keen competition of life goes on, she must provide for the wants of her offspring for an ever increasing period, and, as her powers in this respect are taxed to the utmost, her powers of reproduction are of necessity diminished; she produces some imperfect eggs, and she produces fewer eggs. Still the vast majority of her offspring perish, either for lack of sufficient food or as prey to natural enemies before their power of self defence are sufficiently developed for successful flight or resistance.

It is quite reasonable to suppose that the bee has been subjected to such vicissitudes as these. The extraordinary differences in the sizes of the various living species of bees would indicate the truth of the theory of insufficient food as far as we have yet followed it. If we have a species of bee only one-eight of an inch in length while some others are an inch and a quarter in length and stout in proportion, it will take one thousand (1000) of these Lilliputian bees, to weigh as much as a single specimen of one of these largest species. Is it not most reasonable to suppose that this tremendous variation in size, is chiefly due to the matter of food supply, as is the well known fact in the very large variation we can thus make in the size of an individual fish?

Now when the food supply is so very scant that the size of the offspring is necessarily much dwarfed, evidently the weakest will die in the process of rearing; evidently also, the mother-bee whose reproductive

powers are the weakest as to the number of offspring, and whose maternal instincts are the strongest, that is to say, the one that lays the fewest eggs and takes the best care of her young, will best succeed.

If any broods of young perish altogether from famine, it will be those that are so numerous as entirely to overtax the powers of the mother-bee in feeding them. Thus we gradually approach a time when the care of the mother-bee extends to a period in the life of the offspring, when they appreciate and respond to her affection. The offspring are still numerous and the struggle for existence is severe. The food supply is sufficient to bring the young to that point in existence when they are capable of applying with some prospect of success the instinct, that is to say, the congenital knowledge inherited from the mother. And as the mother-bee continues after this period to help them in their struggle for existence, they see and understand her assistance, and they neccessarily respond to her affection. Here is definitely established filial love, in response to maternal affection and it is necessary that this filial love should be established in strength even in this little insect, before it is possible that the specialization under consideration shall commence. It must not be supposed that the size of these tiny creatures renders them incapable of this strong feeling,—we must in this respect as in others go by the evidence of our senses and the necessities of the case. Without strong affection the whole life of these bees is quite inexplicable, while with it their conduct is the natural outcome of a certain amount of intelligence applied to certain conditions of existence.

Among all creatures nursed with a mothers care, filial love grows stronger and stronger, according to the capacity and circumstances of the offspring and the strength of that affection which calls it forth. But when the time for mating approaches the young seek other relationships and so far as it is incompatible with these does filial love decay.

But what happens if the young are by nature incapacitated for these other relationships?

Then filial love necessarily grows with the individual and strengthens with her strength.

The mating instinct may be almost or wholly lacking; and if wholly lacking, then all of that part of the highly nervous organization, inherited from the mother that is devoted to the affections, will have no other outlet than in filial love.

The common life around us, and man himself will perhaps afford us some partial illustrations of this necessary law. The best illustration outside of the insect world is one of which the facts may be easily ascertained by any person who will make the inquiry.

The breeding of mules is an important industry. The horse and the ass are capable of strong affection, but their colts seldom develope a filial love which has a controling influence on their adult life.

But the mule, the hybrid between the male ass and the female horse, except in very rare instances is congenitally incapable of reproducing its kind. It has more or less of the instinct for mating, but it necessarily does not have the strong sexual passion of a perfect equine animal. Its love for its mother however amounts to a master passion; it is not spasmodical, but it is intense and it continues as long as there is an opportunity of showing it. It is capable of transfer to another subject and those who breed mules in large numbers take a useful, instructive and amusing advantage of this fact.

When the young mules are weaned, the mothers are withdrawn from their company, and one, otherwise worthless old mare is substituted for many mothers. The poor young things turn to the good natured old mare as to a very goddess; while she receives their worship with the equanimity of her sex, never hinting in the mildest terms, that it is an idolatry that should be abated. As the dilapidated goddess herself may be depended upon for her staid qualities, it follows that her worshippers are thereby kept out of mischief. And the poor mule is not a backslider, it is always a consistent worshipper.

I have stated that filial love is absolutely necessary to the specialization under consideration. It should be added that it must be intense in its character and capable of replacing to a large extent the maternal instinct of the perfect creature.

From the fact that insufficiency of food would affect the growth of all organs we deduced the further fact that it would affect weak animals the most, giving those not congenitally perfect an irregular development. It follows also, that if a very young animal congenitally perfect, receives for a long period only sufficient food to sustain life, the organs not vital will be more or less dwarfed in their proportions, as compared to the vital organs.

For here the law of parsimony is absolute. The vital organs *must* receive a certain supply, or the life perishes. The non-vital organs make no such imperative demand, and they consequently get less in proportion. And an organ that is entirely useless to the life of the individual, would under such circumstances receive no nourishment whatever; excepting only as it is correlated to the organs that are useful or vital. The re-productive organs of the young of all species are entirely useless to the life of the individual; their powers are latent, and excepting as they are correlated to other organs, they make no demand for nourishment. Star-

vation must therefore dwarf the reproductive organs of very young individuals, in proportion to those which are very important, or absolutely necessary to life. In plants this fact is constantly shown all around us and our maize is a striking example.

The reproductive powers of swine are very great. But a young pig that is half-starved will not only have its reproductive powers very much retarded in their growth, it will have them diminished in their ultimate strength. This is a matter in which general observation furnishes the proof. I have not asked fish-culturists the question but I am absolutely certain that other things being equal, the number of fish-eggs will depend upon the size and thrift of the individual, and these, other things being equal depend upon the question of food.

It is easy to imagine a possible case among the vertebrates or even the mammals in which a perfectly normal organism by long continued insufficiency of food, is allowed a slow development of those organs that are absolutely necessary for its life, and of the others most nearly correlated to these, while the organs of reproduction, in the incipient or undeveloped stage in which they were when starvation commenced, still remain till they become fixed and immutable notwithstanding any abundance of food that may be given at a later period of life.

Let us now go back to the variability of eggs as shown by our hundred chicks or the variability of seeds as shown by our ears of corn. This variability is variability of the germs, and this is congenital variability. This variability as shown in the hundred chicks gives us from three to six pounds for their adult weight and they all differ in color, form, or both.

We take no account at present of the fact that our primitive bee as shown by her offspring of to-day was far more variable than fowls, but we note that she was a hoarding insect, gathering with great care and industry in good times, food for times of scarcity: that she supplied her young from her stores; and that they responded to her maternal cares with filial affection.

We left her at a time when the struggle for existence was keen and some of her offspring starved through no fault of her own. She was exhausted with a constant search for food and the cares of a numerous and starving family.

This necessarily involved the fact that her reproductive system was quite out of balance. she was incapable of producing as many eggs as her progenitors, and many of those that she did produce were imperfect.

Of these imperfect eggs some addled and some hatched out imperfect offspring.

At this point we proceed to inquire into the nature of the imperfections of the offspring.

There would probably be quite a variety in these defects. One might be wanting in legs, another deficient in wings, another insane, another deaf, another possibly congenitally blind, or perhaps wanting in that sense, whatever it is, by which ants and bees intelligently converse with their fellows.

All of these and many other congenital defects are possible and even probable, because we see them in other and the least changeable orders and species of creatures.

But the greatest in number of all the very important defects, would be defects of the reproductive organs; because they are the organs in the mother which have been most affected by her unfortunate environment.

Under these circumstances, what must become of all the imperfect offspring in a sharp struggle for existence?

Manifestly all wanting in legs, or wings, or eyes, or in any organs necessary for quick and intelligent movements in attacking or resisting enemies, or in collecting food, must die at an early age, notwithstanding any possible care of the mother.

Manifestly none of those defective in the reproductive organs would so die, unless they were also defective in some other particular, unless indeed the struggle became so keen, that perfect and imperfect went to the wall together.

Manifestly also, these insects, thus congenitally imperfect in the reproductive organs, would have a great advantage over all others in the struggle for existence, *from the time at which the reproductive period in those others commenced.*

If altogether incapable of reproduction, they would have vitality enough for themselves and a surplus to expend.

The energy inherited from the hardworking progenitors would be too great for idleness. The surplus must be expended at the dictates of love or hate. Hate, beyond that healthy indignation at attack or imposition which is necessary to self-protection, is unnatural to such beings.* But they have one to love, and that is the mother. The perfect offspring depart to reproduce their kind, and the one, two, three, or the dozen, of the imperfect ones, stay behind with the mother bee, or if she dies they transfer their affection to some one of their perfect sisters.

Now another hoard of honey must be gathered, and another lot of eggs laid, hatched out and cared for. The female bee works industriously,

* Lubbock's instances of ants attacking strangers and not rescuing friends by no means demonstrates the opposite of this proposition.

and true to her instinct, denies herself of necessary food, that she may lay by the more for her future offspring.

And now these creatures, happy in their deprivation, capable of supplying their own wants with ease, insist on gathering food for the mother-bee. She takes it with eagerness, tastes and stores it away. And after the young are hatched out, the like attempt to feed the mother-bee results in feeding them. Thus this family have for a time a great advantage in the struggle for existence and there is a perfectly adequate motive for the conduct of the kind little creatures who minister to the wants of the mother-bee.

Still this happy family is not precisely the foundation of our modern bee-hive; it is really too affluent for complete success.

The mother-bee, no longer overworked, recovers her health and unfortunately lays perfect eggs; with the help of the nursemaids she rears her young without overtaxing her powers. Her family and any others like it have very decided advantages over the old type, to which nevertheless they inevitably revert, to fall into a state of starvation as before; for, in this family, the nursemaids have and can have, no probable successors while there is plenty to eat.

If this happens to one family of bees, it will probably happen to many families. The temporary affluence of one family caused by the presence of the helpers will itself increase the depth of poverty in the neighboring families, and this poverty will give them helpers in undeveloped bees in the next generation, by which in turn they will be raised to affluence. Thus there will be alternating generations of bees, that is to say generations with helpers, followed by generations without them.

Among those that go forth from the mother-nest to find mates and rear families of their own, are some that are congenitally weak in the reproductive organs. The majority of these meet with sound mates and the variation dies out. But some individuals thus congenitally imperfect, meet with like mates. The congenital weakness of the reproductive organs is intensified in the offspring. The majority are perhaps so imperfect as not to be able to reproduce their kind. Any of these that reach maturity will be glad helpers of the mother-bee.

Their less imperfect brothers and sisters are defective in many degrees. The offspring of one never reach maturity. Those of another nearly all thrive and there are a dozen reproductive females among them.

In their migrations at swarming time these bees sometimes become established near less affluent families, congenitally perfect, and are sometimes crossed with them.

Here we have the bees in a condition of the greatest variability as

to reproductive powers, but all of those that are getting on well in the world have among their offspring some that cannot reproduce, and helpers are consequently numerous.

About this time the paupers are established as a distinct variety. Sick and discouraged with the unsuccessful battle of life, they are more or less tolerated in the affluent families of their neighbors. But when they have recovered their bodily strength, they have not also regained their mental balance. They have become accustomed to a life of tolerated dependence; so they live in the nest and lay eggs to be reared by their industrious neighbors. Sometimes the imposition becomes too great for good nature to stand and there may be a terrible slaughter of the innocent paupers and their offspring. The ones however that most nearly resemble the useful members of the community escape destruction and thus are established the Cuckoo-Bees, their similation of virtue being ever the closer as indignation increases at their vice.

The varieties become extremely numerous; many of them however becoming rapidly extinct. At first in all families where there are helpers there are almost or perhaps quite as many undeveloped males; but this being for bees, a hurtful variation the tendency of natural selection is to their diminution. On the whole those families are the most successful in which there are the largest number of undeveloped females.

All this time experience is being gathered in the mothers and differentiated and stored in their systems, to re-appear as instinct and intelligence in the offspring.

Sometimes the most affluent families come to want, and perfect females are dwarfed in their reproductive organs by scarcity of food and are only capable of being helpers.

From all this diversity there is at last a type evolved which is on the whole the best for the majority of the bees. This type is one involving a degree of imperfection in the reproductive organs of all offspring unless highly stimulating food in large quantity is supplied from a very early stage of growth. Thus the normal product is simply a helper and the number of males and females in proportion to the number of helpers and the food supply is a matter entirely under the control, not of chance nor of the mother, but of the community. This then, I think, is the foundation of the Hive-Bee family, the highest type of the flying Hymenoptera.

As instinct enlarges and intelligence increases, the helpers take more and more upon themselves the care of the household. They become pre-eminently the workers, and their officious interference is continually stopping the mother-bee's toil, and stuffing her with the best

food they can obtain. She gives herself up more and more exclusively to the work of reproduction, and her powers increase till she becomes capable of changing food into eggs and individually starting a hundred thousand existences in her single lifetime.

Between this highest type of the bee and the lowest, we find several hundred varieties all capable of explanation, either as progressive or retrogressive, developments from our primitive bee. Many of them are highly specialized in their social habits, and it seems to me that all those that have two fully developed sexes and one or more undeveloped sexes, must neccessarily have thrift, intelligence and love, as the foundation without which it is impossible that such creatures should of themselves build up such a singular condition.

It seems to me that hunger, something approaching starvation, is necessary as a beginning of the specialization. Now we all know that from their capacity to increase with enormous rapidity, some insects are subject to great vicissitudes in the matter of food. The locusts, for instance, increase in numbers till having eaten everything in their native habitat, they leave it in dense masses that obscure the heavens, and which devastate vast regions. Of the next brood, immensely more vast in numbers than even these, comparatively a small remnant reach maturity, and scarcely any reproduce their kind. The race grows up again from the few starved individuals too weak to leave the old habitat and of which a few managed to survive long enough to lay some eggs. Those doubtless produce many imperfect insects, but these specializations are not useful to the race in this case, and they cannot survive. I think it likely however, that man could specialize locusts and many other insects in this way without difficulty. I think it likely that he could with great care so specialize fish and possibly fowls and with great patience and much difficulty some of the mammals. I think also that if mules were from a thrifty hoarding stock like squirrels they would be in the habit of feeding the old mare as the workers feed the mother-bee. But while it may be allowable to mention these as interesting possibilities I do not propose to discuss them in this paper.

There is another element which is, I think, very important in fixing the definite type of the workers, and which I had intended to discuss. But while I think that element important in the bee and perhaps absolutely necessary for the still higher specialization of the ant, I think also that a permanent body of workers is necessarily evolved from the conditions which I have assumed as natural and proper to the primitive bee.

To recapitulale in few words:

I presuppose a primitive bee fertile and affectionate, hoarding and intelligent.

I show that great want will necessarily diminish the number of her eggs.

That it will render some eggs imperfect by deranging the reproductive organs of the mother.

That consequently some of the offspring will be defective in the reproducing organs.

That while other imperfect bees will generally die before maturity, those imperfect only in the reproductive organs, will live if the perfect offspring live.

That some of these being incapable of mating, will not go away for that purpose, but will stay with the mother-bee.

That having surplus energy to expend, they will use it in accordance with the instinct of the race, in gathering and storing food.

That the surplus food will be utilized by the mother-bee, and that therefore this family will be affluent.

That being affluent the formerly overtaxed mother will recover her health, and that her offspring will thereafter be perfect.

That consequently these nursemaid-bees will have no successors, and the family will therefore be again reduced to want.

That some bees of the same hatch with the nursemaids will be congenitally imperfect notwithstanding that they leave the mother and find mates.

That the offspring of congenitally imperfect bees will be extremely variable.

That some of this offspring will be unable to reproduce and that they will remain with the mother-bee as nursemaids or helpers.

That these helpers from the congenital imperfections of their mothers will have successors; substantially as is seen among the hive-bees and the humble-bees of the present day, and

That the variation thus started will eventually be reduced to a given type or types—by the survival of the fittest.

That whatever other circumstances may aid in producing the result in question, this is sufficient of itself to account for the specialization of the bee and the ant into females, males and workers.

Record of some Contributions to the Literature of North American Beetles, published in 1883—84.

By Samuel Henshaw.

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Apion vespertinum Casey 7 p. 67 Cal.; A. erraticum Smith 153 p. 44 Tex. Iowa; A. obsoletum Smith 153 p. 44 Dac. Mich. Ca.; A. erythrocerum Smith 153 p. 44 Kans. Middle States D.C. Tenn.; A. robustum Smith 153 p. 45 Tex. Mo. Iowa; A. punctinasum Smith 153 p. 46; Wy. Dac. Col.; A. parallelum Smith 153 p. 47 D.C. Tenn.; A. estriatum Smith 153 p. 47 Ca; Col. Tex.; A. ovale Smith 153 p. 47 Mo. Cal.; A. impunctistriatum Smith 153 p. 48 Tex. D.C.; A. desolatum Smith 153 p. 48 Geo.; A. sordidum Smith 153 p. 48 Utah; A. floridanum Smith 153 p. 49 Fla. Cal. Ariz. Ia. D.C.; A. obesum Smith 153 p. 49 Mich. Tex.; A. parvulum Smith 153 p. 49 Middle States; A. atriceps Smith 153 p. 49 Geo. Fla. Cal.; A. minutum Smith 153 p. 50 Fla. N.Y.; A. opacicolle Smith 153 p. 50 Cal. Ariz. Or.; A. texanum Smith 153 p. 51 Tex,; A. ellipticum Smith 153 p. 51 Neb. La.; A. californicum Smith 153 p. 52 Cal.; A. decoloratum Smith 153 p. 52 D.C. N.C. Ariz. Md. Va.; A. concoloratum Smith 153 p. 52 Cal. W.Va. Geo. Mich. Fla.; A. carinatum Smith 153 p. 52 Fla. Tex. Neb.; A. brevicolle Smith 153 p, 53 Cal. Tex. Ariz.; A. typicum Smith 153 p. 53 Cal.; A. abdominale Smith 153 p. 53 Ariz. Ill. D.C.; A. antennatum Smith 153 p. 53 Cal. Ariz.; A. cordatum Smith 153 p. 54 Cal.. A. capitatum Smith 153 p. 54 Mich. Neb. Or.; A. oblitum Smith 153 p. 54 Col. Cal. Tex. Kans. Fla.; A. turbulentum Smith 153 p. 56 Middle States Tex. Cal.; A. minor Smith 153 p. 56 Cal. La.; A. dilatatum Smith 153 p. 56 Ariz.; A. herculanum Smith 153 p. 56 Pa. N.Y. D.C. Mass.; A. pyriforme Smith 153 p. 57 Ariz.; A. Walshii Smith 153 p. 57 pro lanuginosum || Walsh; A. vicinum Smith 153 p. 58 Col. Cal. N.Y. D.C.; A. modestum Smith 153 p. 58 Ariz. Kans. Fla.; A. perminutum Smith 153 p. 59 Tex. Geo D.C. Mass.; A. griseum Smith 153 p. 59 Middle, South & West. States: A. fraternum Smith 153 p. 60 South. & West. States; A. varicorne Smith 153 p. 60 South. & West. States; A. extensum Smith 153 p. 61 Mont. Kans.; A. æneipenne Smith 153 p. 61 D.C.; A. contusum Smith 153 p. 61 Dac.; A. tenuirostrum Smith 153 p. 62 Tex. Kans. Neb. D.C.; A. attenuatum Smith 153 p. 62 Kans.; A. confertum Smith 153 p. 63 West. & South. States; A. patruele Smith 153 p. 64 U. S.

Podapion (*n. g.*) Riley 118 p. 61; gallicola Riley 118 p. 62 D.C., L. Sup. Mass. Tyloderma nigrum Casey 9 p. 56 N. Ill.; T. punctatum Casey 9 p. 57 N.Y.—Balaninus obtusus Blanchard 3 p. 107 N.H. Mass. Tex. Neb.

Notes and News.

In the Vol. of the Stettiner Entomologische Zeitschrift for 1884, which has just come to hand, we note that our good friend Dr. Horn has also been elected honorary member of that society. It gives another proof of the high standing Dr. Horn has made for himself.

* * *

Early this spring I found under the bark of a tree a specimen of *Coptocycla aurichalcea* as bright and glittering as ever a specimen I saw in life. It was perfectly dry, and a mere shell and had evidently been dead a long time. In no collections I have ever seen, have I found any specimens at all approaching the living insect in beauty. I mentioned this to Drs. Hagen and Horn, at Cambridge, recently, and Dr. Horn says both Dr. Leconte and himself had tried in every way to restore or preserve the color of this insect, without success: he suggests that the living insects be confined, kept perfectly dry, and allowed to die of starvation and possibly in that way fine cabinet specimens might be obtained. Dr. Hagen says that a drop of Glycerine under the elytra preserved their lustre for some time but eventually they became dull. Will our Coleopterological friends try their hands at this during the coming season and report success?

* * *

In Can. Ent. XVI p. 131, Miss Murtfeldt gavesomenotes on "*Attacus cinctus*, *Tepper*". In Mrs. Fernald's collection I saw recently, a pair of *A. splendidus* De Beauv. labelled *A. cinctus*, and received from Miss Murtfeldt. The remarks in the Can. Ent. must therefore be considered as notes on *A. splendidus*, the determination (credited to Prof. Riley by the bye,) being erroneous. *Splendidus* is credited to our fauna in Mr. Grote's list of 1882; but I have never seen a specimen from the U.S. and do not remember having seen any note of its being found north of Mexico. Still it is very likely that it will yet occur near the border.

From *cinctus* the species is readily distinguished by the shape of the transparent spots, which in *splendidus* take the form of an elongate triangle, or arrow head, and extend to and sometimes cross the outer median line: in *cinctus* on the contrary the spots are smaller, not regularly triangular but more rounded; those of secondaries of an irregular diamond shape: they never cross and rarely even touch the outer median line. Other characters are not wanting to separate the species, but those above mentioned are the most obvious. The error in determination was a very natural one, as Mr. Tepper had but recently figured the species, and a cursory comparison with the figure would indicate identity.

* * *

Newark, N. J., now has an Entomological Society with about 15 members. Some of our Newark friends are excellent collectors, and will no doubt be heard from before long. We wish them good luck and prosperity.

* * *

Early in June we had the pleasure of seeing Mr. Thaxter and his collections at Kittery Point and obtained some hints on collecting at light. One point may be interesting, and that is that Noctuids always fly against the wind, and unless your light is placed so that they can fly thus to get to it, your success will be small.

* * *

In Dr. Horn's *Scotocryptus* paper in our last number, p. 51, is "Aglyptus 4—3—3 ♂ ♁". The "♀" is owing to a slip of the pen, and should be omitted.

* * *

Dr. Goding, of Ancona, Ill., writes us "Having read Mr. Stretch's article" 'Anal appendages of *Leucarctia acræa*', (Papilio III, 41), I was interested in the capture of a specimen of *Ctenucha fulvicollis* while the insect was in the act of protruding similar appendages. These 'anal antennæ' were about ¾ of an inch long, of a milk white color, and covered with short yellowish gray hairs, very closely resembling a lamp chimney cleaner" as observed by Mr. Stretch.

The insect was captured while flying around a lighted lantern, the appendages being plainly seen by quite a number of persons. I have never observed these organs in the insect mentioned by Mr. Stretch."

This is interesting as showing similarity of structure between the *Arctiidæ* and this species, classed as one of the *Zygænidæ*. Will our friends all over the country watch the insects they attract to light, and find whether any other species shows this peculiarity, the function of which is not yet satisfactorily explained.

* * *

In an old (1879) foreign Journal I found recently a note of some interest. A pair of *Anth. pernyi* emerged from the cocoon together; next morning they were found *in coitu* and so remained until 4 P.M. that day. They then separated, the ♂ was removed and killed, and the ♀ began ovipositing. About 6 P.M. another ♂ emerged, which immediately and before the wings were yet fully unfolded, sought the female and remained *in coitu* until 8 A.M. next morning. The ♀ then continued the egg-laying business and *all* the eggs proved fertile. The interesting point is, that it controverts the accepted theory that a ♀ once mated exercises no further attraction to the ♂♂ and is unmolested by them. Have any of our readers observed similar instances?

* * *

The new Check list of Coleoptera, by Mr. Henshaw will be ready for distribution some time in September. Mr. Henshaw has promised to furnish manuscript for annual supplements, which will be published in our Journal. What we need now, is an addition that will bring our Lepidoptera lists up to date, and may-hap the present year has also that in store for us.

* * *

Lt. T. L Casey has sent us $50 for a life-membership in the B'kln. Ent. Soc. This sum goes to our publication-fund. Will not some of our other friends help us along in the same way?

* * *

Mr. Curley's paper, on a previous page, is an interesting contribution, and one deserving of study; many will not be inclined to agree with him in his deductions; but it presents facts in a somewhat novel light, and we are ready to receive criticisms.

Society News.

Brooklyn Entomological Society. June 2, 1885.—Twenty persons present, among them Dr. Geo. H. Horn, honorary member of the society; Mr. Cramer in the chair.

A communication from Capt. D. H. Murdock, presenting the Society with a small lot of *Anthobium*, was read by the Secretary.

Mr. Smith read a paper upon some structural peculiarities of the *Zygænidæ* and *Bombycidæ*, touching upon some points of correlation of habits and structure, and dwelling somewhat on the modifications of the genital organs of the male. These structures it seemed probable would furnish characters of great systematic value, and their modifications in the Noctuidæ were now being studied by Prof. Riley and himself in the preparation of a monographic work on the N. A. Noctuidæ. A system of classification of the *Sphingidæ*, *Zygænidæ* and *Bombycidæ* was outlined, placing the *Sphingidæ* lower in the scale then at present catalogued.

Dr. Horn illustrated some modifications of structure in *Corphyra*, referring more especially to the ♂ sexual pieces.

The balance of the evening was spent in discussing methods of collecting on the sea-shore. Mr. Weeks had succeeded in taking quite a number of *Dyschirius pallipennis* by digging on the site of a dried up pond until he found water which he then poured over the old banks.

After informal discussion the Society adjourned until the first Tuesday of September.

Will the members of the Society please collect during the season in all orders, outside of their specialities and turn over the material to me for the benefit of the Society's collection? I am ready to receive donations to the cabinet at my office, No. 4 Fletcher St., N.Y., or will call for specimens if notified.

CHAS. W. LENG, *Curator.*

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An Introduction to a classification of the N. A. Lepidoptera.

By John B. Smith.

(Continued from "Bulletin" VII, p. 141.)

In the previous papers of the series is given a synopsis of the families of the Lepidoptera and a review of the genera of the Rhopalocera. The present paper deals with the *Sphingidæ* which in our lists are catalogued immediately after the *Rhopalocera*.

This group or division has had rather a hard time of it at the hands of recent authors, no two lists being alike. Sometimes there would be a dozen species to a genus, then a dozen genera each with one species, and in the next list we would find as many genera, but with different names, or the same genera differently applied. To straighten out the confusion thus caused will be the task of the monographer of the group, and is beyond the province of this paper; those names which are used in Mr. Grote's most recent list will be used here, though not all of the genera are adopted and the sequence is changed.

On this point of sequence of genera, I have adopted an order based on their structural relations. It is a matter of small importance because the genera are interchangeably related, *Arctonotus* for instance having the structural characters of both *Pogocolon* and *Smerinthus*, while *Deidamia* unites *Smerinthus* with *Sphinx*. No linear classification will therefore show the true relationship of the genera, and my scheme is to begin with the most typical genus of the series and thence work to that form most nearly like the following group. I am unable to comprehend why Mr. Grote places the "Phalænoides" (*Smerinthides*) between the "Eumorphæ" (*Philampelus* and allies) and the "Manducæ" (*Sphinges*)

for they are entirely out of place there and the "Manducæ" and "Eumorphæ" are certainly closely enough related.

The Sphingidæ are distinguished by their usually large size, plump robust bodies, usually long, conic and cylindrical abdomen and prismatic antennæ. The venation has been figured in Vol. VII of the "Bulletin" and the distinctive feature in that respect was found to be a distinct cross vein, connecting the costal and subcostal of the secondaries, near base. The wings of the typical Sphinges are usually rather narrow, long and stiff, capable of great resistance to the air, as well as of rapid motion; and the habits of the insects, or at least a large part of them, hovering over a flower while feeding, requires such a structure. Usually they fly in the early evening, though many, among them the *Macroglossæ* fly in the hottest sunshine, and are often mistaken for humming birds. The *Smerinthides* on the contrary, incapable of feeding, are rarely taken, though sometimes attracted to light.

The larvæ are usually furnished with a distinct caudal horn, or an eye like spot denoting its usual position, though some species lack all trace of it. It is the habit of the larva also to rest with the thoracic segments raised, and somewhat curled, and this, giving them a fancied resemblance to the Sphinx, is said to have prompted the name.

Among our forms two distinct groups may be distinguished. The *Sphinges*, with long corneous tongue, prominent head, and rarely serrate antennæ, and the *Smerinthides* with short weak membraneous tongue, retracted head, usually serrate or pectinated antennæ in the ♂, and generally angulated dentate or crenulate outer margin of forewings.

The true Sphinges, or those with long corneous tongue divide readily into two distinct series on the shape and proportion of the antennæ.

In the *Macroglossæ* they are distinctly clavate toward the tip (which is furnished with a small bent hook) and usually fully one half the length of the primaries. In the others the antennæ are either tolerably equal throughout or they are thickest in the middle, tapering to each end.

Most, if not all the *Macroglossæ* are diurnal in their habits, flying about flowers in the hottest sunshine.

Macroglossa (*Hemaris*) contains those of our species with more or less transparent wings, and unarmed tibiæ.

Pogocolon (*Pterogon*) has opaque wings of much the same form as *Macroglossa* but has spinose tibiæ, the anterior armed with a series of long corneous claws at outer side and tip. I cannot separate *Lepisesia* from *Pogocolon*, and *Euproserpinus* also seems congeneric. These genera, each containing a single species, have a somewhat different habitus from that of the more typical *Pogocolon*, and serve to show the close relationship of that genus to *Macroglossa*.

To some extent intermediate between the *Macroglossæ* and the Sphinges are three genera which are aberrant wherever placed.

Amphion, *Aellopos* and *Thyreus* have no special relationship except in the tufted abdomen. There is always a prominent anal tuft, and usually there are more or less distinct lateral tuftings. The tongue is strong and the antennæ are not clubbed.

Amphion is perhaps nearest to *Macroglossa* and has a similar body form; the ornamentation is also similar, but the primaries are excavated below apex, and again below middle, and the hind angle is somewhat prominent. The single species, *nessus*, is a very pretty one, with a narrow, clear yellow band across the abdomen.

Aellopos is somewhat depressed. The head is much more prominent than either of the preceding, the antennæ are remarkably slender, almost setaceous, with a small recurved hook at the tip; the thorax is narrow, the primaries inserted well back, and the abdomen is long, broad, obtusely terminated, and the tip is furnished with a fan like tuft. The primaries are narrow with even, very oblique outer margin. The narrow thorax well produced before the insertion of wings, and the narrow primaries, recall *Dilphonota*.

Thyreus is a very peculiar form, with strong *Smerinthid* tendencies, but long corneous tongue. The ♂ antennæ are thickened and serrate, the head is not prominent, the body is plump, convex, and the abdomen short, very broad and obtusely terminated. The anal tuft is pointed and the lateral tufts, extending nearly to middle are round and truncate. The primaries are excavated below apex, angulated at middle and again excavated above the hind angle. The *Smerinthid* features are prominent but not more so than the characters which lead to its association with *Amphion*.

Enyo is a very recognizable form, distinguished by the prominent thoracic crest. The primaries are narrow, but else very much as in the preceding. The abdomen is elongate, conic, with a fan like tuft, distinct in the ♂ only The distinctly crested thorax is unique in the N. A. Sphingids and serves to isolate the genus at a glance.

The series of typical *Sphinges* may be headed with the genus *Sphinx* which includes *Daremma*, *Diludia*, *Phlegethontius* (*Macrosila*) *Dolba* and *Hyloicus* of Mr. Grote's list.

The characters common to all these, are oblong, or subquadrate thorax, the primaries inserted well forward, the head moderately prominent, the abdomen conic, robust, primaries with even, somewhat roundedly oblique outer margin, sometimes with the anal angle somewhat marked. The legs are long and strong, the fore tibiæ moderate in length, robust, and usually furnished with a series of claws or stout spines at

outer side, and a similar series along outer side of tarsi. The hind tibiæ are always longest and are furnished with two pairs of very long unequal spurs. The species classed as *Phlegethontius* are more robust, with broader head, somewhat more prominent palpi and rather broader wings. *Sphinx* is applied to the narrower winged species with long acute apices. *Daremma* has rather more retracted head and more rounded outer margin. *Hyloicus* is very like *Daremma* but there is an excavation in the secondaries before anal angle, *Diludia* has the hind angle of primaries marked, and lacks the armature of the fore legs. This has perhaps a claim to generic distinction, but the armature here is a variable quantity and not decided enough in its character to be given much weight.

Dolba is applied to a small, dark species, with rather short stout abdomen and unarmed fore tibiæ. None of these generic names seem worthy of adoption, since the characters upon which they are based are evanescent.

Cautethia is rather a peculiar form with the habitus of *Pogocolon*, but the structure of a true *Sphinx*, except for the wider head and more prominent eyes, which ally it to *Dilphonota*. It falls in naturally after *Dolba*. It certainly does not belong with *Macroglossa*.

Ceratomia has a more retracted head, smaller eyes, and longer, obtusely terminated abdomen. The larval character of *C. quadricornis* (4 short horns on shoulder) is so peculiar that I should expect that more differences will yet be discovered in the imago. The genus should precede *Sphinx* in cataloguing.

Pachylia, *Philampelus* and *Deilephila* agree in having a larger head, more prominent eyes, and robust thorax, with the insertion of primaries further back than in *Sphinx*. The legs are longer, less robust, and the fore legs especially are longer and weaker than in *Sphinx*. The primaries are wider, slightly excavate below apex and above hind angle. Secondaries with distinctly marked anal angle.

The differences between this series and the series *Sphinx* are difficult of enumeration because mostly comparative, but I think the foregoing will serve to separate them.

Inter se these genera are distinguishable—*Pachylia* by its very large size and obtusely terminated abdomen; *Philampelus* by conic abdomen, long fore tibia and unarmed (i.e. no armature other than the ordinary spines) tarsi; and *Deilephila* by having the fore tibia at tip, and the tarsi at the sides furnished with longer claw like spines. I cannot separate *Argeus* from *Philampelus*.

Amphonyx and *Dilphonota* have still more prominent head, narrower thorax still more produced in front of the base of primaries, very long conic abdomen, and long, pointed primaries. *Amphonyx antæus* is a

large insect, the middle of secondaries semi-transparent, and the outer margin of primaries even. The third joint of palpi is produced in the form of a small curved horn. *Dilphonota* contains smaller species with dentate outer margin of primaries, and the thorax with a distinct divided crest. The latter structure is peculiar to this genus so far as I know, among the N. A. representatives of the family.

These two genera really belong nearer to the true *Sphinges* than *Pachylia* and allies; but are placed here merely for convenience of comparison.

In the remaining genera of this series, a long step is made to the *Smerinthids* in the weak legs with the small spurs of the middle and hind tibia. The head is as in the *Sphinges* and the thorax is rather shorter than in that group.

Chœrocampa has short narrow primaries and an unusually long slender, conic abdomen. The secondaries also are very narrow, and excavated before the anal angle. The species are of the most elegant in our fauna.

Darapsa has wider wings and heavier, shorter abdomen, the thorax is proportionately weaker, and the head more retracted. The wings are much as in *Philampelus*. I cannot separate *Ampelophaga versicolor* from this genus.

Deidamia is one of the connecting genera between this group and the *Smerinthids*. The head is retracted, the ♂ antennæ serrate, the primaries shaped like *Smerinthus*. But the tongue is distinct and for this reason I place it at the end of the present series.

The *Smerinthides* are distinguished by the short membraneous tongue, retracted head, serrate or pectinate antennæ of the ♂, usually angulated or scolloped primaries, less conic and more obtusely terminated abdomen, which is also more woolly and less smoothly clothed than in the preceding group, and by the weak short legs in which the spurs are greatly reduced in size and often wanting in part. The posterior legs are much reduced in length and strength, and instead of being the most robust, they are in this series the weakest pair. As a whole the tendency to the *Bombycidæ* is unmistakeable and very strongly marked in every respect.

The genera are closely related and with the exception of *Arctonotus* and *Ellema* which I class with this series, they are often lumped under the generic type *Smerinthus*.

Triptogon contains two large species, *modesta* and *occidentalis*, with very strongly retracted head, scolloped outer margin of primaries, and a heavy claw terminating the tip of fore tibia. The middle and hind tibiæ have each two small spurs at tip. The secondaries are not ocellated.

Paonias has the outer margin of primaries similarly crenulated, but lacks the claw of the fore tibia. It is smaller, and has the secondaries ocellate, differing from *Smerinthus* only in the outer margin of primaries. Whether or not this ought to warrant the genus is a question, and in the limited number of species in our fauna it should be considered rather as specific than generic.

Smerinthus has the primaries excavated and angulate and the secondaries ocellate. The antennæ of the ♂ vary in the length of the pectinations; but the differences are specific and not generic. The tibiæ are unarmed and the posterior pair have only a single pair of small spurs at tip. I cannot separate *Calasymbolus* Grt. from this genus.

Cressonia is a very distinct genus. The palpi are long, the third joints prominent, pointed and divaricate, the tibiæ heavily spined, the posterior with two pairs of spurs. The antennæ of the ♂ are bipectinate in true bombyciform fashion. The outer margin of wings is dentate or scolloped, but not prominently so. This is one of the most distinct of the Sphingid genera, the palpi being abnormally developed.

Arctonotus is a peculiar genus, which Mr. Grote classes with the "*Caudiberes*", and which in the armature of the fore tibia is related to *Pogocolon*; but by the weak short tongue, the serrate and bristled ♂ antennæ, and woolly body is nearer related to the *Smerinthides*. It seems out of place anywhere. The primaries are small, stout, the outer margins even. The posterior tibiæ have two pairs of spurs.

Ellema is usually classed as a *Sphingid* genus but the tongue is short, the legs are weak, and the posterior tibia have only a single pair of spurs. The ♂ antennæ are serrate and furnished with tufts of bristly hair and the head is retracted. The outer margin is even, and the apex somewhat rounded.

Exedrium Grt., based on *Sphinx halicarniæ* Strk., probably comes here. Mr. Strecker's description gives no structural details of any kind, and I have only seen the insect to make a superficial examination of it. It has a strongly bombycoid appearance, the wing form being much like that of *Heterocampa* and the body compact, robust. The tongue is probably weak, and the legs short.

In synoptic form the scheme above developed is as follows:

Tongue long, strong, corneous.....**SPHINGIDES.** 1
Tongue short, weak, membraneous.....**SMERINTHIDES.** 8

1—Antennæ clubbed at tip and furnished with a short bent hook 2
Antennæ not clubbed, equal, or thickest at middle, either bent at tip or slender, curved..... 3

2—Tibiæ unarmed, wings more or less hyaline .....**Macroglossa.**
Tibiæ spinose, anterior armed at sides and tip .....**Pogocolon.**

3—Abdomen tufted at tip, and usually also at sides..... 4
Abdomen not tufted at tip or sides..... 5

4—Body short, plump; abdomen pointed at tip; primaries excavated below apex and again before hind angle.....Amphion.
Abdomen elongate, flattened, rather abruptly terminated; anal tuft fan like; primaries very narrow, pointed; antennæ very slender .....Aellopos.
Abdomen short, obtuse, broad, with brush like lateral tufts; antennæ thick, in ♂ serrate; primaries angulate and excavate ... .Thyreus.
Abdomen conic, with a fan like tuft at tip; thorax with a distinct sharp crest behind collar, primaries as in *Thyreus*.....Enyo.

5—Spurs of middle and hind tibiæ very long, unequal, legs robust.....6
Spurs of middle and hind tibiæ short, weak, more equal; legs weak..... 7

6—Prothorax not much extended before base of primaries; fore legs short and stout.
Abdomen conic, pointed, fore tibia and tarsi usually armed with spines or claws at outer side.....Sphinx.
Abdomen conic, pointed, head much broader, eyes larger; size very small; secondaries yellow with black margin .....Cautethia.
Abdomen obtuse at tip, head retracted, wings wider.....Ceratomia.
Prothorax more extended before the base of primaries, head larger, thorax robust; anterior legs longer, weaker; primaries with outer margin sinuate.
Abdomen obtuse.....Pachylia.
Abdomen conic; anterior tibia and tarsi unarmed.....Philampelus.
Abdomen conic; shorter; anterior tibia and tarsi with claw like spines at outer side.....Deilephila.
Prothorax still further produced before base of primaries; head large; eyes very prominent; abdomen long and rather slender; thorax narrower.
Thorax untufted; third joint of palpi projecting forward like short horns; outer margin of primaries not dentate..... Amphonyx.
Thorax with divided crest, outer margin of primaries dentate.....Dilphonota.

7—Wings very narrow, small, abdomen long, conic, very smoothly clothed.....
Chœrocampa.
Broader winged, less robust, head more retracted, abdomen shorter, less regularly conic..... Darapsa.
Primaries angulated, abdomen obtuse, head crested, strongly retracted; ♂ antennæ serrate..... Deidamia.

8—Primaries with outer margin scolloped or evenly crenulated.
Anterior tibia with a heavy claw at tip..... Triptogon.
Anterior tibia unarmed..... .....Paonias.
Primaries with outer margin excavate and angulate ..... Smerinthus.
Primaries with outer margin evenly dentate; 3rd joint of palpi unusually long; divaricate at tip ..... Cressonia.
Primaries with outer margin even.
Anterior tibia armed with a series of long claws; plump, robust, body woolly.....
Arctonotus.
Anterior tibia unarmed; form more slender, less robust..... Ellema.

(To be continued.)

Synonymical Notes No. 2.

By Geo. H. Horn, M.D.

The species here considered are those described in a large and rather rare folio volume entitled "*Insectes recueillis en Afrique et en Amerique*" by A. M. F. J. Palisot de Beauvois, bearing date 1805. The species described are of all orders and were nearly all collected by the author himself during the year 1786—1797 and by reference to the descriptions the regions of our country visited by him can readily be ascertained.

The present essay will consider the U. S. Coleoptera mentioned by Beauvois whether the species are described by him as new or quoted from other authors. In the following list I have arranged the genera alphabetically for easy reference and follow the species with the initial B. for Beauvois, the other abbreviations being sufficiently known.

In the case of any change in the name, whether in the genus or species, the present equivalent follows the Beauvois name.

The first attempt at a translation of the Beauvois species was made by Chevrolat (Ann. Fr. 1853) but not in a very satisfactory manner as many were not seen by him. A work of this kind is never very easy and can best be done by one well acquainted with the separate regions from which Beauvois obtained the species.

Agathidium oniscoides, B. p. 160.

Blaps metallica, B. p. 140 = Hoplocephala bicornis.

Callidium fulminans Oliv. p. 248 = Arhopalus fulminans.
erythrocephalum Oliv. p. 248 = Neoclytus erythrocephalus.

Cerambyx garganicus Oliv. p. 247 = Chion cinctus.

Cebrio bicolor Fab. p. 9.

Copris viridis B. p. 24 = Canthon viridis.
obtectus B. p. 25 = Onthophagus Hecate.
capistratus B. p. 57 = Choeridium histeroides.
Ammon Oliv. 92 = Copris minutus.
canadensis B. p. 92 = Onthophagus Janus.
striatulus B. p. 92 = idem.
latebrosus Fab. p. 93 = Onthophagus Hecate.
subæneus B. p. 105 = Janus.
carolinus Fab. p. 198.
carnifex B. p. 198 = Phanæus carnifex.

Elater oculatus Linn. p. 213 = Alaus oculatus.
luscus Oliv. p. 213 = myops.
verticinus B. p. 214 = Elater rubricollis.
griseus B. 214 = Limonius griseus.
ramicornis B. pp. 10 and 214 = Dicrepidius ramicornis.
rufipes B. p. 214 (1).

Harpalus viridiæneus B. p. 108.
dubius B. p. 108 = Cratacanthus dubius.
Helops contractus B. p. 121 = Meracantha contracta.
tenebrioides B. p. 121 = Tenebrio tenebrioides.
tæniatus B. p. 121 = Helops micans.
obliquatus Fab. p. 122 = Penthe obliquata.
americanus B. p. 122 = *Helops undulatus* (2).
tristis B. p. 139 (3).
carolinensis p. 162 = Scotobates calcaratus.
saperdoides Oliv. p. 162 = Xylopinus saperdoides.
calcaratus B. p. 162 idem.
Hister cylindricus B. p. 178 (4.)
elongatus B. p. 178 (4).
latipes B. p. 178 (5).
subhæmisphericus B. p. 180 = Hister abbreviatus.
interruptus B. p. 180.
regularis B. p. 180 = Epierus regularis.
Lamia nodosa Fab. p. 244 = Acanthocinus nodosus.
dentator Fab. p. 244 = Monohammus titillator.
Melasis picea B. p. 7 = Zenoa picea.
Melolontha angustata B. p. 30 = Macrodactylus angustatus.
paradoxa B. p. 173 = Rhipidandrus paradoxus.
Passalus cornutus Fab. p. 1.
Prionus imbricornis Oliv. p. 242.
Scarabæus nasicornis-americanus B. p. 75 = Xyloryctes Satyrus.
Blackburnii Fab. p. 75 = Geotrupes Blackburnii.
Broscii B. p. 89 = Strategus Antæus ♀.
splendens B. p. 89 = " splendens.
ferrugineus B. p. 90 = Bradycinetus ferrugineus.
rubeolus B. p. 90 = Aphodius rubeolus.
Cephus Oliv. p. 90 = Bolbocerus farctus.
tumefactus B. p. 91 = idem.
truncatus B. p. 41 = Phileurus truncatus.
Tityus B. p. 138 = Dynastes Tityus.
Antæus Fab. p. 210 = Strategus Antæus.
Scarites marginatus Fab. p. 106 = Pasimachus marginatus.
depressus Fab. p. 106 = " depressus.
sublævis B. p. 107 = " sublævis.
Georgiæ B. p. 107 = Morio Georgiæ.
quadrimaculatus B. p. 107 = Clivina bipustulata.
Sphæridium pallidum B. p. 157 (6).
crenatum B. p. 158 = Sphæridium scarabæoides.
læve B. p. 158 (6).
unistriatum B. p. 158 (6).
Sinodendron americanum B. p. 192 = Sinodendron cylindricum (9).
Stenocorus cyaneus Oliv. p. 249 = Desmocerus palliatus.
Trichius scaber B. p. 58 = Osmoderma scabra.
variegatus B. p. 59 = Valgus canaliculatus.
squamiger B. p. 160 = squamiger.
seticollis B. p. 59 = idem.

Tenebrio sublævis B. p. 163 = Nyctobates pensylvanica.
femoratus B. p. 163 = Haplandrus femoratus.
minimus B. p. 164 = Opatrinus notus.
variolosus B. p. 164 (7).
elongatus B. p. 164 = Zophobas morio.
Trox scabrosus B. p. 175.
unistriatus B. p. 175 = Trox suberosus.
crenatus B. p. 176 idem.
denticulatus B. p. 176 idem.
serrulatus B. p. 176 = Trox tuberculatus.
Trogosita virescens Oliv. p. 125.
angustata B. p. 125 = Languria angustata.
marginata B. p. 125 = Tenebrioides marginata.
maxillosa B. p. 125 = Gnathocerus cornutus.
mutica B. p. 126 (8).
depressior B. p. 126 (8).
subnigra B. 127 (8).

NOTES.

1—*Elater rufipes.* The name being preoccupied at the time it was given and not being recognizably described should be dropped.

2—*Helops americanus* Beauv. Should be adopted for the species now called *undulatus* Lec.

3—*Helops tristis* Beauv. This is certainly not a Helops but I cannot identify it. Is it American?

4—These two species cannot be identified and should be dropped from the insufficiency of the descriptions.

5—The occurrence of a species so large (13 mm.) in our territory is very doubtful.

6.—*S. pallidum* and *S. lævе* are said by Chevrolat to be Camptodes (Ann. Fr. 1853; p. 631). I think there can be no doubt that *S. pallidum* is *Pallodes silaceus* Er. and Beauvois' name should prevail. *S. lævе* I cannot identify while *S. unistriatum* seems to be *Dactylosternum abdominale* Fab.

7—This is called an Iphthimus by Chevrolat. It should doubtless be omitted from our lists.

8—These species are Tenebrioides but it is impossible to identify them by the descriptions and figures.

9—This species is European and does not occur in the U.S.

We call attention to the advertisement of the New Check list of Coleoptera on our cover. It is now in press, and subscriptions may be made through the Brooklyn Entomological Society.

* * *

The position of assistant curator of Entomology in the U.S. Museum will be filled by "ye Editor", who will nevertheless see that Ent. Amer. is issued promptly, as heretofore.

The Influence of Climate on Cicada septendecim.

By C. V. Riley.

I have instituted the present season a series of experiments in the transferring of the eggs of Brood XXII (*septendecim*) of the Periodical Cicada, to the extreme southern states, where no *septendecim* brood is known to occur and of Brood VII (*tredecim*) to northern states where no *tredecim* brood is known to occur. The purpose of the experiments is to test the effect of climate on the permanency of the two races; in other words, whether the larva in its subterranean life will be influenced by variation in the mean annual temperature. It will be interesting to observe whether or not the *tredecim* race will require more than 13 years for development when transferred north, or the *septendecim* race fewer than 17 years when transferred to the south.

The details of the experiments will be placed on record. The following transfers have already been made through the kind assistance of the gentlemen mentioned:

BROOD VII (*Tredecim*).

DATE.	EGGS RECEIVED FROM.	EGGS SENT TO.
July 1, 1885	P. H. Skipwith, Oxford, Miss.	J. A. Lintner, Albany, N.Y.
" 6, 1885	W. L. Peters, Senatobia, Miss.	J. H. Comstock, Ithaca, N.Y.
" 13, 1885	J. G. Barlow, Cadet, Mo.	Herbert Osborn, Ames, Ia.
" 13, 1885	P. H. Skipwith, Oxford, Miss.	Saml. Henshaw, Boston, Mass.
" 13, 1885	P. H. Skipwith, Oxford, Miss.	R. Thaxter, Kittery Pt., Me.

BROOD XXII (*Septendecim*).

DATE.	EGGS RECEIVED FROM,	EGGS SENT TO.
July 1, 1885	F. M. Webster, Lafayette, Ind.	E. A. Smith, Tuscaloosa, Ala.
" 6, 1885	F. M. Webster, Lafayette, Ind.	Geo. Noble, Savannah, Ga.
" 6, 1885	F. M. Webster, Lafayette, Ind.	J. E. Willett, Macon, Ga.
" 11, 1885	E. Roeder, New Hope, Pa.	D. L. Phares, Agr. Coll. Miss.
" 13, 1885	E. W. Allis, Adrian, Mich.	R. W. Jones, Columbus, Miss.

The Periodical Cicada on Staten Island.

By William T. Davis.

In 1877 the Periodical Cicada occurred on Staten Island in countless numbers. In places fences, trees and bushes were brown with cast skins, while the whir of their flight and monotonous song could be heard in every direction. This was the Hudson River brood, or that

numbered XII by Mr. Riley, and is the only one that seems to be generally remembered by observing persons on the Island. I recall thinking at the time, while I watched the pupa crawl up the garden fence and cast their skins as night came on. that I would not see any more of these insects on Staten Island until 1894.

However, on May 8th, 1881, while collecting insects with Mr. Leng in the neighborhood of Watchogue, Stat. Isl., we found a red-eyed Cicada pupa under a stone, and on June 5th, eight specimens were collected, all of them males and many of those being wet, having recently immerged. By the 12th of June they had become quite numerous, and I noted at the time that "about one tree I counted 52 pupa skins of the red-eyed Cicada".

This year I made special search for this Harvest fly, and as it occurred in the neighboring territory, I hoped to find an individual or two on Staten Island. On July 4th, while walking along a wood-path with my friend, Mr. James Raymond, he found the upper left wing of the insect I had been looking for, and which some bird had evidently torn from its owner. I have this fragment now, and there is no doubt of its identity.

From the above it seems that whenever the 17-year Cicada has occured as a brood or "Locust year" happens in the vicinity of Staten Island, that a few individuals have appeared on it. This fact has been observed before by Mr. S. S. Rathvon, (mentioned by Mr. Riley), in Lancaster Co., Pa., who noted all those broods in his locality; but it may be of interest to again call attention to it in connection with a new location.

NOTE.—Mr. Leng has this year also found a few pupa on Staten Island, but not common anywhere. J. B. S.

Descriptions of New Lepidoptera.

By B. Neumoegen.

Sphinx Separatus, n. sp.

Head, thorax and abdomen of mouse gray color, with darker shades on prothorax and thorax, shading laterally into whitish gray. Lateral lines of prothorax and patagiæ prominently marked in black, inner marginal line hardly distinguishable. Gray dorsal band on upper side of abdomen, with a black dorsal centre line on last and anal segments, ornamented with black segmentary bands. Primaries of mouse gray color, with markings like in *Sph. lugens* Wlk., in brownish black, but the apical diagonal dashes, the undulating transverse line, which runs partly along outer margin and in an irregular bend turns and rests within the central part of inner margin, as well the two horizontal dashes between median nervules, much more prominent and pronounced than in *lugens*. The space between interior and anterior transverse line and along costa, above discal spots of brownish hue, leaving in discal cell and above centre of inner margin, interspaces of grayish white. A round basal, black blotch. Secondaries whitish gray. with large marginal and prominent medial bands of brown-

ish black, the color in marginal band fading into gray towards anal angle. A black basal blotch. Fringes in primaries and secondaries whitish gray, ornamented with dark brown at intersection of nerves; less marked on secondaries. Below: legs and abdomen mouse gray. Primaries and secondaries brownish gray, the basal regions shading into light gray and assuming a whitish tint near anal angle of secondaries. The anterior transverse line on primaries and the marginal and medial bands on secondaries well pronounced. Fringes as above.

Habitat: New Mexico. Length of body 28 mm. Expanse of wings 110 mm. = 4.40 inches.

Types in coll. Prof. F. H. Snow and B. Neumœgen.

This stately insect has been, for many years, confounded with *Sph. lugens* Wlk., which comes from Mexico, although a few specimens have been found in our South-Western States. *Lugens* Wlk., is a considerably smaller insect of brownish olive tint, with delineations not so prominently marked, and faint basal blotches. The excellent figure of Mr. Strecker's *Sph. lugens* Wlk. (H. Strecker's No 13, fig. 12), would do well for *Sph. separatus*, if the color were changed and the other differences prominently marked.

Arctia v. Mormonica, N. var.

This is a beautiful variety of the *Incorrupta* type. Head, thorax and wings whitish yellow with black markings. The two black dots on prothorax missing and the black stripes on thorax and pategiæ slender. Primaries have the black markings of the various horizontal and transverse lines so diminutive that they appear merely as a number of irregular dots and dashes. Secondaries have a marginal transverse row of black dots and a prominent discal dot. A bright rose colored shade along basal margin. Abdomen bright rose, with black dorsal and lateral lines, and black anal tip.

Habitat: Northern Utah.

Types coll. Hy. Edwards and B. Neumœgen.

This insect is the connecting link between the *Nevadensis* and *docta* groups, and shows how near akin they are *Mormonica*, but for its color and slender markings, resembles *A. Antholea* Bd. in its primaries and *A. Mexicana* Gr. and R. in its secondaries.

As I stated, at the time, in Papilio Vol. VIII, p. 151, *A. incorrupta* Hy. Edw., is undoubtedly the typical form and *A. Nevadensis* Gr. and R. but a variety; but entomological etiquette, much to the detriment of clear scientific understanding, giving the first disvoverer the preference, *Nevadensis* will have to lead the line, which stands, as far as we know, now:

A. Nevadensis, Gr. and R.
v. incorrupta, Hy. Edw.
v. Sulphurica, Neumgn.
v. Mormonica, Neumgn.

A. elongata Stretch, from Spokane falls, Wash. T., lately described, seems to be but another local form of this extremely variable insect.

Arctia v. sulphurica: This is simply a correction for the *v. ochracea*

Neum. mentioned in Papilio III, p. 151; *ochracea* being preoccupied by Mr. Stretch for a var. of *A. Achaia*.

Adelocephala Bicolor var. Suprema.

A brilliant variety of this handsome Bombycid. Head, thorax, abdomen and legs pearl gray. Primaries brownish shading off into pearl gray, from apex along external and interior margins to base. Two distinct silvery white discal dots. Fringes pearl gray. Secondaries bright rose color, fading into pearl gray along margins.

Below, primaries bright rose color, shading into pearl gray along costa and margins. Secondaries uniform pearl gray, sprinkled with brown granules.

Habitat: Iowa.

Types coll. Mr. Geo. Franck and B. Neumœgen.

Some New Species of Hispini.

By John B. Smith.

While arranging my collection of *Chrysomelidæ* recently, I found that an *Odontota* given me by Mr. Julich which superficially resembled *dorsalis* was really a distinct species. As it seems probable that specimens of this species are confounded with *dorsalis* in collections I desire to call attention to the form. In order that our knowledge of the *Hispini* might be brought to date, Dr. Horn has kindly sent me such new species as were in his own collection.

Microrhopala uniformis, sp. nov.

Terminal joint of tarsi very little longer than lobes of third; antennal club elongate. Moderately robust, black, shining. Vertex not sulcate. Thorax rather longer than wide, wider at base, sides arquate, surface cribrate; a shallow fovea at base. Elytra nearly parallel, each distinctly tricostate, the intervals biseriately punctured except between the second and third in which four rows are observed at the apical fourth; margin not serrate.

Length 4—4.5 mm. *Hab.* Ariz.

Two specimens; one somewhat immature, and therefore piceous. Differs from *porcata* to which it is most nearly allied by not having the vertex sulcate, by the longer thorax, the sides more distinctly arquate, and by the more robust form. The species is to an extent intermediate between the groups into which the genus is divided, the posterior tarsi having the fourth joint very obviously exceeding the lobes of third, while in the anterior tarsi it is scarcely longer.

Odontota Horni, sp. nov.

Elytra with ten series of punctures, with three entire costæ; reddish yellow, suture narrowly black, the sides and tip not serrate or crenate. Antennæ and legs black. Head black, coarsely punctured. Prothorax yellow above and below; above coarsely punctured, the punctures deep and somewhat elongate; a smooth deeply impressed median line. Meso and meta-thorax black, sternum yellow. Abdomen pale, sides piceous. Size and form of *dorsalis*.

Length 6 mm. *Hab.* Mass.

This species bears a deceptive resemblance to *dorsalis*, and may be confused with it in collections. Superficially it differs only by the nar-

rower, equal, sutural vitta. It differs further in the bicolored underside, the want of serrations at the sides of elytra and in the presence of a distinct impressed median line on thorax. Several specimens from Mass. are in Mr. Julich's collection, and he informs me he has seen the same species in Mr. Lugger's collection taken near Baltimore. Dr. Horn says there is a specimen of the same species in the Leconte collection.

Odontota lateritia, sp. nov.

Elytra with eight series of punctures, divided into twos by three costæ. Form slender, parallel, margins of elytra distinctly serrulate. Above, uniformly blood red in color; beneath, head and prothorax red, else black. Antennæ and posterior legs black; median legs piceous, anterior legs rufo-piceous. Vertex with a median sulca. Thorax slightly wider at base, sides arquate; coarsely and densely punctured with an impressed median line, and a shallow transverse basal fovea.

Length 6 mm. *Hab.* Ariz. 1 specimen.

A very distinct species, belonging between *nervosa*, and *gracilis*. It is more robust than *gracilis* and more parallel than *nervosa*. Its uniform blood red color is characteristic and differs immediately from the two other species belonging to the same section.

Charistena bicolor, sp. nov.

Head and elytra metallic dark blue, shining, thorax red. Beneath prothorax and abdomen red, else blue black. Elongate, sides of the elytra parallel, margins not serrulate. Thorax as long as wide, feebly arquate in front, parallel behind, Disc hardly convex, with a large, shallow, fovea at base; sparsely punctured at middle, more densely at sides. Antennæ black, legs red.

Length 45 mm. *Hab.* New Mexico. 1 specimen.

The second and third joints of antennæ are equal in length, and the species is close is *Ariadne*. It stands before that species in the series. The intermediate femora do not appear to be serrulate, and the margins of the elytra are also smooth. It differs from all other species by the uniformly red thorax: the red legs also distinguish it from *Ariadne*.

On the discovery of Thoracantha, a tropical genus of Chalcid flies, in Florida.

By Wm. H. Ashmead, Jacksonville, Fla.

It may be interesting to many of your readers to know that that interesting genus of the *Chalcididæ*, Thoracantha, has a representative in the United States.

This spring, among other interesting captures, I took a beautiful male specimen of this unique genus, feeding upon the flowers of the gall-berry *Ilex glaber*, being I believe the first of the genus discovered on the North American Continent.

The genus has heretofore been considered tropical, all the described species having been taken in the tropics.

Thoracantha furcata Fabricius, is from Africa and Brazil; *T. striata*

Perty and *T. Latreillii* Guerin are from Brazil; while *T. nasua* Walker is from Philippine Islands, so that the discovery of the species in the U. S. is doubly interesting.

As my species does not agree with any of the descriptions accessible and is probably new, I name it in honor of the "Land of Flowers" and submit the following description.

Thoracantha floridana, n. sp.

♂. Length .17 inch. Black, shining, coarsely rugose. Head small, transversely rugose, not visible from above and held horizontally under the abnormally developed thorax: eyes moderate, oblong oval, mandibles large. curved, and 4-dentate; antennæ black, 12-jointed, 9-branched, scape moderately long, cylindrical, 2nd large, globular. 3rd to 11th short, cylindrical, slightly widened and truncate at tip, each emitting a long sparsely pubescent sub-clavate branch; 12th joint very long, about same size as the antennal branches and making the antennæ apparently ten-branched; thorax enormously developed and elevated, strongly rugose, the rugosities taking the form of longitudinal grooves, with short sparse pubescence; parapsides wide apart, distinct; scutellum abnormally developed, projecting posteriorly over the abdomen in the form of two long slightly curved horns, which are longitudinally grooved; wings are slightly brownish or fuliginous and when at rest lie flat under the horns; the marginal vein is long, thick, and brownish black, stigma a large brown black spot with the postmarginal vein very long; abdomen pedunculated, peduncle longer than abdomen, finely sculptured, cylindrical, slightly bent near the middle and thickest at base, abdomen smooth shining, black, compressed and when viewed from the side, triangular; legs testaceous, pubescent, coxæ well developed black, upper part of femora and upper edge of tibiæ brown, two apical spurs on posterior tibiæ, with one small spine on middle pair.

Described from one ♂ specimen.

Notes and News.

The meetings of the Entomological Club of the A.A.A.S. will be held in room "H" of the University of Michigan. The first meeting will be held on the 25th of August at 2 P.M. and the following is the programme for that meeting: 1. Annual address of the President, Dr. John G. Morris. 2. Election of Officers for the ensuing year. 3. Reports of Officers and Committees. 4. New business. 5. "A biographical sketch of Dr. Wm. Le Baron, late State Entomologist of Illinois" by Dr. F. W. Goding. 6. Notes on structural and systematic characters of some N. A. Lepidoptera, by John B. Smith.

Other papers have been promised by Prof. C. V. Riley, Prof. Herbert Osborn, Rev. Geo. D. Hulst, Dr. D. S. Kellicott and Prof. J. A. Lintner.

* * *

Mr. Ricksecker has written us a letter that is interesting enough to print almost in full; he says:

"Allow me to add my testimony to the fact, that at least some Curculio larvæ are lignivorous. At Monterey, Cal., I took numbers of

Cossonus piniphilus Boh. from a partly decayed pine log, and at Spokane Falls, W. T., I found *Cossonus crenatus* Horn under the bark of pine logs and stumps that were still sound. *Magdalis Le Contei* Horn I have suspected of depredating in living pine-trees, but am not certain of this. Of *Scolytidæ* I have seen great swarms of *Pityophthorus pubipennis* Lec. in the branches of newly-felled Live Oaks, and have taken the same or an allied species from sticks of oak that had previously been peeled for tan-bark. *P. hamatus* Lec., *Tomicus plastographus* Lec. and several species of *Dendroctonus* burrow in pine and spruce timber.

It must not be inferred, however, that because some of these insects burrow in timber-trees that they are destructive to our forests. Many species will never attack a healthy tree but have an acute sense for discovering an injured or dying tree or one that has recently fallen. It is the same with many Buprestidæ and Cerambycidæ. I have taken a dozen *Buprestis* upon a single pine log, and at night, in a wood-cutters camp, many specimens of *Monohammus* and *Acanthocinus* were taken on the piles of cord-wood (pine), and some were shaken from young pines that had been injured by fire, but none were observed on healthy trees. The apple-tree-borer, *Chrysobothris femorata*, attacks young fruit trees that have been scorched by the sun, but its natural food is the oak for I have seen dozens of them in the branches of a small Live-Oak that had been cut down less than an hour. *Xylotrechus nauticus* Mann., were also there, in great numbers, some copulating and others ovipositing. Thus also I have observed a swarm of many hnndreds of *Melanophila consputa* and *M. longipes* Say, where a brush fire had scorched some young spruce trees (*Abies Douglasii*). *M. fulvoguttata* also attacks the spruce and *M. gentilis* the pine, *Ergates spiculatus* Lec. flourishes equally well in spruce or in pine, but our common *Hylotrupes ligneus* Fab., I have found only in Redwood*, (*Sequoia sempervirens*), and *Neoclytus conjunctus* Lec. only in the Madrone.

In all these cases, however, it is only the dying or recently deceased wood that is attacked. Every tree that falls in the forest, every limb that is broken off by the wind, every stick that is cut by the wood-choppers axe, is attacked by its own peculiar species. They come from all directions. They swarm about it, and run up and down upon it The sexes will be in copulation; some females will be hunting for suitable crevices in the bark, in which to deposit their eggs; other females will be seen in the act of ovipositing, and last of all, not infrequently,—the parasitic Hymenoptera, in their turn, seeking the eggs of the wood-lovers,

* Mr. Julich informs me that in the east, he has found this species confined to red cedar. Ed.

and depositing their own upon them. In due time the eggs hatch, the larvæ bore the wood and live their required time, until they come forth as imagines to renew tneir war upon the dying or injured trees. As these species are generally represented by thousands of individuals in a given locality, it is easy to imagine how destructive they would be to our forests and orchards were they to attack healthy trees. As it is, their operations are fruitful of good in that they aid nature in the grand scheme of life. The fallen tree is perforated in all directions, moisture enters the perforations and Termites, fungi and decay all add their forces in reducing the wood to soil.

Many interesting facts continually come under ones observation, but the difficulty is in determining what is new and what is not. Thus, I was astonished some ago, in watching a swarm of perhaps a thousand *Melanophila consputa* and *M. longipes*, on some spruce trees and logs, after, a fire in the woods. A large old spruce log, partly decayed, and full of termites, had been subjected to considerable heat, and some of the bark had slipped off. Here I saw and watched four different individuals of *Melanophila* devour the scorched termites, which was the first instance I had observed of a carniverous habit in the *Buprestidæ*. This may, however be well known to others, Then again some very common facts seem to be little known. For instance, I once told Dr. Leconte that our common *Metrius contractus* was a bombardier beetle and he was surprised to hear it."

Melanophila longipes has been known to take playful nips out of exposed portions of the human body, but actual carnivorous habits have not been heretofore recorded to our knowledge. As to *Metrius*, the information is new. Dr. Horn has collected this insect and never noticed the bombardier habit, and Mr. Julich has also taken them in large numbers without making that observation. Have any others of our Western friends noticed this fact?

* * *

The death of Mr. H. K. Morrison has made an opening for an intelligent, enterprising and good collector. Coleoptera and Lepidoptera find a ready sale, and other orders are attracting increased attention here and may also be disposed of in Europe. Who will undertake this?

* * *

To facilitate exchanges among collectors we will hereafter publish a separate page of advertisements of offers and requests to exchange. A uniform charge of 5 cents per line will be made and the ads. will remain until crowded out by others. *Desiderata* may be mentioned and lists of duplicates added. Check list numbers or names may be used.

Book Notices.

Cut Worms. A paper read before the New York State Agricultural Society, at the Annual Meeting, January 21, 1885, by J. A. Lintner, Ph. D., New York State Entomologist. 8vo. 25 pp. figures.

Contains a brief review of the literature, a synopsis of their life history, and a compilation of what is known of remedies.

Studies among the Meloidæ. By Geo. H. Horn, M. D. Tr. Am. Ent. Soc. XII, pp. 107—116, March 1885.

Descriptions of New North American Scarabæidæ by Geo. H. Horn, M. D. Tr. Am. Ent. Soc. XII, pp. 117—128, March 1885.

Contributions to the Coleopterology of the United States (No. 4) by Geo. H. Horn, M. D. Tr. Am. Ent. Soc. XII, pp. 128—162. March 1885. Plates V and VI illustrate these articles.

On the species of Canthon and Phanæus of the United States, with notes on other genera, by Frederick Blanchard. Tr. Am. Ent. Soc. XII, pp. 163—172, May 1885.

We are glad to see Mr. Blanchard in the ranks of our systematic workers. He has been long and favorably known as a collector, and his paper gives evidence that he is able to do good work in the systematic line.

The Periodical Cicada. An account of Cicada septendecim and its tredecim race, with a chronology of all broods known, by Chas. V. Riley, Ph. D. Bulletin No. 8, Div. of Entomology U. S. Dept. of Agricult. June 1885, pp. 46, figures.

This pamphlet is accompanied by Circular No. 16, giving the distribution of the two broods due this year, and stating that notes of the appearance, the numbers and distribution of the broods are desired. It would be a desirable thing for all Entomologists to gather what information they can in reference to these insects if they appear in their localities and send the same to Prof. Riley.

Descriptions of some new Cerambycidæ with notes by Geo. H. Horn, M.D. Trans. Am. Ent. Soc. XII, pp. 173—197, June 1885.

Gives synopses of *Oxoplus*, *Stenosphenus*, *Monilema*, *Monohammus*, *Goes*, *Onciderus*, *Eupogonius* and *Dysphaga*.

Synopsis of the Throscidæ of the United States. By Geo. H. Horn, M. D. Trans. Am. Ent. Soc. XII, pp. 198—208, June 1885.

A Study of the species of Cryptobium of North America. By George H. Horn, M. D. Tr. Am. Ent. Soc. XII, pp. 85—106. Pl. I and II. (Feb. 1885.)

Dr. Horn here gives us an exceedingly interesting paper, illustrating some remarkable peculiarities of structure. These were touched upon in the March Meeting of the Brooklyn Entomological Society, and are here elaborated. Of many species there are three forms of structure of the 4th ventral segment of the ♂. One is called a perfect ♂, another an imperfect ♂, the third an incomplete ♂. These are but descriptive terms and are not applied to differences of function. It is however an exceedingly interesting question whether these differences in structure

have not some corresponding physiological difference. It seems highly probable, and yet it is difficult to imagine what it could be. The complete ♂ is the most common, the imperfect ♂ nearly as plentiful while the incomplete ♂ is comparatively rare.

The imported Elm Leaf Beetle. Its habits and Natural History and means of counteracting its injuries. Bulletin No. 6 of Div. of Ent. U. S. Department of Agriculture pp. 18; 1 pl. May 1885.

Insects affecting growing wheat. By F. M. Webster. Purdue Univ. Bulletin No. 3. Indianapolis April 1885, pp. 6; 3 Plates.

Obituary Note.

We are sorry to record the death of Mr. H. K. Morrison, of Morganton, N. C. Mr. Morrison was born at Boston, Mass., January 24, 1854, and died at his home in Morganton, June 15, 1885, of inflamation of the bowels. The passion for collecting insects was strong with him from childhood, and in his twentieth year he determined to give up his business as shoe dealer and devote himself entirely to Entomology. At this time he began publishing, and described quite a number of heterocerous lepidoptera and made valuable notes and observations, especially in the Noctuidæ. The papers were principally in 1873. 1874 and 1875 in the Boston Proceedings, and Proc. Ac. N. S., Phil. Many notes and shorter papers are in the Canadian Entomologist for those years. They display strong appreciation of characters used in systematic Entomology, and render it a matter of regret that he did not continue the study. However he had determined to earn his living as a collector, and the long trips necessitated by this made systematic work an impossibility; the more so as justice to those purchasing from him required that rarities should go to them in the sets taken. In the spring of '76 he went south, collected in Georgia and the mountains of Western N. C., in '77 he married and established his home in Morganton, whence his later trips were made. In '77 he also made a three months trip to Colorado; the summer of '78 he collected in the black hills; '79 in Nev., Cal. and Utah, '80 and '81 in Wash. Terr., Or. and So. Cal.; '82 and '83 in Arizona, '84 in Southern Florida and in the spring of '85 he again spent some time at Key West. Mr. Morrison was a dilligent and careful collector and found a large number of new species in all orders, so that "Collected by Mr. Morrison" appears everywhere in descriptive papers. He was well known not only everywhere in America, but also in Europe, and had built up quite an extensive business in this line. His premature death has deprived our science of one of its most active workers in the collecting line and will leave a vacancy hard to be filled.

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Descriptions of New Species of Heterocera.

By R. H. Stretch.

As many of the readers of "Entomologica Americana" are aware, I have for the past three years been engaged on a monograph of the groups *Zygænidæ*, *Lithosiidæ* and *Arctiidæ* of North America, intended to collate all the literature thereon, and to illustrate *all* the species with a good recognizable figure. The work is now in such a state, that its completion depends only on my ability to secure a certain number of types for figuring; and in this place I propose, while describing certain new forms, so as to obviate the risk of their being described while the work is in the press, and so creating synonyms, to indicate my desiderata and ask assistance from those who may be fortunate enough to possess the species, either in the form of drawings or photographs, or the loan of the insects themselves. At this date there are drawn about 350 figures, illustrating 210 species, most of them already printed.

Scepsis Wrightii. ♀.♂. Similar to *S. fulvicollis*, but smaller. Head, palpi, antennæ, legs, thorax and abdomen, black, the latter with blueish reflections. Prothorax white with very pale yellowish tinge, not extending to the underside of the head and palpi. Primaries dark brown, as in *fulvicollis*, but with paler fringes and yellowish costa. Secondaries diaphanous, with irregular blackish margin, as in *fulvicollis*. Beneath as above.

Expanse of wings 1.10 inches. *Hab.* Southern California, Wright.

Described from 7 ♂♀, received from Mr. G. W. Wright, after whom it is named. Readily distinguished by its smaller size and the tint and distribution of the prothorax coloring.

Harrisina australis. ♂. Similar to *H. Americana*, but larger. Head black. Antennæ black, with a metallic blue tinge. Abdomen and legs black. Prothorax orange, the color extending to the base of the patagia, and underside of the head and breast. Wings shaped as in *americana*, but more opaque, blacker and with a more positive blackish-green reflection.

Expanse of wings 1.15; length of body 0.50 inches. *Hab.* Florida, Hy. Edwards.

Out of the four American species this is the only one which has the underside of the head yellow, and this character will instantly separate it. In size, the range of *americana* is from 0.75 to 1.00 inch, with an average of about 0.90 inch, so there is a notable difference in size as well as color.

Harrisina metallica. Similar to *americana* but much larger. Entire insect above and below, lustrous blueish-green, with the wings a shade yellower than the abdomen. Prothorax orange, the color not extending to the underside of the head. The wings have the apices much more produced than in *americana* or *australis*.

Expanse of wings 1.60 inches; length of body 0.50 inch. *Hab.* New Mexico, Prof. Snow.

Very distinct from any of the other American forms. The types were received from Prof. Snow under the name of *H. americana*, and it may probably be in other collections under that label.

Nola hyemalis. ♀♂. Head and palpi whitish, palpi darker beneath. Abdomen pale. Body beneath, and legs darker. Primaries very pale gray, resulting from a sprinkling of minute brown dots on a white ground, somewhat darker towards the outer margin and apex. Costa with a dark brown streak at the base, and wings crossed with three indistinct lines made up of dots. Basal line most distinct, at one third from the base, oblique, straight, parallel with the outer margin, with a distinct brown dot near the costa, made up of tufted scales. The second line is slightly beyond the middle, parallel with outer margin for half its length, then rounding rapidly to the costa. The third line originates near the anal angle, is parallel with the second, and leaves the terminal space broadest on the costa. Each of these lines is followed outwardly by a very narrow white shade, and the tip of the wing is faintly striped, owing to the varying depth of color of the veins and interspaces. Fringes long, darker than the wing, and distinctly separated therefrom by a very narrow pale line.

Secondaries very pale, shaded with darker tints at the apex. Fringes very long, concolorous. Beneath, immaculate, primaries darkest.

Expanse of wings 0 80 inch. *Hab.* Crystal Springs, San Mateo County, (Hy. Edwards); Alameda County, Calif. (Behr).

Does not appear to be uncommon in March and April on fences and at light.

Cisthene plumbea. Head and thorax lead color. Abdomen bright red above, dusky beneath. Primaries lustrous drab or lead color, with a somewhat triangular whitish spot on the inner margin, two thirds from the base. Secondaries clear pink, with a broad costal lead colored margin, which is continued along the outer margin, decreasing in width to the anal angle. Beneath as above, but somewhat paler.

Expanse of wings 0.85 inch. *Hab.* Texas, Belfrage.

Similar to *unifascia*, but of a darker and different tint and fewer pale markings.

Cisthene lactea. Eyes black. Antennæ brown. Palpi black. Tongue as long as the body. Entire insect otherwise white above and on the body parts, the underside of the wings being smoky, especially the primaries, on the latter are usually six small black spots, three on the costa, equally spaced; one just outside the discal cell, and two in the space below the median vein, one of them being near the base, and the other near the outer margin.

Expanse of wings 0.70 inch. *Hab.* Providence Mountain, Bernardino County, California.

This species may not strictly belong to *Cisthene* but the material is too scant to allow of dissection.

Crocata Belfragei. Eyes black. Head, palpi, collar, thorax and primaries, concolorous, clear yellowish brown. Secondaries reddish, with a moderately wide, outer, blackish border. Fringes red. Beneath reddish on all wings, as are the underside of palpi and abdomen; the latter above, dull orange, with a dorsal and lateral series of black spots. Legs somewhat dusky.

Expanse of wings 0.85 inch. *Hab.* Texas, Belfrage.

Intermediate in size between *rubicundaria* and *costata*, and very different from either in color and shape of the primaries, which are square at the tips, the inner margin being much longer proportionally, and the outer margin less oblique than in either of the species mentioned.

Crocota costata. Eyes black, head reddish, palpi same with dusky tips. Thorax pale stone color, collar very narrowly edged with red. Abdomen pale red. Underparts reddish; outside of legs dusky. Primaries pale stone color, dusted with red scales, which are most conspicuous along the costa and on the discal vein. Secondaries pale reddish, of the tint of red-lead. Beneath, all wings pale reddish, not so dark as secondaries above.

Expanse of wings 1.10 inch. *Hab.* Texas, Belfrage.

Allied to *rubicundaria*, but larger; with the primaries and thorax of a very different color; the primaries are long and comparatively narrow, with the outer margin very oblique.

Crocata obscura. Pale fawn color to smoky brown; when of the latter color, the entire insect is concolorous, except the eyes which are black, and the costa of the primaries beneath which is enclosed to red. The same is the case when entirely fawn color. Sometimes the primaries are fawn color and the secondaries smoky, in which case the head, thorax and abdomen are the color of the primaries.

Expanse of wings 1.05 inch. *Hab.* Pennsylvania, Strecker; New Hampshire, Fernald.

This insect has been sent to me under the name of *ferruginosa*, Walker, and is so described by Packard in his monograph of the Bombycidæ, but this cannot be as *ferruginosa* has a discal dot on the secondaries like *brevicornis*.

Callimorpha reversa. ♂♀. Head and prothorax ochre yellow. Palpi ochre yellow, black at the tips. Patagia white. Thorax white, with a broad central brown stripe. Abdomen white, with traces of a narrow dorsal stripe. Legs yellowish, coxæ of anterior pair with a round black dot; outer edges of anterior and middle pair dusky. Primaries silky white; inner margin, costa, and outer margin rather broadly edged with dark brown, interrupted at the apex. A brown band crosses the wing from the anal angle to the costa, about two-fifths from the base; from the centre of this band, a second brown band runs to the outer margin just below the apex, dividing the wing into three principal white patches. The basal patch is triangular (sometimes divided by a narrow basal brown band). That on the outer margin is more or less ovate, and is frequently divided near the apex by the brown nervules into three sub-equal spots; and the costal patch is more or less clearly divided into three sub-equal spots, by an expansion on the discal vein of the brown costal margin, and by toothed enlargements of the brown markings, between the discal vein and apex. Secondaries clear white, immaculate. Beneath as above, but the markings are more obscure, and the costa of all the wings is tinged with yellow ochre.

Expanse of wings 1.50 to 1.90 inch! *Hab.* Canada, Saunders; New York, Hy. Edwards; Kansas, Prof. Snow.

This species has long been confounded with *Lecontei*. Harris and Doubleday discussed the question of their specific identity, and Canadian Entomologists have long contended that two species were included under the latter name, but so far as I know without pointing out the most recognizable character, which is to be found in the main transverse band of the primaries. In *Lecontei*, this starts from the inner margin and goes to the apex, while in *reversa*, it starts from the outer margin and goes to the anal angle, being exactly as in *Clymene*. Just as is often the case in the latter species, the transverse band is sometimes partly absolete near to the costa, and this seems to be the chief variation.

Arctia approximata. ♀. Head and palpi black beneath, front and vertex pale. Thorax cream color; prothorax with two black spots, thorax with three black stripes. Abdomen red above, with dorsal series of black spots; tip and underside black. Legs black touched with cream color. Primaries velvety black, with all the margins, the nerves and nervules, terminal W, terminal transverse band on which the W rests, and longitudinal streak, dark cream color. The terminal band is incomplete, wanting the portion between the subcostal and median veins. A small pale dot above the origin of the first median vein, is all that remains of the median band. No basal or sub-basal bands. Secondaries clear red, yellowish round the black spots, which consist of the discal spot of the median row, all four of the submarginal row, and the two apical spots of the marginal series, which are fused together round the apex. No basals clouds. Beneath as above, but colors more diffused.

Expanse of wings 1.45 inch.. length of body 0.52 inch. *Hab.* Canada, Hy. Edwards.

A small species close to *Saundersii*, of which it may be only a variety. The pattern of the primaries resembles no other species. The secondaries are like *Saundersii* and *intermedia*. Described from 1 ♀,

sent me by Henry Edwards, who states that he has another identically the same.

Arctia obliterata. ♂. Head beneath and palpi black; above pale yellowish, with black spot between the antennæ. Thorax pale yellowish, with two prothoracic and three thoracic stripes. Abdomen black above, yellow ochre along the sides, with black lateral spots; beneath whitish with two rows of black spots. Legs black; femora of the anterior pair touched with ochre; outside of all the tibiæ whitish. Primaries dark blackish brown; costa, fringes and inner margin, narrowly pale yellow, as well as the veins, longitudinal stripe, terminal W, and costal half of the terminal band, this being all that is left of the transverse bands except traces of the median. Secondaries dull red with black spots, the marginal and submarginal rows being all present and of good size. There are faint traces of all the row of median spots, but the discal one is the only one conspicuous. Base unclouded. Apical spots slightly fused into a narrow apical border. Beneath, as above, but the colors paler and more diffuse.

Expanse of wings 1.30 inch. *Hab.* (?)

Described from 1 ♂ in only fair condition, sent me many years ago by W. H. Edwards, Esq. After seeing all the other American *Arctians* I can refer it to none. The ornamentation of the primaries places it in the *Quenselii, gelida* group, characterized by the presence of only the costal half of the terminal band, which imparts to them a very distinct character. *Obliterata* is however the only one in which the secondaries are spotted, and also the only one in which they are red.

Arctia elongata. ♀. Head and palpi black, front very narrowly margined with pale yellowish white. Thorax the same color, with two prothoracic and three thoracic stripes which occupy nearly the entire surface. Abdomen above yellow-ochre, last segment whitish; terminal hairs, two lateral rows of spots, and a moderately broad dorsal stripe, black. Thorax and abdomen beneath, black, with a few pale marks on the edges of the segments of the latter. Legs imperfect in my specimen. Primaries black, markings pale yellowish white. These consist of a narrow costal border not reaching beyond the median band; a similar border to the inner margin and the fringes; the median vein very narrowly as far as the terminal band; the longitudinal streak, terminal W, terminal and median bands both extending from costa to beyond the longitudinal streak, and traces on the costa of a sub-basal band. Secondaries clear ochre-yellow, with black spots. All four spots of the marginal and sub-marginal rows are present, the costal spot of the former, and the three apical spots of the latter row, being fused into a narrow apical margin. All three spots of the median row present, the inner one being connected with the base by a black streak. Fringes yellow. Beneath, similar to the upper surface, but colors less pronounced.

Expanse of wings 1.55 inch. *Hab.* Spokane Falls, Washington Territory.

Described from one female in good preservation except the legs and antennæ. Collected by Mr. Ricksecker and presented to me by Mr. Rivers of Oakland, California. The species is very distinct. In shape

it approaches nearest to *Dahurica*, the wings being rather narrow, with the outer margin oblique, and apex acute. If the veins were all pale, it would somewhat resemble the yellow forms of *achaia* in color, but not in shape.

Euchætes murina. ♂♀. Eyes dark brown. Head and thorax clear stone color, with a pink shade in the suture between them. Palpi dusky, a few pink hairs at their base. Abdomen above reddish, with a dorsal row of small black dots. Beneath stone color, as are the legs, the fore coxæ of the latter shaded with pink. All the wings pale stone color, above and below. Fringes and extreme costa paler.

Expanse of wings 1.25 inch. *Hab.* Tucson, Ariz.

Not uncommon at light in August. In form it is near *egle*, but smaller, and differs from it in having pale costa and red abdomen.

Euchætes Bolteri. ♀. Palpi, eyes and antennæ dull black. Thorax white above, with a fine red line on the front of the prothorax. Thorax below slate color with a red patch centrally. Legs dark gray; coxæ of anterior pair red; base of the femora white. Abdomen bright orange above, dull white beneath, with a white anal tuft, a dorsal series of black dots as well as a lateral series. Primaries dull white, slightly tinted on the outer half with irregular markings of light stone-drab color. These markings vary in depth of color in different specimens, and extent; in one specimen they are so close that only fine white points of the ground color of the wing show between them. Secondaries pale slate color. Beneath, all the wings are uniform pale stone-color.

Expanse of wings 1.40 inch. *Hab.* Texas, A. Bolter.

The above description was kindly furnished me by Mr. Bolter, drawn up from the three females in his possession. The species is very distinct, being close to *elegans*, but differing in color of abdomen and tint of wings.

Halesidota scapularis. ♂. Eyes black. Head pale fawn color. Antennæ stout, long, rufous. Prothorax dirty white, with brown median line. Patagia like prothorax, brown in front. Thorax brown, with triangular white spot in front. Abdomen dark yellow ochre above, banded below with brown and pale fawn color. Primaries dark brown with six irregular bands of white spots. The first basal and narrow, the spots fused into an irregular curved band. The second row consists of a large irregular spot below the median vein, and a long costal spot divided by the subcostal vein. The third row has a similar costal spot, a small one below the median vein, and a large one above and a small one below the submedian vein. The fourth row has five spots, the middle one very small. The fifth row is submarginal, and consists of eight lunate spots decreasing in size towards the costa where they also become more ovate. The sixth row is marginal, triangular, a small spot at the end of each of the nervules. Secondaries very pale fawn-white, with four darker submarginal spots, those near the apex largest. ♀. Similar to ♂, but the head brown, the spots on the primaries larger and slightly more irregular, and but two spots on the secondaries, the largest near the apex. Beneath, the secondaries show a dusky shade at the middle of the costa, irregularly connected with the apical spot.

Expanse of wings ♂ 2.00, ♀ 2.30 inches. *Hab.* New Mexico, A. Bolter.

Allied to *Sobrina, Ingens* and *Argentata,* but distinguished from all these by the thoracic parts.

DESIDERATA.

Eudryas Stæ Johannis, Walker.
Ctenucha Robinsonii, Boisd.
Lycomorpha Palmerii, Packard.
Penthetria majuscula, Hy. Edwards.
" parvula, Hy. Edwards.
Nola anfracta, H. Edwards.
Hypoprepia inculta, H. Edwards.
Cisthene tenuifascia, Harvey.
Eulithosia thoracica, H. Edwards.
" composita, H. Edwards.
Nemeophila Scudderi, Packard.
" Geddesii, Neumoegen.
Alexicles aspersa, Grote.
Spilosoma antigone, Strecker.
Ectypia bivittata, Clemens.
Leucarctia permaculata, Packard.
Halesidota Davisii, Hy. Edwards.
" mixta, Neumoegen.
" minima, Neumoegen.
" cinnamomea, Boisduval.
" macularia, Walker.
Euhalesidota pura, Grote.
Vanessodes fuscipes.
Euchætes inopinatus, Hy. Edwards.

Of these desiderata, *Eudryas Stæ Johannis* is in the British Museum; the types of *L. Palmerii* and *Leucarctia permaculata*, as well as *Ectypia bivittata* appear to be hopelessly lost; *Ctenucha Robinsonii* and *Halesidota cinnamomea* appear to exist only in the Boisduval collection in France; *Halesidota macularia* is in the British Museum, but apparently not known in the United States; and lastly *Nemeophila Scudderi* (Platarctia, Packard) is *Nemeophila Selwynii*, H. Edwards, and may be in collections under that name.

NOTE ON SANDALUS.

Sandalus has always been rather an uncommon insect near N.Y. while Mr. H. W. Wenzel of Philadelphia has found it commonly enough; he writes: "In regard to finding *Sandalus petrophyà*, you inform me that the insect is rare in the neighborhood of New York. I think if it is sought for in the right season and locality it might be found as frequently as I find it near Philadelphia. I do not think *Sandalus* is a local insect, as I have found it in several places, not before the end of June, and the most of them I have captured in the middle of July, and always on Beech, crawling on the bark or sheltered along the roots of the tree. Their movements are very slow. I have frequently observed them with head and thorax covered with dirt; have also found them half out of the ground, but only in the morning. The females are found more frequent than the males. So far as my experience goes, the larvæ evidently live on Beech. The new classification refers to *Sandalus* as affecting various cedars; I have collected in several cedar districts through Southern New Jersey but never met with a single specimen on cedar, and wherever I have found them, there was no cedar in the vicinity."

Synonymical Notes. (No. 3.)

By George H. Horn, M. D.

During a visit made a short time ago to the Museum at Cambridge, I had an opportunity to examine the types of the species described by Lieut. T. L. Casey, now the property of the Museum.

The proposed publication of a new list of the Coleoptera of our fauna rendered it advisable to go carefully over the writings of those who have specially treated the species of our fauna. With this view the descriptions of Kirby, Leconte, Randall, Newman and Palisot de Beauvois have been as far as possible re-studied, and those of Melsheimer, Haldeman and Ziegler are in progress.

In the following pages especial attention has been given to the species described in an isolated manner, those treated synoptically such as the Euplecti, Euæsthetus and Steni have been left for future study.

The remarks which follow are based on a comparison of the species with those of the cabinet of Dr. Leconte, now part of the Museum at Cambridge.

A few of the species mentioned below have been described in the Brooklyn Bulletin and are so quoted, the others are in pamphlets privately printed, entitled "Contributions to the systematic and descriptive Coleopterology of the United States", parts 1 and 2, (the paging being continuous.) and "Revision of the Stenini of America North of Mexico".

Pterostichus zephyrus, 1, p. 2 = P. adoxus *Say*, var. *rejectus*, Lec.
" osculans, id. = P. diligendus *Chd.*
" manhattanis, 2, p. 72 = P. lucublandus *Say.*
Amara apachensis, 1, p. 3 = A. remotestriata *Dej.*, var. *relucens* Mann.
" marylandica, 1, p. 4 = A. basillaris *Say.*
" pallida, 1, p. 5 = A. rubrica *Hald.*
" ferruginea, 1, p. 5 = A. rubrica *var.*
Bembidium vernula, 2, p. 62 = B. constrictum *Lec. typical!*
" acticola, 2, p. 63 = id. slight variety.
" militare, 2, p. 65 = B. picipes *Kby.*
" vividum, 2, p. 66 = B. contractum *Say.*
" dejectum, 2, p. 67 = (1).
" vinnulum, 1, p. 15 = (2).
Tachys occultator, 2, p. 69 is allied to *pallidus* and *mordax.*
" litoralis, 1, p. 15 = T. pallidus *Chd.*
Barytachys glossema, 2, p. 70 = T. granarius *Dej.*
" gemellus, 2, p. 71 (3).
Discoderus pinguis, 2, p. 75 = D. robustus *Horn* (4).
Cratacanthus litoreus, 2, p. 74 = C. dubius *Beauv.*
" bisectus, 2, p. 75 = id.
" texanus, 2, p. 75 = id.

Bradycellus lucidus, 1, p. 8 (5).

Stenolophus gracilis, 1, p. 14 = S. ochropezus *Say*.
" scitulus, 2, p. 78 = S. conjunctus *Say*, var. *rotundatus Lec.*
Harpalus opacus, 1, p. 8 = Anisodactylus nigerrimus *Dej.*
" manhattanis, 1, p. 9 = Xestonotus lugubris *Dej.*
" vespertinus, 1, p. 10 (6).
" placidus, 1, p. 10 = H. fallax *Lec.*
" convictor, 1, p. 12 = H. viridiæneus *Beauv.*
" canonicus, 1, p. 12 = id.
" lustralis, 1, p. 12 = id.
" ænescens, 1, p. 12 = id.

Selenophorus æneopiceus, 1, p. 13 = S. pedicularius *Dej.*
" perpolitus, 2, p. 76 = gagatinus *Dej*, var.
Anisodactylus arizonæ, 1, p. 6 (7).
Bidessus nigrinus, 2, p. 80 = B. affinis *Say*, var. *obscurellus Lec.*
Helephorus pallens, 2, p. 81 = H. lineatus *Say*.
Philhydrus angustulus 2, p. 83 = P. reflexipennis *Zimm.*
Colon decoris, 2, p. 84 = C. thoracicum *Horn.*
Eumicrus vestalis, 2, p. 85, a valid species.
" punctatus, 2, p. 86 = Cholerus Zimmermanni *Schaum.*
Tychus testaceus, 1, p. 31 = T. longipalpus *Lec.*, fide Lec.

Bryaxis facilis. 2, p. 87, near to B. rubicunda *Aube.*
" gracilis, 1, p. 32, id. id.
" inopia, 1, p. 33, very near B. puncticollis *Lec.*
Batrisus denticollis, 2, p. 87 = near B. nigricans *Lec.*
" virginiæ, 2, p. 90, allied to B. striatus *Lec.*
" aterrimus, 2, p. 91, near B. spretus *Lec.* and B. striatus *Lec.*
Arthmius gracilior, 2, p. 88 (8).
Euplectini (species) (9).
Tithanis, new genus = Maseochara *Sharp.*
Emplenota maritima, 1, p. 17 is Polystoma maritimum.
Quedius silvicola, 2, p. 123 = Q. fulgidus *Fab.* var.
Belonuchus moquinus, 2, p. 125 = Belonuchus xanthomelas *Solsky.* (10).
Xantholinus fucosus, 2, p. 126 = X. emmesus *Grav.* var. *fusciceps* Fvl.
Cryptobium capito, 2, p. 127 = C. pallipes *Grav.*
" convergens, 2, p. 129 = C. floridanum *Lec.*
" parallelum, 2, p. 130 id.
" proximum, 2, p. 132 id.

Lathrobium tricolor, 2, p. 133 = L. ventrale *Lec.*
" inops, 2, p. 135 = L. othioides *Lec.*
Orus picipes, 2, p. 136 = Scopæus picipes.
" punctatus, 2. p. 138 = Scopæus punctatus (11).
Stilicus latiusculus, 2, p. 139, a valid species.
Lithocharis tabacina, B. B. VI, p. 65, a valid species.
Edaphus carinatus, 1, p. 30 = E. nitidus *Lec.*
" luculentus, 1, p. 31 id.
Euæsthetus (species) 1, p. 19 (12).
Erchomus flavidus, 2, p. 141 = E. ventriculus *Er. immature.*

Conurus versicolor, 2, p. 142 = C. crassum *Grav. immature.*
" imbricatus, 2, p. 143 = C. pubescens *Payk.*
" occultus, 2, p. 145 = C. basale *Say.*
" corticola, 2, p. 145 = C. opicum *Say.*
" setifer, 2, p. 147 = id.
Bolitobius facilis, 2, p. 148 = B. trinotatus *Er.* cab. Lec.
" occiduus, 2, p. 150 = B. cincticollis *Say.*
Bryoporus parvulus, 2, p. 151 = B. rufescens *Lec.* var. *testaceus* Lec.
Mycetoporus inquisitus, 2, p. 152 = M. splendidus *Grav.*
Apocellus (species) 2, p. 153 (12).
Ptilium fungicola, 2, p. 162 = P. Hornianum *Matth.*
" truncatum, 2, p. 163 (13).
Trichopteryx radicola, 2, p. 163 (14).
" funginus, 2, p. 164 = T. discolor *Hald.*
" longipennis, 2, p. 166 = T. parallela *Mots.*
Cryptamorpha Hubbardi, 2, p. 167 = Psammœcus Desjardinsii *Guer.* (15).
Carpophilus zuni, 1, p. 34, a valid species.
Epuræa papagona, 1, p. 35, allied to E. rufida *Mels*
Rhizophagus procerus, 2, p. 168, a valid species.
Monocrepidius finitimus, 2, p. 169 = M. auritus *Hbst.*
Drasterius fretus, 2, p. 170 = D. amabilis *Lec.*
Anthaxia nanula, 2, p. 174 = D. æneogaster *L.* et *G.*
" simiola, 2, p. 175 = id.
" ænescens, 2, p. 175 = id.
Lyctus parvulus, 2, p. 175 = L. opaculus *Lec.*
Ennearthron californicum, 1, p. 36, a valid species.
" unicolor, 1, p. 37 = E. Mellyi *Mellie.*
Serica parallela, 2. p. 176 = S. sericea *Illig. immature.*
" porcula, 2, p. 177 = S. elongatula *Horn.*
Diplotaxis levicula, 2, p. 178 = D. punctata *Lec.*
" popino, 2, p. 179, a valid species.
Strigoderma pimalis, 2, p. 181 = S. arboricola *Fab.* (16).
Lachnosterna subpruinosa, 1, p. 38 (17).
Cryptocephalus ellipsoidalis, B. B. VI, p. 66 = C. insertus *Hald.*
Disonycha pulchra, 1, p. 51 = D. punctigera *Lec.*
" procera, 2, p. 182 = D. pensylvanica *Illig.*
" arizonæ, 1, p. 52 = near maritima *Mann.*
Chætocnema paupercula, 1, p. 53 = C. parcepunctata *Cr.* immature.
Psylliodes extricata, 1, p. 54 = punctulata *Mels. very immature.*
" angustata, 1, p. 55 = P. interstitialis *Lec.* var. *convexior* Lec.
Bruchus cubiculus, 2, p. 183 = B. impiger *Horn* ♀.
Epitzagus ovalis, 2, p. 184 (18).
Eurymetopon piceum, 1, p. 40 = E. emarginatum *Cas. immature.*
" emarginatum, 1, p. 41 (20).
" dubium, 1, p. 44 (19).
" carbonatum, 1, p. 43, is the ♂ of dubium (21).
" sculptile, 1, p. 44 = E. emarginatum *Cas.*
" papagonum, 1, p. 42 = id. (22).
Emmenastus nanulus, 1, p. 45, nearly related to *obesus Lec.*

Conontis elliptica, 1, p. 46 (23).
Eleodes arcuata, 1, p. 47 = E. extricata *Say* (24)
Blapstinus pimalis, 2, p. 185 = B. pulverulentus *Mann.*
Platydema pernigrum, 1, p. 49 (25).
" parvulum, 1, p. 50 = P. excavatum *Say.*
" opaculum, 1, p. 51 = P. ruficorne *Sturm*, var. *anale* Hald.
Mordella deserta, 2, p. 186 = M. lunulata *Helm.* var.
Xylophilus densus, 2, p. 187, allied to *piceus* Lec.
Notoxus delicatus, 2, p. 189 = N. monodon *Fab.* var. *Pilatei* Laf.
Anthicus facilis, 2, p. 190 = A. spretus *Lec.*
Rhynchites naso, 2, p. 190 (26).
Anthonomus moleculus. 2, p. 191, a valid species.
Elleschus californicus, 2, p 193 = E. ephippiatus *Say*
Tyloderma nigrum, 1, p. 56 = T. æreum *Say.*
" punctatum, 1, p. 57 = id.
Apion vespertinum, B. B. VI, p. 67, a valid species.
Prachytarsus paululus, 2, p. 194 = B. tomentosus *Say* ♂.

The following new genera of Carabidæ have been proposed:

Amerinus for *Bradycellus linearis* Lec. In the first description (1, p. 7) no distinctive generic characters are given. In fact there are none if we except the presence of a few squamules on the middle male tarsi. The new name is unnecessary.

Glycerius for *Bradycellus nitidus* Dej. The character given being the number of setæ along the lateral margin of the thorax. The value of this will be recognized by those having some knowledge of the Carabidæ. The name is also unnecessary.

1—*Bembidium dejectum* Casey. This species belongs to that series of the Peryphus group in which the dorsal punctures are at the middle of the third interval, it should therefore be placed with *ephippiger* and *grandicolle* (Lec. Proc. Acad. 1857, p. 4).

2—*Bembidium vinnulum* Casey. Should be placed in the series with *scopulinum* and *picipes*. It is remarkable in the large and deep punctures of the striæ.

3—*Barytachys gemellus*, Casey. Closely related to *incurvus* and differs in the absence of punctures in the basal stria of the thorax.

4—The difference in the measurement of the episternum of the metasternum between Mr. Casey and myself results from the fact that I compare the anterior side with the internal edge while Mr. Casey measures the piece really diagonally.

5—This species must at present remain in Bradycellus but the middle tarsi being as widely dilated as the anterior mark it as a very peculiar species.

6—*Harpalus vespertinus* Casey. Allied to and very closely resembling *ellipsis* Lec. and differs in having the elytra very smooth in both sexes.

7—*Anisodactylus arizonæ* Casey. Belongs to that series in which the anterior tibial spur is broader at middle and the hind tarsi shorter and somewhat depressed. It belongs to the group B-b as defined by me (Proc. Amer. Philos. Soc. 1880, p. 172) and is related to *nivalis* by the single puncture at each angle of the epistoma. In form it resembles *semipunctatus*. It is very black and shining (the female slightly opaque) the surface sometimes with a slight purplish lustre.

8—This form is placed by Leconte with *globicollis*. I find differences in the form of the sexual fovea in all the males examined.

9—As the genera and species are treated systematically the value of the species will be determined in time. It is however the opinion of Mr. Ulke, to which Dr. Leconte assented, that *Nicotheus tibialis* is the male of *Eutyphlus similis* Lec.

10—This species is considered a Philonthus by Dr. Sharp. It is not included in my synopsis as I thought and still think that it should either remain in Belonuchus or that the latter should be entirely united with Philonthus.

11—*Orus* does not differ from Scopaeus. The antennæ are *not* geniculate. *O. picipes* is very close to Scopaeus exiguus *Er.* *O. punctatus* is from Owens Valley, Cal., the type was formerly one of two in my cabinet, it is very close to Sc. brunnipes.

12—These are treated synoptically and the value of the species can be determined by any one having the material.

13—The generic reference seems doubtful. I was unable from lack of time to dismount the specimen for study.

14—Of this species I saw the elytra only and could not satisfactorily determine.

15—There is no difference between the specimens from Florida and those from Oregon, Madeira, Mauritius and New Zealand.

16—The comparisons made by Mr. Casey are between specimens from New Jersey and Arizona, he having none from the intermediate regions.

17—The important characters which define the position of this species have been omitted. It is however allied to *micans*.

18—*Epitragus ovalis* is extremely close to *plumbeus* and very doubtfully different.

19—*Eurymetopon dubium*. In the types of this the thorax is a little more coarsely and not quite so closely punctate as in *rufipes* and the sides of the thorax slightly sinuate near the hind angles. In a large series before me (21 specimens) these characters are evanescent.

20—*E. emarginatum* is also allied to *rufipes* but is more elongate, somewhat convex and with the elytra less densely and somewhat substriately punctate.

21—*E. carbonatum*. The typical series of this species consisted of five specimens. That to which the label was attached is *emarginatum*, the other four are males of *dubium*. Supposing the majority to represent the species the synonymy is placed accordingly.

22—The differences between the forms united as *emarginatum* are purely individual.

23—The species of Coniontis are with our present knowledge purely opinionative. I preferred to consider the forms described as *C. elliptica* as smaller forms of *robusta* in view of the recognized variation in *Eschscholtzii* and *viatica*. There is almost unlimited opportunity for new names in this genus.

24—There can be no doubt in the mind of any one who will examine a large series of *extricata* that *cognata* Hald. is merely a variety and that *arcuata* Casey is the female of *cognata*.

25—*Platydema pernigrum* has the form of *Janus* Fab. but with a more shining surface and more distinct sculpture. The color differences alluded to by Mr. Casey are inexact.

26—*Rhynchitis naso* is allied to *fossifrons* but the thorax is more densely punctured: the striæ are also more coarsely punctured.

Among the Steni the following synonymy has been observed:

Dianous chalybeus Lec. = cærulescens *Gyll.* A ♂ specimen of the latter obtained by me in Scotland has been returned to me by Mr. Casey as *chalybeus*.

D. zephyrus Casey = nitidulus *Lec.*

Areus *Casey* = Hemistenus *Mots.* The genus is not considered a valid one.

We call attention to our page of "Exchange" Notices. Those having good species to offer or desiring a particular line of insects, cannot do better than to avail themselves of its advantages.

On the Classification of North American Diptera.

(Third Paper.)*

By Dr. S. W. Williston.

"The families Stratiomyidæ, Tabanidæ, Xylophagidæ, Acanthomeridæ and Leptidæ form a natural group, which has several characters in common: three pulvilli, total absence of macrochætæ, and smooth legs, deprived of those bristles and spines that distinguish the Asilidæ, and, in a lesser degree, most of the Bombylidæ and Therevidæ."

"The principal families in this group are well marked enough, but there are, along side of them, many forms of transition, so-called synthetic types, which render the exact difinition of the families very difficult."—*Osten Sacken.***

Three or four of these synthetic genera are peculiar to, or occur in, North America. These are: *Arthropeas* Loew, *Glutops* Burgess, and "*Nov. Gen.*" Osten-Sacken (to include *Arthropeas leptis* O.-S. and an undescribed species from Washington Territory). Of *Bolbomyia* Loew, not enough is known to base any definite opinion—its author was in doubt about it himself. Dr. Brauer, in his recent extensive review*** of the genera of Xylophagidæ and Stratiomyidæ, would place them under the Xylophagidæ. Baron Osten-Sacken, on the other hand, would locate them under the Leptidæ. I know but one species, pertaining to the new genus; its general habitus is so markedly Leptid, that I would agree with Osten-Sacken that the structure of the antennæ should hold a subordinate value. The larvæ possibly, when found, may give more decisive evidence. *Subula*, another disputed form, Brauer retained in the Xylophagidæ, but pointed out larval relationships with the Stratiomyidæ; Osten-Sacken gave reasons (l.c.) for including this genus under the Stratiomyidæ, a view which Brauer afterwards accepted.†

With these changes, however, I am utterly at loss to find characters that will distinguish these families, and I am here compelled to give an artificial analysis to separate the disputed forms.

The veins separating the posterior cells are here spoken of simply as posterior veins. In the distribution of the groups I follow Brauer chiefly.

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* See ante p. 10 for second paper.

** Berlin. Ent. Zeit., Band XXVI, 1882. p. 363.

*** Denkschr. d. math.-naturw. Classe d. kais. Akad. d. Wissenschaften, Band XLIV, pp. 59—110.

† Denkschr. etc. Band XLVII, p. 23.

The writings of Loew, Schiner, Gerstäcker, Osten-Sacken and Brauer have been especially studied in the preparation of this paper.

Empodium developed pulvilliform, pulvilli present. Without distinct bristles (diptera eremochæta O. S.). *Basal cells of wings large. Third joint of antennæ segmentated or annulated. Tegulæ small or rudimentary. Proboscis not adapted for piercing. Males holoptic or dichoptic*.*

1.—Tibiæ wholly without spurs; veins usually crowded anteriorly..... **STRATIOMYIDAE.**

Tibiæ more or less spurred; the costal vein encompasses the whole wing; two sub-marginal and five posterior cells always present..... 2

2.—All the tibiæ with spurs 3

Front tibiæ without spurs 4

3.—Third joint of antennæ not acute at tip, or, if so, the scutellum with spines on its border..... **XYLOPHAGIDAE.**

Third joint acute; palpi cylindrical; scutellum without spines..***Arthropeas**, Lw.

4.—Fourth posterior cell closed. (*Macroceromys* Bigot)..... **Subula**, Meig.

Fourth posterior cell open..... 5

5.—Face projecting on each side into a rounded conical protuberance, thickly covered with hair..... ***Glutops**, Burgess.

Face with two deep, diverging furrows, running from the base of the antennæ to the oral margin..... "**Nov. gen.**" O.S.

XYLOPHACIDAE.

Species of moderate or large size, more or less elongated, thinly pilose, or nearly bare. Ocelli present. Antennæ elongate, third joint annulated or segmentated, never with a differentiated style or bristle. Veins of the wings distinct, not crowded anteriorly, third longitudinal vein furcate; five posterior cells. Abdomen with seven or eight visible segments. All the tibiæ with spurs at the tip.

The flies are usually found about trees, where they feed upon sap, or about decaying logs, and are often mistaken for ichneumonids.

1.—All four posterior veins arise from the discal cell; head small; scutellum with spines..... **Cœnomyia**, Latr.

The last posterior vein arises from the second basal cell; head not small; scutellum without spines..... 2

2.—Fourth posterior cell closed; third joint of antennæ much elongate, composed of numerous distinct divisions, often pectinate; eyes emargmate near the antennæ **Rhachicerus**, Hal.

Fourth posterior cell open; third joint of antennæ composed of eight annuli, indistinctly separated..... **Xylophagus**, Meig.

* I propose this term as the antithesis of holoptic.

STRATIOMYIDAE.

Head large, hemispherical. Antennæ situated at or below the middle of the head in profile, short or elongate, the third joint composed of more or less distinct annuli; usually with a more or less differentiated style, or bristle. Eyes bare or pilose; ocelli present. Scutellum often with thickened spine-like points. Abdomen elongate, clavate, oval, or rounded, flattened or convex above, of five or more visible segments. Legs never very stout, often slender, tibiæ without spurs (except in some exotic genera). Wings usually with the veins more or less crowded anteriorly, often on the outer posterior part weak and faint; third longitudinal vein usually furcate, terminating before the tip of the wing; four or five posterior cells, all open, the posterior veins not seldom more or less rudimentary.

Species from three or four to twenty or more millimeters in length, bare or moderate pilose. They are mostly flower-flies, and are often found upon vegetation in the vicinity of damp places. Larvæ pupigerous, that is the pupæ remain within the larval skin till ready to emerge as perfect insects.

1.—Abdomen with seven visible segments..... **Beridinæ.**
Abdomen with only five or six visible segments..... 2

2.—Three posterior veins, all discal..... **Pachygastrinæ.**
Four posterior veins, the anterior ones sometimes rudimentary..... 3

3.—All the posterior veins discal, the last posterior cell contiguous at its base with the discal cell..... 4
The last posterior vein arises from the second basal cell, the last posterior cell not contiguous at its base with the discal cell..... 5

4.—Third antennal joint with a long, delicately fringed, lamelli form style; usually large, more or less elongated species; males dichoptic. (*Hermetiinæ.*)..... **Hermetia,** Latr.
Third joint not with such a style; abdomen short, not more than twice as long as broad..... **Clitellarinæ.**

5.—Antennæ with a slender dorsal or terminal bristle..... **Sarginæ.**
Antennæ never with a slender or long bristle..... **Stratiomyinæ.**

(To be continued.)

In the article on the *Sphingidæ* in No. 5, the word *Dilphonota*, wherever it occurs, should read *Dilophonota*.

On the Parasites of Odontota Suturalis.

By L. O. Howard.

I publish this short note on the parasites of *Odontota Suturalis* at the request of Dr. Riley, who has recently made an exhaustive study of the habits and life history of this interesting leaf-mining Coleopter, and who wishes to refer to the parasites specifically in his paper without the necessity of cumbering it with descriptive matter. He has bred four species, all of which issued in July.

1. **Spilochalcis odontotae,** *m.* This is strikingly handsome species, looking like a dwarfed specimen of *S. mariæ* (Riley.) It was described by the writer together with other species of the genus in Bulletin 5 of the Division of Entomology. It issues from the pupa of the Odontota the latter part of July.

2. **Sympiezus uroplatae,** n. sp. *Male.*—Length 2.61 mm. Expanse 4.6 mm. Flagellar joints of the antennæ distinct and somewhat flattened. Whole of pro- and mesonotum strongly shagreened. Median carina of metascutellum delicate, straight and clearly defined. Abdomen ovate. Hind coxæ coarsely shagreened above. Color metallic green; scape yellowish beneath; front femora brownish at base, distal half honey yellow, tibiæ and tarsi nearly white; middle and hind femora brownish, slightly metallic above, tibiæ and tarsi nearly white with the exception of a brownish tinge near base of hind tibiæ. Wing veins dusky; stigmal more delicate than with other species.

Described from 1 ♂, bred from mine of *Odontota* (*Uroplata*) *suturalis*, July 24, 1884 at Washington, D. C. The larva of the *Sympiezus* was observed on opening the mine, to feed externally on the larva of the *Onodontota*.

3. **Trichogramma odontotae,** n. sp. *Female.* — Length 0.55 mm., expanse 1.12 mm. Color: eyes red, head, antennæ, thorax and basal joint of abdomen orange yellow, all legs light fuscous, remainder of abdomen light brown. Antennæ except scape and including pedicel with a few short sparse hairs. Basal portion of fore wing included by stigmatal vein slightly fuscous, remainder hyaline.

Male.—Length averages about .05 to .1 mm., shorter than ♀, with wings of about the same proportionate length. Colors the same except that the abdomen is darker, and the fuscous patch on the base of the fore wings is more pronounced. In balsam-mounted specimens no complete division of the flagellum into joints can be observed and the antennæ appear 3-jointed (scape 1, pedicel 2, flagellum 3). Conspicuous whorls of hair are present, however, indicating possible sub-divisions. The appearence is much like that of the ♂ antennæ of *Tr. erosicornis*, Westw. (Trans. Linn. Soc. Lond. Ser. 2, Vol. I. (1878) Pl. 73, figs. 24 & 25) for which Westwood erects the sub-genus *Aprobosca*.

Descrbed from ♂ and ♀ specimens bred during the month of July from the egg masses of *Odontota suturalis* on Locust at Washington, D. C.

4. **Derostenus (Closterocerus)** sp. A number of the brilliant little species of this genus have been bred in this country from the leaf mines of both lepidopterous and coleopterous larvæ. None have ever been described and as they are very difficult of separation and approach very closely to the European species, I shall not undertake to publish an isolated species. A study of the American *Entedonina* will, of course,

be made in time, and meanwhile this species may be referred to by the manuscript name *Derostenus primus*.

The fact that a species of this genus has been bred from the pupa of *Eulophus* would seem to indicate that *Derostenus* may consist of secondary parasites and that this species may have fed in the larva state on the larvae or pupae of the *Spilochalcis* or the *Sympiezus*.

Notes and News.

It seems that Mr. W. H. Edwards has not yet forgiven Dr. Hagen for his article on *Colias*. Having on several occasions attempted to dispute Dr. Hagen's conclusions by bringing out prominently the differences between the species—thus showing how minute and evanescent they really are—he now makes his attack in a different way and in 'Papilio" IV, pp. 167—171, with great display of logic and fat type, undertakes to prove that Dr. Hagen for the sake of annihilating several innocent species of *Colias*, did wilfully, and with malice prepense, manufacture, invent, and as truths publish, certain facts which had no existence. In other word sthat Dr. Hagen wilfully lied to prove the identity of two species of *Colias*. Of course such charges require no answer from Dr. Hagen. No one believes them and they therefore do no harm. Still to show that Mr. Edwards has either withheld evidence he had knowledge of, or did not inquire far enough before making so grave a charge, the following is published.

"Dear Mr. Henshaw:

You probably have "Papilio" IV, No. 9 and 10. Will you please read the article 'On some Historical Errors' on p. 167, and give me any information you may have, in reference to the matters there stated as facts. I am especially desirous of learning about those insects caught *in copula*. Mr. Stretch says he did not catch them: did you? What are the facts about that unfortunate cyanide bottle? Please correct any other errors you may know of in the article, and let me have your reply at as early a date as possible.

Very truly, John B. Smith."

Dear Sir:

A number of the statements in the paper "On some historical errors" (Papilio 1884! [1885] v. 4, p. 167—171) by Mr. W. H. Edwards require correction.

Dr. Hagen's statement, that six pairs of *Colias* were taken in copulation, is correct. Many envelopes, as Mr. Stretch writes, contained more than a single specimen frequently of widely separated genera, but in no case were specimens labelled as collected in copulation unless so

taken; the six pairs in dispute were labelled by me "♂ and ♀ taken in cop.", so that assumption in this case was unnecessary.

Memory as to the number or per cent of the specimens taken by an individual collector after a term of nearly two years, is not wholly trustworthy and by Mr. Stretch's reasoning it could be logically inferred that I collected 95 per cent of the Coleoptera. According to my memory such a conclusion would be far in excess of the truth, through not more so than that Mr. Stretch collected fully 95 per cent of the Diurnals. It is immaterial how many or how few butterflies Dr. Hagen collected, but I can state positively that he caught and handed to me for labelling more than *five pairs* of a single species. Mr. Stretch must surely have forgotten the many discussions that took place concerning *machaon*, *menapia* and *leto*, not to mention others, when he wrote that Dr. Hagen knew nothing about the butterflies, and I can bear willing testimony that Mr. Stretch was too energetic and too enthusiastic a collector to allow his many interesting captures to miss so appreciative an audience as Dr. Hagen proved himself on many occasions.

Mr. Edwards' statement of Mr. Stretch's remarks, in relation to the *Colias* whose color was changed by cyanide are not entirely consistent. In June 1884 he wrote me that Mr. Stretch claimed that Dr. Hagen was wholly mistaken in his account of the matter and in Papilio Vol. IV, p. 170 (received in July 1885,) he writes that Mr. Stretch, in answer to his question as to what he (Mr. S.) knew about this *Colias*, "replied that he knew nothing of it."

Mr. Edwards' English while not "obscure" is certainly misleading when he says that Mr. Stretch did not use a cyanide bottle, as he probably intended saying that Mr. Stretch did not use the cyanide bottle in question.

Mr. Stretch used a cyanide bottle all the time he collected in Oregon and Washington Terr.

In regard to the *Colias* similar in color to *C. astraea*, I have only to say that a yellow *Colias* recognised in the field as corresponding closely to, if not identical with others previously collected, was placed in a damp, freshly prepared cyanide bottle, and when taken from the bottle the hind wings were wet; the specimen was preserved and the facts noted at the express wish of Dr. Hagen.

The application of the term "omnivorous" to the new collecting bottle is not clear to me.

Yours, Saml. Henshaw.

How shall we collect, in alcohol or cyanide? And how shall we fasten our small beetles, with gum or with shellac? Practice varies in this respect and each method has its advantages and corresponding disadvantages. Mr. C. Lugger has had an experience this summer that is somewhat suggestive. He transported his collection of Coleoptera to New Orleans for the exhibition, and the moist heat of that locality soon began to produce a crop of mould. Careful examination showed that of insects on cards, those mounted with gum of any kind were uniformly mouldy, while those mounted with shellac as uniformly escaped. Pinned insects collected in cyanide began to mould and decay while those collected in alcohol pretty generally remained sound. Southern collectors claim that they cannot use shellac because it hardens so rapidly that the insects turn and twist. Alcohol as a collecting medium has the disadvantage that it contracts the muscles of the mouth parts. Dr. Horn says that in *Bembidium* and many other small Carabidæ and many of the *Staphylinidæ* there appears a great difference in the proportions of the joints of the palpi. Two specimens of a *Bembidium* examined, showed, one a minute terminal joint hardly ¼ as long as the preceding; while another, obviously the same species, had the terminal joint fully as long as the second. The first was collected in alcohol, and the terminal joint was retracted far into the second; while the other, collected in cyanide, had the joint extended as far as possible. Care and knowledge are thus imperative in the use of these organs in systematic work.

Book Notices.

Vol. VI, Part 2, of the Trans. Am. Conn, Ac. Arts and Sc., is at hand and contains the following of interest to Entomologists.

New England Spiders of the family Epeiridae. By J. H. Emerton, pp. 295-342, pl. 33-40.

New England Lycosidae. By J. H. Emerton, pp. 481-505, pl. 46-59.

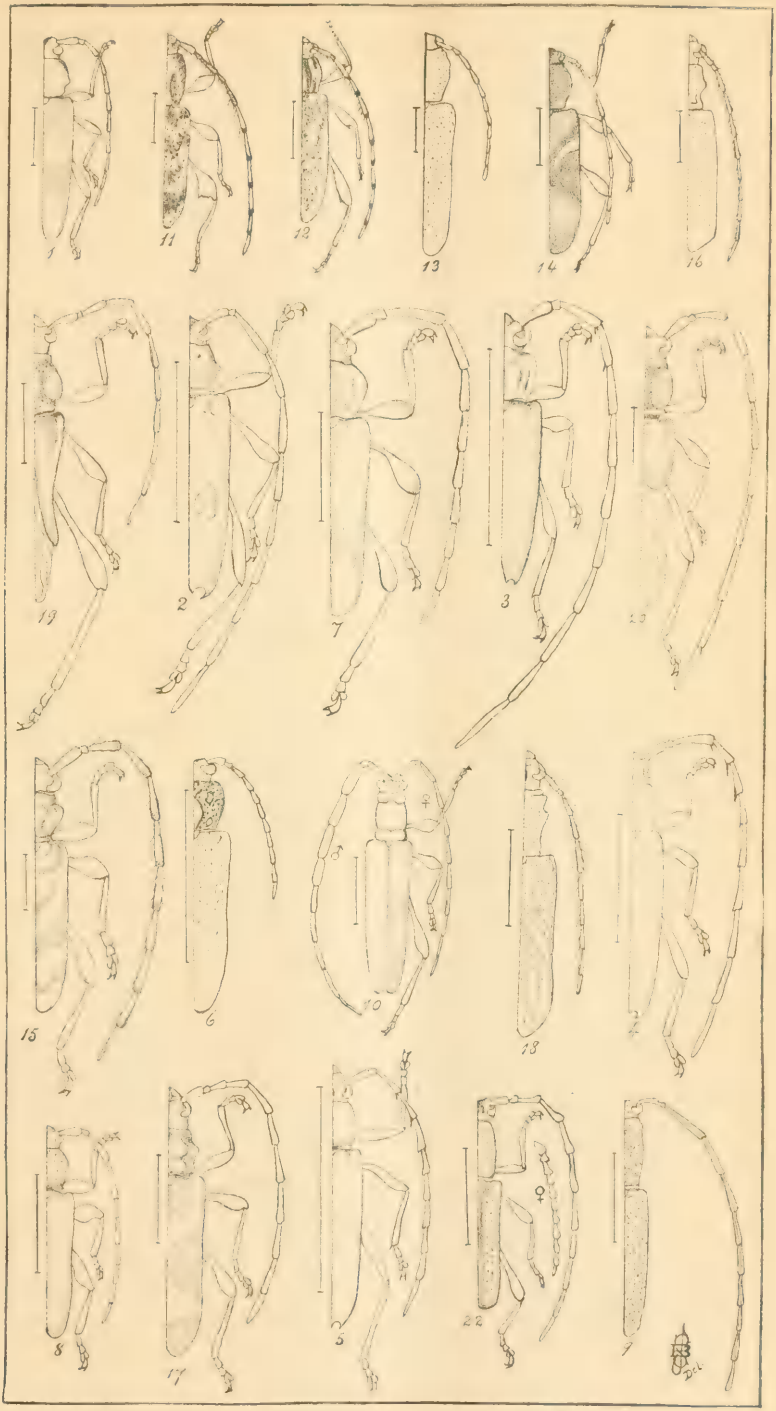
North American Conopidae, *Conclusion.* By. Dr. S. W. Williston, pp. 377-394. pl. 41.

Mr. Emerton here continues his studies on the new England spiders, and by his clearly drawn plates and careful text gives a great addition to our knowledge of these handsome though somewhat repugnant insecta.

Of Dr. Williston's paper we need only say it is good. Our readers know his style of work.

* * *

In the July No. of "The American Monthly Microscopic Journal" is a note by D. S. Kellicott of an aquatic lepidopterous larva probably belonging to *Cataclysta*, which forms a free case, similar to that of a *Phryganeid*, with silk, holding together fragments of *Lemna* &c.



ENTOMOLOGICA AMERICANA

VOL. I. BROOKLYN, OCTOBER, 1885. NO. 7.

Proceedings of the Entomological Club of the A.A.A.S.

The club met under the rules and pursuant to notice, on the 25th day of August, at room H of the University of Michigan, at 2 P.M., 23 persons present.

In the absence of the President, the meeting was called to order by Prof. Osborn, the Vice-President, who stated that Dr. Morris, the President, had announced his inability to attend.

The Secretary stated that the minutes of the meetings at the Philadelphia session of the Ass'n, had been printed in the Bull. Bkln Ent. Soc., the Can. Ent. and in the Proceedings of the Ass'n., and printed copies were in the hands of the members. On motion the reading of the minutes of the previous meeting was dispensed with.

The following were then nominated and elected officers of the Club for the ensuing year. President, Prof. J. A. Lintner of Albany; Vice-President, Mr. E. A. Schwarz of Washington, and Secretary, Mr. John B. Smith of Brooklyn, N. Y.

Prof. Lintner taking the chair expressed regret at the absence of Dr. Morris and the consequent want of a presidential address. He stated that there had not been during the past year any falling off in the interest taken in Entomology: on the contrary the interest had rather increased. Those in public positions know this to be the case by the increase and character of the applications for information, especially from Agriculturists which were made both to the U. S. Dept. of Agriculture, and to State officers.

The chairman of the committee on arrangements reported what had been done to obtain papers for the present meeting.

Prof. Riley moved that hereafter the officers of the club be elected

at the end of the sessions, in each year, and that the officers thus elected serve at the meetings of the club the following year. This was seconded, and a resolution to that effect was adopted.

The Secretary then read the following paper, Dr. Goding not being in attendance.

BIOGRAPHICAL SKETCH OF WILLIAM LEBARON,

LATE STATE ENTOMOLOGIST OF ILLINOIS.

BY DR. F. W. GODING.

William LeBaron was born Oct. 17, 1814, in North Andover, Mass., and was the son of *Dr. Lemuel* and *Martha LeBaron.* His father was a physician of considerable note, and his paternal grandfather a minister. His maternal grandsire, *Dr. Thomas Kittredge*, was a surgeon whose fame extended from Maine to Washington and was one of a long line of physicans. Thus it is plain that Dr. LeBaron inherited studious habits and scientific tastes, and even his life study was decided upon from earliest childhood.

The neighboring cities soon attracted his less studious brothers, and upon William devolved the care of the aged mother and grandmother, both of whom he attended through long illnesses and closed their eyes in death before he was twenty-five years old.

His early education was acquired under the iron rule of Dr. Putnam whose school for boys was famed in those days, attracting from far and near many who afterward attained distinction in their several vocations. Among his school-mates he was beloved and respected, one of whom said of him: "He was the boy with the best judgement among us. In any dispute we always called upon William to decide; for he was always so fair and so true, that we were all willing to abide by his decisions."

From childhood he evinced a strong love of nature and devoted his leisure hours to studying her in her various branches. First Ornithology and then Botany attracted his attention; and having made an exhaustive collection of specimens in each of these departments, he turned his attention to Entomology to which he ever after remained faithful.

The doctor studied medicine under the tutorship of his uncle, Dr. Joseph Kittredge, in North Andover, and for several years he practiced there. We are informed by his family that he graduated from Harvard Medical College in 1857, hence he must have returned from the West to complete his medical studies.

In 1841 he married *Sarah Jarvis Carr* of Ellsworth, Maine, and in 1844 removed to Geneva, Kane Co., Ill. (the old homestead being in sight of the place where I am now sitting), where the remainder of his

life was spent with the exception of the last year, during which time he resided in Chicago. While in Geneva he continued in the practice of Medicine, and he was known far and near for his skill in diagnosis of disease and surgical operations.

In 1850 he made his advent into the scientific world by means of an article published in the old *Prairie Farmer*, upon the "*Chinch Bug*" which was at that time making serious ravages in the wheat crop, then the most important product of the State. In this article—which was re-published in Fitch's 2d N. Y. Ent. Report—he gave the first scientific account of the life history of this important pest describing it as new under the name of *Rhyparochromus devastator*. Of this paper Dr. Fitch says: "Little requires to be added to this account". The same is true of the many scientific papers written by *Dr. LeBaron*, as he never published until the entire subject was thoroughly understood by him. His exhaustive researches into the habits of the *chinch-bug*, and practical suggestions (in this and subsequent papers) as to their extermination, attracted the attention of the leading entomologists of Europe and America, with whom he ever after maintained a close correspondence.

In 1861 he was elected corresponding member of the *Entomological Society of Philadelphia* and soon after member of the *Mass. Hort. Soc.*

In 1865 he became Entomological Editor of the *Prairie Farmer*, to which paper he had contributed at intervals, for years, severing this connection only when his declining health compelled him to do so.

A collection of *Dr. LeBaron's* contributions to that paper, of his answers to correspondents, and other papers read before various Agricultural and Horticultural Societies would make a valuable addition to entomological literature. We have received a hint from his family that the publication of a volume containing his essays etc., both published and unpublished has been seriously contemplated, a fact that will be received with pleasure by all.

The doctor was thoroughly practical in all he wrote, and his statements of facts could be relied upon implicitly, as he tested his discoveries again and again before he gave them to the world.

In 1870 two candidates appeared for the office of Illinois State Entomologist made vacant by the untimely death of the lamented Walsh—Dr. Henry Shimer of Mt. Carroll and Mr. Emery of the *Prairie Farmer*, both of whom were well qualified for the position. For reasons that cannot be given at this time, Gov. Palmer refused to appoint either, but named *Dr. LeBaron* for the place, taking him entirely by surprise.

From this time he devoted his whole attention to this work that lay nearest to his heart, until his health gave way under the severity of the strain. One of the first moves made by him was the purchase of the

Walsh Collection which secured to the State the finest and most accurately named collection of insects to be found in America. But this was not all; his labors being of an original nature added directly to our knowledge of insect life and his name will be handed down to posterity as one of the pioneers of economic entomology.

But Dr. LeBaron's standing as an entomologist will be based almost entirely upon his Four Annual Reports, the last of which forms a most valuable text book for the order *Coleoptera*. He was moved to undertake this work by the numerous letters he received from young men interested in the study of entomology, who could find few books on the subject, suitable for beginners that were within their means. In his *Fifth Report* he proposed to compile a similar work on *Diptera*, his specialty. He had collected much material for it, but his sickness and death cut short his usefulness, just as he began to give to the world the results of his half century of arduous study and investigation.

Dr. LeBaron died in Elgin, Ill., Oct. 14, 1876, in the 62d year of his age, leaving a wife and five children. All are highly respected and esteemed, one son being editor of the Elgin *Daily News* and Post Master, and another being a successful publisher living in Chicago

The doctor left quite a collection of insects besides augmenting the Walsh Collection, and that of the State University.

As you are all conversant with his writings I need not remark that he was a man of fine literary attainments. A finished classical scholar, he showed a remarkably fine discrimination in the use of words, and as a consequence his meaning was always perfectly clear. He was even an authority to those about him upon all literary subjects, and many an evening he spent entertaining and instructing the young people of his neighborhood by his keen analysis of the best English and American authors.

He was an active member of the Unitarian Church, being trustee both east and west for many years. For nearly a quarter of a century, consecutively, he held the position of school director, while he was frequently called to fill other positions of trust by his fellow townsmen.

In conclusion, as a neighbor I would say, that more important than all was the good he did in the community by the example he set and the high moral standard he held up for all to attain to, who were in any way connected with him. A knowledge of his keen discrimination between right and wrong, and the ease with which he blew away the sophistries that men of the world use to cover their derelictions from duty, exercised a restraining influence upon all who knew him.

With a hand ever open to aid the poor and friendless, he gave what he valued far above money—his time to straighten the crooked paths of others; and make the doubtful way plain.

The poor of the town flocked to his funeral to look once more upon one, who had been their best friend upon earth. As his writings were a guide and a help to those who labored in the same scientific field, so his life was a guide and a help to all with whom he came in daily contact.

His entomological writings both published and unpublished, so far as I have been able to ascertain, are as follows:

"*History of the apple-tree Caterpillar.*"

Written in Mass. at an earlier date than the others.

"*Worms Injurious to Dried Fruit.*"

"*Metamorphosis of Insects.*"

"*On the Codling Moth, Curculio and Potato Beetle.*" Delivered at Cobden, Ill.

"*Insects Injurious to the Peach.*"

"*On the Extermination of Noxious Insects.*" Delivered in Jo Davies Co.

"*Connection between Scientific and Practical Entomology.*"

In two parts. First, delivered at Jacksonville. Ill.; Second, published in Tr. Ill. St. Hort. Soc., Vol. 5.

"*Insects Injurious to Field Crops.*"

"*Sudden Appearance and Disappearance of Noxious Insects.*" Delivered at Galesburg.

"*Communications to Prairie Farmer.*"

"*First Annual Report of Ill. State Entomologist.*" 1871.

TABLE OF CONTENTS: Introduction.—White Marked Tussock Moth.—Fall Web Worm.—Lesser Apple Leaf-folder (n. sp.)—Oyster Shell Bark Louse.—Callimorpha Pear Caterpillar.—Green Chestnut backed Plum Caterpillar.—American bine Chafer.—Green Cream Spotted Grape Worm.—Spinous Currant Caterpillar.—4-striped Plant-Bug.—Colorado Potato Beetle.—Rose Slug.—Pine Leaf Louse.

"*Second Annual Report of Ill. State Entomologist.*" 1872.

TABLE OF CONTENTS: Introduction.—Canker Worm.—Apple and Walnut Leaf Crumpler (n. sp.?).—Periodical Cicada.—Pear Flea Louse.—Small Bronze Flea Beetle.—Spotted Willow Aphis (n. sp.).—Willow Bark Louse (n. sp.).—Stalk-borer.—Chinch Bug.—Grasshopper parasite (n. sp.?).—Notes of the Season.

"*Third Annual Report of the Ill. State Entomologist.*" 1873.

TABLE OF CONTENTS: Introduction.—Codling Moth.—Hand-maid Moth.—Cottonwood Leaf Gall Louse.—Transportation of Useful Parasites.—Introduction to Entomology.

"*Fourth Annual Report of the Ill. State Entomologist.*" 1874.

Consisting of an Introduction.—Outlines of the Study of Insects.—Tables etc., and a Treatise on the Coleoptera of North America.

"*Apple Tree Tent Caterpillar.*" Publ. in "American Ent." Vol. 2, p. 143.

"*Corn Kernels in Cocoons of Cecropia Moth*". Publ. in "American Ent." Vol. 2, p. 177.

"*Noxious Larvæ*". Publ. in "American Ent." Vol. 2, p. 232.

"*The Chalcideous Parasite of the Apple Tree Bark-louse* (n. sp.).

"Publ. in "American Entomologist" Vol. 2, p. 360.

(To be continued.)

"Ye editor" has entered upon the duties of his new office at the National Museum, Washington D. C., and letters should be addressed to him there. Communications for the Society and books and pamphlets still go to Brooklyn, N. Y.

Notes on Chrysomela scalaris, Lec.

By G. W. J. Angell.

Lately, while examining some specimens of the genus Chrysomela, I found an insect answering equally well to the descriptions of *scalaris* Lec. or *philadelphica* Linn. This led me to arrange a series from my material in this group, to find, if possible, intergrades between the two. Further examination but strengthened the idea, that these so called species are but varieties or races of one and the same insect. Before discussing the series thus obtained I give the original descriptions of Leconte and Linnæus and also the remarks of Rogers and Crotch.

"**C. scalaris** Leconte, Ann. Lyc. I, p. 173.

Oval, greenish blue; elytra punctate, yellowish white spotted with blue. Suture with a broad metallic black stripe, branched in three or four places. Humerus with a large lunate spot; under surface bronzed black, antennæ and legs ferruginous."

"**C. philadelphica** Linn. Syst. Nat. II, p. 592.

Oval, greenish black, elytra pale yellow, with a longitudinal stripe near the suture and a number of dark green spots; palpi, antennæ and legs rufous, under surface dark green."

Rogers (Proc. Acad. 1856, p. 31) says: "This insect (*scalaris*) is closely allied to *C. philadelphica* of Linnæus, the difference consists in the suture being marked with a broad black stripe with which the spots are connected. In *C. philadelphica* the suture is black, straight and narrow, separated from a narrow subsutural black vitta by a narrow yellow line."

Crotch (Proc. Acad. 1873, p. 49) separates them as follows:

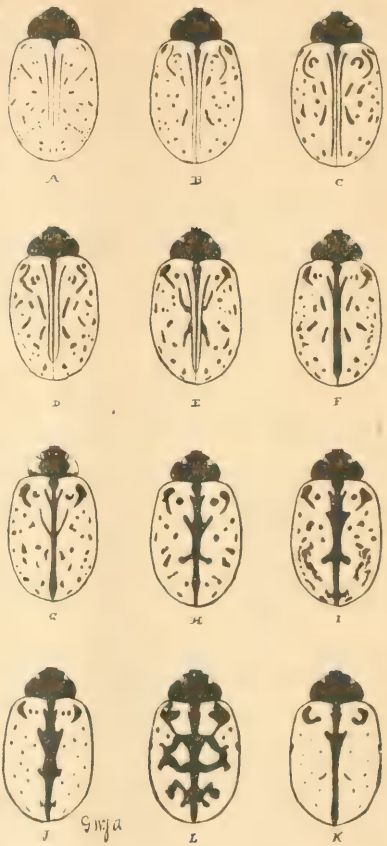
"First vitta joined to suture, which is laterally tridentate..... **scalaris.**
First vitta free, suture not green..... **philadelphica.**

He also states that in this group the epipleuræ of the elytra are yellow. This I find to be the case in the majority of insects examined, but it is not entirely constant. From the above descriptions it appears that the basis of all determinations of these insects has been the metallic green, tridentate sutural vitta of *scalaris* and the free, bronzed, subsutural vitta of *philadelphica*. In my series I find the following variations from the typical form. For convenience, I refer to those markings near the vitta, which being joined to the latter make it dentate, as vittal spots.

A.—Vittal spots small, hardly linear. Humeral markings broken, not forming a continuous line. Vitta faintly marked. An interior humeral spot.

B.—Vittal spots linear. Humeral markings connected, and two interior humeral spots. Vitta more strongly marked, slightly diverging.

C.—Vittal spots longer. Humeral line curved and interior spots connected.



D.—Vittal spots nearer the vitta, diverging, almost connected. Humeral line angulated. In these specimens A, B, C & D the markings are pure bronze.

E.—Vittal spots joining subsutural vitta, making the latter dentate. Humeral lunule pipe shaped Interior spots combined forming a single heavy dot. Sutural and subsutural vittæ uniting near lower margin of elytra.

F.—Vittal spots free, vitta sutural. Markings greenish bronze.

G.—Sutural vitta strongly dentate. Lower vittal spot free. Markings green. Margins of prothorax light yellow.

H.—Vitta broader and dentations more obtuse.

I.—Dentations still more obtuse. All markings heavier. This is the common form of *scalaris*.

J. & K.—In these specimens the series reverts somewhat to the *philadelphica* type. The sutural vitta and humeral lunule are like *scalaris* but the fine lateral spots and reddish bronze color of the markings recall *philadelphica*. This series shows a nearly complete gradual gradation from the finely maculate form of *philadelphica* (H) to the strongly marked *scalaris* type (I). A still more extended series will, I expect, completely demonstrate the truth of the opinion here advanced. Should further investigation bear me out, the name *philadelphica* Linn. must stand for both insects, as it has decided priority. *Scalaris* is however a well marked race, in some localities very constant. Hundreds collected at Cambridge last summer show scarcely any variation, while specimens from New Jersey, Cape Cod and principally Canada are decidedly inconstant and variable.

Figure L represents an insect which has long been considered a variety of *scalaris*. In many collections it bears Dr. Leconte's cabinet name *labyrinthica*, but it has lately been determined by Dr. Horn as identical with *C. pnirsa* Stäl. Its elytral markings are certainly peculiar

and very constant, yet in many specimens of *scalaris* I have seen, there is a strong tendency towards this form. In regard to Crotch's paper, already quoted, I find another important exception to a specific character given therein. He separates *multipunctata* Say, and its varieties from *scalaris* and *philadelphica*, by its partially yellow prothorax. An examination of figure G will show that in this insect, a decided *scalaris* form, the lateral margins of the prothorax are light yellow. This leads me to doubt the validity of *multipunctata* as a distinct species, a doubt which Crotch also expresses, though he gives no reason for it.

Notes on Mexican Lepidoptera, with descriptions of New Species.

By Henry Edwards.

(Fourth Paper.)

I continue the descriptions of a few other fine insects collected by Mr. Wm. Schaus, at Jalapa, Mexico, which, as far as I am able to ascertain, are new to science. They certainly do not occur in any works to which I have access, and I therefore think it best to place them on record.

FAM. ZYGAENIDAE.

Lycomorpha notha, n. sp.

Form and size of *L. pholus*, Dru. Wholly bluish-black with the exception of a triangular patch at base of primaries, a very small patch at base of secondaries, collar, palpi, and inside of fore femora, which are bright orange.

1 ♂. 1 ♀. (No. 228.)

Lycomorpha sinuata, n. sp.

Allied to *L. laterculu*, Hy. Edw. Head, antennæ disc of thorax, abdomen and legs all dull sooty black. Thorax with the sides and base, brick red. Primaries brick red, with the margins sooty black, very narrowly so at the apex, broadest on the median vein, thence straight to internal margin. Secondaries wholly sooty black, except the base, which has a brick red patch. The markings are repeated on the lower side.

Exp. wings 24 mm. Length of body 10 mm. 1 ♀. (No. 230.)

SUB-FAM. ARCTIIDAE.

Gnophæla disjuncta, n. sp.

Somewhat resembling at first sight the common *G. vermiculata*, G. & R. The wings are however much narrower, and have a very striking greenish metallic sheen, while the spots are totally different both in size and arrangement. Below the median nerve is a narrow stripe, not quite reaching the base, widening from a mere point to immediately below the cell, where it is excavated, and surmounted by a rather large subovate patch, divided in half by the black median nerve. The apical patch is large, cut into 5 spots by the nervures, that nearest the internal angle being a mere dot. The secondaries have a large spot at the base, which is also divided into two by the nerve, the lower being almost oblong; and the upper subtriangular in shape.

From the costa near to the apex, runs a large pyriform spot, crossed by two black nervures. The markings are repeated on the lower side. The fore femora and pectus are bright orange, the rest of the body bluish-black, the abdomen having a row of 6 small dots on the sides, and not a stripe as in *G. vermiculata*.

Exp. wings 45 mm. Length of body 17 mm. ♂. ♀.

SUB-FAM. NOTODONTIDAE.

Janassa laciniosa, n. sp.

♂. Bright but pale fawn-color, with darker streaks. The primaries have the costa shaded with rich coffee-brown, especially on the apical half. There is also a sub-apical dash, and some streaks of the same color on the posterior margin. From the base in centre of the wing runs an olive-brown clouded line, expanding into a blotch as it passes the cell, but not reaching to the margin. Secondaries sordid white, yellowish along the abdominal margin, and with a bright brown blotch at the anal angle. Beneath yellowish fawn-color, costa of both wings stained with brown, and the ends of the nervures of the primaries also marked with brown. Thorax brown on disk, fawn-color at the sides. Abdomen fawn-color, darkest at the base.

♀. Dark coffee-brown, costa fawn-color towards the apex, and a pale fawn dash at internal angle, which in both sexes is a good deal jagged. Secondaries darker than in the ♂, with the brown anal blotch as usual. Beneath, the primaries are dull brown, paler on the margins. Secondaries fawn-color, with brown dots at the ends of the nervules. Thorax and abdomen as in the ♂, the latter with a brown line beneath. 2 ♂, 3 ♀. Jalapa (W. Schaus, No. 398). Mazatlan (Hy. Edw.).

Exp. wings ♂ 42 mm., ♀ 50 mm. Length of body ♂ 22 mm., ♀ 20 mm.

SUB-FAM. HEPIALIDAE.

Phassus triangularis, n. sp.

Wings greatly produced into a falcate point at the apices; rich wood brown, varying in shade, the ♀ considerably paler than the ♂. Costa arched at the base, both it and the subcostal nervure very strong and muscular. The costal margin is pale fawn-color, clouded with brown, three distinct triangular patches, most apparent from the middle of costa towards the apex. From the subcostal nervure, about 15 mm. from the base of the wing runs a broad ribbon-like band, which passes into a point as it nears the internal margin, then upward to the edge of the cell, forming a very open V-like mark. At the end of the cell it is joined to a clear silvery white triangular patch, behind which is a double white spot. These white spots vary slightly in shape in different individuals, but the average form is as here described. The posterior margins are broadly clouded with rich brown, on the field of which may be seen 3 macular bands, not passing below the median nervure. On the subcostal space above the waved broad band is a row of 8 small oblong pale patches, and at the base of the wing near the internal margin are 4 pale spots, some of them occasionally with brown centre. Lower wings dull brown, pale at base, and with pale dashes at the apex. Underside wholly dull brown, with pale marks on the costa of both wings.

Exp. wings, ♂ 140 mm., ♂ 160 mm. Length of body, ♂ 70 mm., ♀ 85 mm.

A magnificent species, evidently belonging to Walker's genus. The transformations have been observed by Mr. Schaus, and will hereafter be referred to.

Synopses of Cerambycidae.

By Charles W. Leng, B.S.

(Continued from p. 35. *ante.*)

The following paper on the species of the genera erected at the expense of *Elaphidion* is based upon material received by Dr. Horn since the publication of our synopses (No. 2 May). Those synopses were submitted to Dr. Horn for the insertion of the new species, but the material then in hand did not justify him in making any changes and the absence of Dr. Leconte's types of *Anaflus* prevented the careful comparison which has led to these notes. We are greatly indebted to Dr. Horn for the opportunity of publishing them in this series and trust the reader may derive great satisfaction from this final clearing up of a puzzling group.

ROMALEUM, *White.*

R. simplicicolle Hald. = *procerum* Lec.

The differences between these two species are not constant and the intergradation in the arrangement of the antennal spines on the outer side of the third and fourth joints is so gradual as to render it impossible to draw any line of separation. *R. operarium* Wht., B. M. Catal. p 309 pl. VI, fig. 9, is without doubt the same thing.

R. seminitidum n. sp.

Form robust, piceous, moderately shining, pubescence very fine and very sparse, hte surface being almost nude. Head coarsely and deeply punctured, a space clothed with yellowish pubescence on each side of the occiput within the eyes. Head slightly wider than long, base a little narrower than apex, sides irregularly arcuate, disc slightly flattened, with three callosities, one median larger, one on each side slightly in front of the middle; surface roughly granulate punctate. Elytra wider than the thorax, slightly narrowing to apex, the apices sinuously truncate, the sutural angle dentiform, disc slightly depressed, surface coarsely punctured and sub-granulate at basal striæ, the punctures very rapidly finer and sparser posteriorly. Body beneath brownish, punctulation fine and sparse, pubescence very fine. Legs brown, punctate, the tibiæ not carinate. Length 1.04 inch; 26 mm.

This species closely resembles *Eustroma validum* and might readily be mistaken for it without reference to the generic characters. It is more shining and less pubescent. The antennæ are distinctly spinous on the inner side from the third to tenth joints, and less distinctly on the outer side from the fourth to tenth.

One ♀, Arizona. The male probably has a different thoracic sculpture as is usual in this genus.

ANEFLUS, *Lec.*

The outer antennal joints are distinctly carinate on their flat sides—this sentence gives the basis on which the genus was erected. On this point some remarks will appear in the course of this article.

The species of Aneflus are thus distinguished:

Outer joints of antennæ more or less distinctly carinated... 2
Outer joints not distinctly carinated ..... volitans, *Lec.*
2—Third joint of antennæ with a very long spine .....tenuis, *Lec.*
Antennal spines of moderate size..... 3
3—Elytra simply emarginate at tip..... .....linearis. *Lec.*
Elytra spinose at tip..... 4
4—Thorax cylindrical; pubescence of elytra conspicuous.
Disc of thorax vaguely quadrituberculate; antennal spines well developed. protensus, *Lec.*
Disc bituberculate at base, an elevated transverse line slightly in front of middle; antennal spines small..... prolixus, *Lec.*
Thorax distinctly narrower at apex, the disc very roughly sculptured; pubescence of elytra very inconspicuous..... calvatus, *Horn.*

A. volitans Lec. New Species, 1873, p. 186. Brownish, sparsely clothed with long pale pubescence. Thorax longer than wide, base and apex equal, sides feebly arcuate, disc densely rather coarsely punctate. Elytra closely coarsely punctate, the punctures finer posteriorly, the apices truncate, the sutural angle acute not spiniform. Tibiæ with flying hair. Length .40 inch; 10 mm.

The carinæ of the outer joints of the antennæ were said by Dr. Leconte to be obsolete, in fact from an examination of the type I cannot find that they exist at all. The spine of the third antennal joint is two-thirds as long as the fourth joint, while that of the fourth is above one-third the length of the fifth joint.

This species is placed at the beginning as an expression of its close relationship with some Elaphidion as *aculeatum* and *subpubescens* and as the genera constructed at the expense of Elaphidion are at present defined there seems to be no reason why *A. volitans* should not be placed near the species above cited, unless it be placed in Psyrassa *Pascoe.* The latter genus and the value of its characters will be referred to later on.

One specimen. Lower California.

A. tenuis Lec., Proc. Acad. 1854, p. 81. Brownish or piceous, sparsely clothed with white pubescence. Head very coarsely punctured. Thorax longer than wide, base very slightly narrower than the apex. Sides feebly arcuate, disc coarsely and deeply punctate, an indistinct smooth median line. Elytra coarsely and deeply but not closely punctate, the punctures gradually finer toward the apex, the apices emarginate, not spinose. Length .46—.64 inch; 11.5—16 mm.

The carinæ of the outer joints of the antennæ are very indistinct. The third joint has a long spine equal to half the length of the fourth joint, the other joints are mutic. This species should probably be placed in Psyrassa, if recognized.

Occurs in south-western Texas.

A. linearis Lec. Proc. Acad. 1859, p. 80. Rufo-testaceous, sparsely clothed with whitish pubescence. Thorax longer than wide, sides arcuate, disc coarsely densely punctate, a slight smooth space at middle posteriorly. Elytra coarsely punctured, the punctures somewhat finer near the apex, the apices separately emarginate-truncate, not spinose. Length .40—42 inch: 10—10.5 mm.

The outer joints of the antennæ are distinctly carinate on their flat sides, the third, fourth and fifth joints with a short apical spine. The flying hairs of the tibiæ are long but not very numerous.

Occurs at Tejon, California.

A. protensus, Lec. (Proc. Acad. 1858, p. 82.) Brownish piceous, clothed with grayish-white pubescence. Thorax longer than wide, scarcely perceptibly narrower at apex than at base, sides feebly arcuate, slightly obliquely impressed near the base, disc convex, very coarsely and roughly punctate-granulate with four distinct elevations arranged in a quadrangle and a narrow median smooth callosity. Elytra coarsely not closely punctate, the punctures gradually finer toward the apex, the apices bispinous ♂ or with the suture above spiniform ♀. Length 1.06 ♂, 1.20 ♀ inch. 26.5—30 mm.

The pubescence of this species is nearly as abundant as in *Elaph. atomarium* but more regularly placed. The joints three to six of the antennæ are distinctly spinous, the spines gradually shorter. The outer joints are distinctly carinate on their flat sides.

Occurs in Arizona and northern Sonora.

A. prolixus, Lec. n. sp. 1873, p. 203. Piceous, moderately densely clothed with cinereous pubescence with a few longer hairs intermixed. Thorax longer than wide, nearly cylindrical, coarsely and closely punctured, disc moderately convex with two slightly elevated tubercles near the base and a transverse elevated line slightly in front of the middle. Elytra coarsely not closely punctured, the punctures finer posteriorly, the apices bispinous in both sexes. Length 1.00 inch; 25 mm.

The outer joints of the antennæ are very distinctly carinate, the joints three to six with a short spine at apex. The slight transverse elevated line of the thorax is made more conspicuous by the arrangement of the pubescence.

Occurs at Cape San Lucas, Lower California.

A. calvatus, n. sp. Brownish piceous, moderately shining, surface with very fine, sparse and inconspicuous pubescence. Head coarsely punctured. Thorax longer than wide, base one-half wider than apex, sides feebly arcuate, disc coarsely and roughly punctured with a tendency in the punctures to become transversely confluent. Elytra double the width of apex of thorax, parallel, coarsely and deeply, not closely punctate, the punctures finer near the sides and toward the apex, apices bispinous in the emargination between the spines and distinct tooth. Body beneath sparsely punctate. Length 1.16 inch.; 29 mm.

The outer joints of the antennæ are very distinctly carinate on their flat sides, joints three to six distinctly spinous at tip. The legs are feebly pubescent without flying hairs. It is conspicuous among the larger species by the very feeble pubescence of the surface.

One specimen ♂. Arizona.

The table and remarks which precede are made from the species (the typical specimens) which Dr. Leconte considered as belonging to the genus Aneflus. Two of the species are, however, doubtful as members of the genus from the fact that in one (*volitans*) the antennæ are not at all carinate, while in another (*tenuis*) more faith than sight is required to see it These two species should without any doubt be referred to Psyrassa *Pasc.*, if it is to be recognized. In the latter genus Pascoe includes our *Elaphidion unicolor*, Rand.

One of the essential characters of the group, Spherionides, to which Psyrassa is referred, is the presence of carinæ on the tibiæ. This is certainly not the case in *unicolor*. "The spine of the third antennal joint is remarkably long; and this seems to be a good generic character" (Bates, Biol. Cent. Am. V, p. 28). In *unicolor* the spine is rarely remarkably long, never longer than one-third of the following joint, usually it is not longer than in *villosum* or *truncatum*. As far as the antennal spine and the carinate tibiæ *volitans* and *tenuis* are Psyrassa. Assuming *unicolor* to be also a Psyrassa we observe a gradual fading out of all the characters: the tibiæ are very distinctly carinate in *tenuis*, scarcely so in *volitans* and not at all in *unicolor*; the spine of the third joint of the antennæ is two-thirds the length of the next joint in *volitans*, one-half in *tenuis* and less than a third in *unicolor*. After studying all the characters of the species cited I can only quote the remarks of Leconte regarding *unicolor* and apply them to the three species: "I can find no sufficient characters for separating this as a distinct genus, much less placing it in another tribe". In conclusion I would suggest that *tenuis* and *volitans* be returned to Elaphidion and placed between *subpubescens* and *unicolor*.

EUSTROMA, *Lec.*

The antennæ are stout, in the male as long as the entire body, in the female much shorter. The antennæ are not carinate in the same sense in which that term is used for Aneflus and it therefore seems better to place Eustroma in closer alliance with Elaphidion.

The excavation of the underside of the antennal joints is more evident in the males. The oval patch of pubescence near the front angles of the thorax is purely a male character and at the same time it is well to note that the male femora are much stouter than those of the female.

The differences between Eustroma and Elaphidion are really feeble and restricted almost entirely to the antennæ: it will, however, be observed that the metasternal episterna are broader in Eustroma but parallel.

Geo. H. Horn.

To Dr. Horn's note on *Eustroma* we may add that the outer joints of the antennæ are compressed and pubescent, the lower joints shining, sparsely punctured and thinly clothed with long fulvous hair; joints 3—7 spinose. The mandibles are stout and acute, with the outer margin suddenly bent near the tip in ♂ (as in *Axestinus*) but regularly curved in ♀. The body above and beneath is punctured and clothed with rather coarse yellowish brown hair; the prothorax has several smooth confluent spaces, the intervals being very coarsely punctured. The elytra are feebly truncate at tip and armed with a small sutural spine.

E. validum, Lec. Proc. Ac. Phil. 1858, p. 82.
Hab. Texas, Lower California.

TYLONOTUS, *Hald.*

Contains one species of variable size and coloration, distinguished structurally by the strongly clubbed femora and bisulcate antennæ and further from the succeeding genus by the callosities of the prothorax. The color is dark brown with part of the thighs and a blotch before the middle and another at the apex of the elytra testaceous. The surface is punctured (only thinly on the elytra) and sparsely pubescent.

T. bimaculatus, Hald. Trans. Am. Phil. X, p. 38.
Length .40—.60 inch. = 10—15 mm. *Hab.* Penn., N. Y.

ZAMODES. *Lec.*

Contains again a single species, opaque black in color, clothed with dense brownish pubescence, mixed with erect hairs; prothorax rounded at sides, punctured; elytra strongly punctured before, gradually less behind. The species resembles *Tylonotus* but differs in the antennæ not being sulcate, the prothorax having callosities and the legs being piceous.

Z. obscurus. Lec. S.M.C., No. 264, 1873, p. 188.
Length .52 inch. = 13 mm. *Hab.* Penn., N. J.

COMPSA, *Perty.*

Prothorax punctured, without callosities..... **puncticollis.**
Prothorax not punctured, with a narrow callus elevated at middle, and an elevated tubercle on each side of the base..... **quadriplagiata.**

C. puncticollis, Lec. S.M.C., No. 264, 1873, p. 188.
Length .32—.52 inch. = 8—13 mm. *Hab.* Lower California.

An elongate blackish shining species, the body clothed with gray pubescence. The sides of prothorax are rounded and the regular punctulation of the elytra is mixed with a few larger punctures.

C. 4-plagiata, Lec. S.M.C., No. 264, 1873, p. 189.
Length .40 inch. = 10 mm. *Hab.* Lower California.

The color is dark brown, each elytron bearing two quadrate pale

spaces. The larger punctures in this as in the preceding species support flying hairs which are not however very long or as conspicuous as in the polished species of *Heterachthes*.

HETERACHTHES. *Newn.*

The species of this genus are strongly allied to the preceding and are easily known by the very elongate form, the large and coarsely granulated eyes and strongly clavate thighs. The antennæ ♀ are slender, but the joints 3—6 in ♂ are remarkably thickened uniformly throughout the length of each joint. Three species are recognized as follows:

SYNOPSIS OF HETERACHTHES.

Femora strongly clavate; elytra shining, with paler markings;
Prothorax roughly punctate without callosities.....**nobilis.**
Prothorax with a few piliferous punctures and callosities at middle.....
quadrimaculatus.
Femora less incrassated; elytra opaque black.....**ebenus.**

H. nobilis, Lec. Proc. Ac. Phil. 1862, p. 41.
Length .50 inch. = 12½ mm. *Hab.* Texas.

This species is the largest of the three. The prothorax is transversely impressed before and behind as in the following. The elytra are ornamented with two pale fasciæ, one before the middle interrupted at the suture and one behind the middle, angulated in front.

H. 4-maculatus, Hald. Trans. Am. Phil. 1862, p. 43; Lec., J.A.P., ser. 2, II, p. 23.
Length .30 –.45 inch. = 7½—11 mm. *Hab.* Penn., Mo.

Varies considerably in the markings. The general color above is darkish testaceous with paler spots.

H. ebenus, Newn. Ent. p. 9; Hald., Trans. Am. Phil. X, 1847, p. 43; Lec. J.A.P., ser. 2, II, p. 23; *dimidiaticornis* Dej. Cat. 3. ed. p. 359.
Length .42 inch. = 10½ mm. *Hab.* Southern States.

Very easily known by the opaque black color and structural characters named above.

PLECTROMERUS, *Lec.*

Contains one species:

P. dentipes, Oliv. Encycl. Méth. V, 1790, p. 268; Ent. IV, 70, p. 29; *scambus* Newn., Ent. p. 79; Lec., J.A.P., ser. 2, II, p. 22.
Length .40 inch. = 10 mm. *Hab.* Georgia, Florida.

The form of this species is cylindrical and the surface is polished and glabrous. Prothorax nearly straight on sides. Antennæ with 4th joint much shorter than 5th. Thighs suddenly clavate armed beneath with a broad tooth which is larger than in *Curius*. Color testaceous, the elytra with two fuscuous bands.

CURIUS, *Newn.*

C. dentatus, Newn. Ent. p. 17; Dej. Cat. 3. ed., p 358; *concinnatus* Hald. Trans. Am. Phil. X, 1847, p. 43.

Length .24 inch. = 6 mm. *Hab.* Florida.

Form depressed, surface dull, slightly pubescent. Color pale brown, the elytra with three longitudinal darker spots. The eyes are coarsely granulated, the antennæ slender, longer than the body, annulated, finely punctulate and pubescent.

EXPLANATION OF PLATE III.

1 Dicenthrus Bluethneri.
2 Eburia 4-geminata.
3 Elaphidion rufulum.
4 " parallelum.
5 Aneflus protensus.
6 Eustroma validum.*
7 Tylonotus bimaculatus.
8 Zamodes obscurus.
9 Compsa puncticollis.*
10 Heterachthes 4-maculatus.
11 Plectromerus dentipes.*
12 Curius dentatus.*
13 Pœcilobrium chalybeum.*
14 Eumichthus œdipus.*
15 Phyton pallidum.
16 Obrium rubrum.*
17 Hybodera tuberculata.
18 Megobrium Edwardsii.*
19 Callimoxys sanguinicollis.
20 Molorchus bimaculatus.
22 Ancylocera bicolor.

* The drawings for this figure we owe to the kindness of Dr. Horn.

In a specimen of *Monilema* sent me as *semipunctatum* I observe a strange aberration. The tarsus of one hind leg is five-jointed, the first four joints being quite equal in length but each shorter than usual so that the four occupy only the length that the usual three would do. The final joint is of the usual size. The spongy pubescence which covers the 3d joint only, on the normal tarsus, is in the other spread over all four joints and reaches even the tip of the tibia. In view of the well established theory that such aberrations are a reversion to an ancestral type more or less remote, this specimen would be a further indication that the Longicorns are descended from individuals possessing five jointed tarsi. CHAS. W. LENG.

Not everybody knows the qualifications required to make a good Entomologist, but we have recently discovered one not previously known to us, and which might prove interesting. A well known Coleopterist rejoices not only in a fine collection, but in a little six year old son, who takes a great interest in his father's collection and in his callers as well. Recently came a visitor who was viewed by the youngster with a great deal of interest and curiosity. After he had left, the boy sidled up to his father and said confidentially: "Papa! that wasn't a real one; was it?" "What do you mean?" said the astonished father. "He collect insects; don't he?" "Yes, certainly." "But he isn't a real collector; not a genuine one I mean!" "But why not?" "Because he has too much hair on his head: all the real ones have very little!" said the youngster decidedly.

Huebner's Tortricids.

By Prof. C. H. Fernald, State College, Orono, Me.

The time of publication of some of Hübner's works has been a matter of no little investigation on the part of entomologists, and many papers have appeared on this subject, in the European Journals. I have thus far interested myself only so far as pertained to the Tortricids, that I might get the most accurate information, in the matter of priority, for my work on the revision of this group.

Hübner published in his Sammlung Europäischer Schmetterlinge, forty-six plates containing two hundred and ninety-one colored figures of European Tortricids, and Carl Geyer who continued the work after the death of Hübner in 1826, published seven plates of Tortricids, containing forty-nine colored figures.

Mr. S. H. Scudder stated in his historical sketch of the genera of Butterflies, page 98, that Dr. Hagen told him the works of Hübner were in their original wrappers in the Königliche Bibliothek in Berlin. Wishing to get what help might be obtained from this source, I wrote to my kind friend Mr. O. Budy in Berlin, who went to the Royal Library and examined Hübner's works for me. He writes that Hübner's part of the Sammlung is not in the original wrappers, but the continuation of the same by Geyer is still in the wrappers of which there are two. In looking over the volumes of Hübner, Mr. Budy found several prospectuses by Hübner himself, bound in the last volume. These were carefully copied and sent to me and they furnish some additional evidence bearing on the date of the publication of Hübners works; but at present I shall mainly make use of what pertains to tne Tortricids.

The first prospectus is without date but gives a list of Hübner's works then for sale, and from the Sammlung, only the Pyralids, twenty plates, and the Sphinges, sixteen plates, are offered. The dates of these are there given as 1796, so that whatever may have been the date of this prospectus, 1796 may be regarded as the date of the first twenty plates of the Pyralids and the first sixteen plates of the Sphinges. The statement is also made on this prospectus that the Tortricids and Tineids will appear very soon, therefore it must have been *later* than 1796, when they were published.

The second prospectus is dated Augsburg Dec. 21, 1806, and advertises four hundred and seventy-five colored plates of the Sammlung, with title page and text, but does not state what the plates are. The third prospectus, dated 1807, advertises four hundred and ninety-seven plates etc. The fourth, dated 1809 is also of little value for our purpose. It advertises 34 4-5, fifteen plate issues. The fifth prospectus is dated Augs-

burg Dec. 22, 1823, and advertises for sale such of Hübner's works as had appeared up to that time, and states of the Sammlung, that there were the title page, twenty-five pages of descriptive matter and six hundred and sixty-three plates, namely: Papilio 161; Sphinx 34; Bombyx 67; Noctua 151: Geometra 100; Pyralis 30; Tortrix 46; Tinea 67; Alucita 7. This is signed by Hübner himself.

The first part of Geyer's contribution is still in the original wrappers dated Augsburg 1830, and contains the Tortricids, plates 48 to 52 inclusive, with title, preface and two sheets of text. The second part of the continuation is in the original wrappers dated Augsburg 1834, and contains five plates of the Noctuids, Nos. 158 to 162. In the same wrappers is contained a prospectus of the whole work dated Augsburg, Jan. 1, 1834, giving the prices and signed by Carl Geyer. In this are advertised, fifty-three plates of the Tortricids, all that were ever published, with the number of plates of the other families.

A careful examination of the contemporaneous works is of importance in this question and I have looked over all that I have access to. In Illiger's edition of the Verzeichniss der Wiener Gegend which bears the date of 1801, there is a notice in the first volume as follows:–"The 2nd volume (that containing the Tortricids) is already in press. Ostern, 1800." Now this second volume contains reference to the first thirty plates of Hübner's Tortricids and as it was already in press in 1800, these plates must have been issued *before* 1800, but from the first prospectus mentioned above, they must have been issued *later* than 1796.

The portion of Haworth's Lepidoptera Britanica which includes the Tortricids,—as shown by the original wrappers in the Banksian Library in London,—was published in 1811 and contains references only to the first thirty plates of the Tortricids in the Sammlung. Whether there were any more published at that time I have no means now of determining but of course Haworth had seen no more.

Charpentier and Sommer's Zünsler, Wickler etc. published in 1821, contains references to plate 40, so that this plate must have been in their hands at that time and the first 40 plates must have been published before 1821. On the 22d of December 1823, Hübner advertises the first 46 plates of his Tortricids for sale as shown above by the fifth prospectus. We may reasonably infer that this last date is the time of publication of plates 41 to 46 inclusive.

Hübner's Verzeichniss contains references to the plates of the Tortricids up to and including plate 46, and yet this work purports to have been published in 1816. We see no way to explain this discrepancy except to agree with Scudder that the Verzeichniss was published in parts and that only the first part with the title page really appeared in

1826, and the part which includes the Tortricids, could not have been published earlier than 1823 and perhaps later than this.

Frölich, in his Enumeratio Tortricum, published in 1828, refers to the first 46 plates but not to the 47th. Treitschke in Die Schmetterlinge von Europa, Vol. V. published in 1830, (the preface is dated Dec. 1829), refers to this 47th plate, so we may feel sure it was published late in 1828 or early in 1829, after Frölich's work but before Treitschke's. The contemporaneous French and English works afford no assistance for their authors do not appear to have received Hübner's works for some little time after their appearance.

Plates 48 to 52 inclusive, of the Tortricids were published in 1830 as shown by the date on the original wrappers in the Royal Library in Berlin. Plate 53, the final one of the Tortricids in the Sammlung, is referred to by Treitschke in his Supplement, Part 3, published May 10th, 1835, but this plate was first offered for sale by Geyer in his prospectus dated Jan. 1, 1834 which must be regarded as the time it was published.

Summing up the above, the dates of publication of the Tortricids in Hübner's Sammlung Europäischer Schmetterlinge are as follows:

Plates 1–30 incl. were publ. later than 1796 and earlier than 1800.
" 31–40 " " " 1811? " " 1820.
" 41–46 " " Dec. 22, 1823.
" 47 was published late in 1828 or early in 1829.
" 48–52 inclusive were published in 1830.
" 53 was published Jan. 1, 1834.

The Present Status and Future Prospects of Silk Culture in the United States.*

By C. V. Riley.

The subject is discussed under the following heads:

1. The adaptability of the U. S. to Silk-culture.
2. Silk-culture in the Gulf States.
3. Silk-culture on the Pacific coast.
4. Profits of Silk-culture.
5. Necessity for a home market for the cocoons.
6. The prospects of establishing a market by private enterprise.
7. The practical outcome of the efforts by the Department of Agriculture in promoting Silk-culture under present restrictions.

The paper deals with the above named subjects in detail and the essential conclusions are:

1. The adaptability of our country to Silk-culture is proven beyond all question.

* Abstract of a paper read at the recent meeting of the Am. Ass. Adv. Sc.

2. That the profits are so small that by far the larger proportion of those who become interested abandon the culture after the first year.

3. That the present encouragement given by Congress through the Department of Agriculture has been productive of good in that it has enabled the establishment of three reeling centres, one at Philadelphia, one at New Orleans and one at San Francisco, which are in active operation and furnish a home market for cocoons.

4. That there is great difficulty in carrying on the experiment on true business principles because of the law which prevents the Commissioner of Agriculture from selling the products of these reels and thus utilizing the income.

5. That this encouragement has intensified the interest felt in the subject, but that it can endure only so long as Congress chooses to continue the appropriation. This, once withdrawn, will precipitate a reaction.

6. Finally, that no permanent advantage can be secured until tariff legislation gives real encouragement to the industry and recognizes the fact that so-called "raw silk" is a manufactured article and should, if other manufactured articles are protected, receive like protection.

Society News.

Brooklyn Entomological Society, September 1, 1885.—Twenty-six members and visitors present. Mr. J. B. Smith in the chair. Mr. Leng the curator reported large accessions to the cabinet, and progress in arranging the material. The Society has now an almost complete collection of the Cicindelidæ and Carabidæ of the vicinity of N. Y. Mr. Hulst, the librarian reported large accessions through exchanges and that books had been re-arranged und newly catalogued.

Lt. T. L. Casey was elected a life member of the Society. Mr. O. Dietz was proposed for membership by Mr. Julich, and Mr. Adrian T. Birkhoff by Mr. Weeks.

The resignation of Mr. L. C. Schenk was presented and accepted. Mr. Leng read a paper on "*Hypocephalus armatus*".* Mr. Smith gave an account of the meetings of the Entomological Club of the A. A. A. S., and called attention to some interesting facts presented, and stated they would be published. A discussion was had over the peculiar structural modification of *Cosmosoma omphale* in which Messrs. Hulst, Leng, Neumoegen, Graef, Weeks and Smith participated. Mr. Hulst exhibited a suffused specimen of *Danais archippus* Mr. Doll says a damp cyanide bottle will produce the same effect. Mr. Mohns has seen just such specimens on the wing and does not believe in its being the effect of cyanide. A discussion was had in reference to the action of cyanide in changing colors of insects. Mr. Waters exhibited specimens of *Saturnia galbina* and states that these are the imagines belonging to the cocoon exhibited at the May meeting of the Society but he cannot account for the presence of *Anisota Heiligbrodtii*, in the box, as there seemed to be no other kinds of cocoons.

*This will appear in full in a future number.

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The North American Myriapoda.

By Lucien M. Underwood, Ph.D.

In order to call the attention of collectors to this interesting though much neglected group of Arthropoda the following outline sketch of the literature of the American species and synopsis of the genera heretofore recognized in America have been prepared.

The first paper of importance was published in 1821 by Thomas Say[1], describing fifteen species half of which will probably stand as good species in the genera in which they were originally described and others in genera established later.

Nothing more of importance appeared until 1844, when George Newport[2] published his extensive Monograph in which five American species were described together with the new genera, *Theatops* and *Scolopocryptops* to which some of Say's species were referred.

Girard[3], in 1853, described *Scolopendra heros*, the "centipede" of the South-West, and two species of *Iulus*. Three years later Sager[4] gave three almost unintelligible descriptions of Myriapoda giving neither structural characters nor localities. Two of the three species, have, however, been identified by later writers.

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[1] *Thomas Say.* Descriptions of the Myriapodæ of the United States. Jour. Phila. Acad. II, 102—114, 1821 (Reprinted in Collected Writings, Edited by Leconte, II, 24—32).

[2] *George Newport.* Monograph of the class Myriapoda, Order Chilopoda. Trans. Linn. Soc. XIX, 265—302, 349—439, 1845.

[3] *Charles Girard* Myriapods. Appendix F to Marcy's Report on Red River Expedition, 243—246, Plate, 1853.

[4] *Ab. Sager.* Descriptions of three Myriapoda. Proc. Phila. Acad. VIII, 109, 1856.

In 1861. H. C. Wood[5], better known by his work on the Fresh Water Algæ, commenced a series of papers which culminated in a monograph, "The Myriapoda of North America", published in 1865, the most important paper ever published on the subject in this country. In the first paper he describes four species of *Scolopendra* from America besides numerous exotic species.

In 1862 Dr. Koch[6] published his monograph of the genus *Lithobius* in which he described *L. mordax* and *L. transmarinus* from Louisiana.

Then follows the remainder of Wood's papers. His paper on the Chilopoda appeared in 1863, in which he describes twenty-six new species from America together with the new genera, *Bothropolys* and *Opisthemega*. In 1864 three papers appeared in the Proceedings of the Philadelphia Academy; the first on the *Polydesmidæ*, describes ten new species; the second on *Iulidæ*, describes eleven species of *Iulus* and three of *Spirobolus*; the third describes the new genera, *Octoglena* and *Brachycybe* with *O. bivirgata* and *B. LeConteï*, new species. In 1865 appeared his chief work "The Myriapoda of North America" published by the American Philosophical Society in quarto with three plates; this work describes all the genera and species known to inhabit the United States at that time, amounting to eighteen genera and ninety-two species. In 1867 two additional papers were published, describing new species from Texas and California, the former with four species the latter with six species.

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[5] *Horatio C. Wood Jr.* Descriptions of new species of *Scolopendra* in the Collection of the Academy. Proc. Phila. Acad. 1861, 10—15.

——— On the Chilopoda of North America with Catalogue of all the specimens in the Collection of the Smithsonian Institution. Jour. Phila. Acad. n. s. V, 5—42, 1863.

——— Descriptions of new species of North American Polydesmidæ. Proc. Phila. Acad. 1864, 6—10.

——— Descriptions of new species of North American Iulidæ. Proc. Phila. Acad. 1864, 10—15.

——— Descriptions of new genera and species of North American Myriapoda. Proc. Phila. Acad. 1864, 186—187.

——— The Myriapoda of North America. Trans. Amer. Philos. Soc. XIII, 137—248, 3 plates, 1865.

——— Descriptions of new species of Texan Myriapoda. Proc. Phila. Acad. 1867, 42—44.

——— Notes on a collection of California Myriapoda, with descriptions of new Eastern species. Proc. Phila. Acad. 1867, 127—130.

[6] *Ludwig Koch.* Die Myriapodengattung Lithobius. pp. 94, two plates. Nürnberg, 1862.

There next appeared a paper published by E. D. Cope[7] in 1869 on the extinct Mammalia of the cave formations of the United States giving a short account of the cave Myriapoda; in this he describes five new species with the new genera *Pseudotremia* and *Androgna thus*. In 1870 a second paper appeared on the Myriapoda of the Alleghanies describing a new genus and species *Petaserpes rosalbus*.

The year 1870 ushers in the first representative of a new order of Myriapoda; Dr. Packard[8] in two short papers notes the discovery of *Pauropus* in Massachusetts—a type of minute Myriapoda on which Lubbock had founded the order Pauropoda.

In the year 1872 Meinert[9] described *Lithobius vorax* from Louisiana; Harger[10] published a paper describing seven new species and the new genus *Trichopetalum*; and Cope[7] in a paper on the fauna of the Wyandotte cave described the new genus *Scoterpes*.

Another paper by Packard appeared in 1874 on "Myriapods from Colorado" published in Hayden's Annual Report; new forms were described but no new species named.

In 1875 Anton Stuxberg[11] published two valuable papers on the North American *Lithobiidæ*, the first describing eight new species of *Lithobius*, the second enumerating all the species of North America, twenty-four in number including five from Mexico.

Packard[12] again in 1877 described *Poldesmus cavicola* from Utah, and Murray[13] described *Brachycybe rosea* from California.

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[7] *Edward D. Cope.* Synopsis of the extinct Mammalia of the Cave Formations of the United States with observations on some Myriapoda found in and near the same etc. Proc. Amer. Philos. Soc. XI, 171—192, 1869.

——— On some new and little known Myriapoda from the Southern Alleghanies. Trans. Amer. Entom. Soc. III, 65—67, 1870.

——— On the Wyandotte Cave and its Fauna. Amer. Nat. VI, 1872.

[8] *A. S. Packard Jr.* New or rare Neuroptera, Thysanura and Myriapoda. Proc. Boston Soc. N. H. XIII, 405—411. 1870.

——— A remarkable Myriapod. Amer. Nat. IV, 621. 1870.

[9] *Fr. Meinert.* Myriapoda Musæi Havniensis. I. Geophili. Naturhist. Tidsskr. 3 R. VII, 1871.—II. Lithobiini. Ibid VIII, 1873.

[10] *O. Harger.* Descriptions of new North American Myriapods. Amer. Jour. Science and Arts, 3rd series, IV, 116—121, plate, 1872.

[11] *A. Stuxberg.* Nya Nordamerikanska Lithobier. Ofversigt k. Vetensk. Akad. Förhandl. XXXII, No. 2, 65—72. 1875.

——— Lithobioidæ Americæ borealis. Ibid. XXXII, No. 3, 23—32. 1875.

[12] *A. S. Packard Jr.* On a new cave fauna in Utah. Bull. U. S. Geol. Survey (Hayden) III, 1877.

[13] *Andrew Murray.* Economic Entomology. Part I, Aptera. London, 1877.

In 1878 J. A. Ryder[14] notices the discovery of a second species of Pauropoda in America.—*Pauropus Huxleyi*, hitherto known only from England; in 1879 the discovery of a third forming a new genus *Eurypauropus*; and in 1881 he gives a list of the *Lysiopetalidæ* of North America adding a new genus and species, *Zygonopus Whitei*.

Packard[15] published three papers in 1883, the first describing *Polydesmus ocellatus* (since referred by Stuxberg to *Craspedosoma*); the second a revision of the *Lysiopetalidæ*, a most important addition to our literature, giving a summary of the information at hand and founding the new genus *Cryptotrichus* on *Spirostrephon cæsioannulatus* Wood; the last is a short paper on the Morphology of the Myriapoda.

Finally in 1884 Latzel[16] in his masterly work on the Myriapoda of Austro-Hungary has given some notes on American species notably the so-called *Lysiopetalidæ*. His criticisms will be found stated below.

Such is the principal literature on the subject to date, to say nothing of many shorter notes on distribution, structure and classification that have appeared in various periodicals and other publications.

The European species have been carefully studied by Meinert[17] 1866—1868, Fanzago[18] 1874, Latzel[16] 1880—1884, and others. The work of the last named author is the most important contribution to a knowledge of the Myriapoda that has appeared for a long time. It is

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[14] *John A. Ryder.* Discovery of two remarkable genera of minute Myriapods in Fairmount Park. Amer. Nat. XII, 557—558. 1878

——— Notice of a new Pauropod etc. Proc. Phila. Acad. 1879, 139, 164.

——— An account of a new genus of minute Pauropod Myriapods. Amer. Nat. XIII, 603—612. 1879.

——— A third locality for *Eurypauropus*. Amer. Nat. XIII. 703. 1879.

——— List of the North American species of the Lysiopetalidæ, (with a blind form *Zygonopus*, n. g.). Proc. U. S. Nat. Museum, III, 520—531. 1881.

[15] *A. S. Packard Jr.* A new *Polydesmus* with eyes. Amer. Nat. XVII, 1883.

——— A Revision of the *Lysiopetalidæ*, a family of Chilognath Myriopoda, with a notice of the genus *Cambala*. Proc. Amer. Philos. Soc. XXI, 177—197. 1883.

——— On the Morphology of the Myriopoda. Ibid. XXI, 197—209. 1883.

[16] *Robert Latzel.* Die Myriapoden der Oesterreichisch-Ungarischen Monarchie. Erste Hälfte: Die Chilopoden, pp. 228, plates I—X, Wien, 1880.—Zweite Hälfte: Die Symphylen, Pauropoden und Diplopoden, pp. 414, plates I—XVI, Wien, 1884.

[17] *V. Bergsœ* og *Fr. Meinert.* Danmarks Geophiler. Naturhist. Tidsskr. 3 R., IV, 1866-7.

Fr. Meinert. Danmarks Chilognather. Ibid. V, 1—32. 1868.

——— Danmarks Scolopendrer og Lithobier. Ibid. V, 241—268. 1868.

[18] *F. Fanzago.* I Chilopodi Italiani. Atti d. Soc. Ven.-Trent. III, fasc. 1, 1874.

——— I Chilognathi Italiani. Ibid. III, fasc. 2, 1874.

finely illustrated by twenty-six plates that might well serve as a model for American monographers. Very few species appear to be common to the United States and Europe. The genera however are much the same, the greater number found in Europe being due to the more advanced state of the study there.

The Myriapoda may be conveniently grouped in three orders* as follows:

A.—Body composed of 6—10 segments; antennæ 5-jointed; bifid, bearing three long jointed appendages; nine pairs of legs; species minute, 0.5—1.5 mm. long..... I. PAUROPODA.

Antennæ simple; species of medium or large size ..... B.

B.—Body more or less cylindric or half-cylindric; head normally composed of three segments; antennæ 7—8-jointed; mouth parts consisting of protomalæ** (mandibles) and deutomalæ (labium); two pairs of legs to each segment..... II. DIPLOPODA.

Body usually flattened; head normally composed of five segments; antennæ 12—70-jointed; mouth parts consisting of protomalæ (mandibles), deutomalæ (1st maxillæ) and two pairs of malipedes (auxiliary lips); one pair of legs to each segment..... III. CHILOPODA.

I. PAUROPODA.

The Pauropoda contain two well marked families as follows:

Segments ten, not sculptured above; head and legs not concealed by projecting scuta; color pale; motions agile..... *Fam.* Pauropodidae.

Segments six, tuberculate or sculptured above; body depressed, three times as wide as high; head and legs concealed by projection of segments; color reddish; motions slow..... *Fam.* Eurypauropodidae.

The first family, *Pauropodidae* Lubbock, contains a single genus *Pauropus* Lubbock, with two American species. The second, *Eurypauropodidae* Ryder, contains the genera *Eurypauropus* Ryder, with one American species and *Brachypauropus* Latzel, as yet found only in Europe.

The entire number of Pauropoda described is seven as may be seen from the following table.

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* Dr. Packard though originally accepting Lubbock's order *Pauropoda* is now disposed to unite it to the *Diplopoda* as a suborder. It is perhaps better for the present to retain this group in the form Lubbock first placed it. For Packard's later views cf. Proc. Amer. Philos. Soc. XXI, 204.

** For a discussion of these organs the reader is referred to Dr. Packard's paper: "On the Morphology of the Myriapoda", before quoted.

Genera.	Total Species	European.	American.	Common to both.
Pauropus	3	2	2	1
Brachypauropus	1	1	—	—
Eurypauropus	3	3	1	1
TOTALS:	7	6	3	2

II. DIPLOPODA.

The order Diplopoda contains the following families:—*Polyxenidae*, *Polyzonidae*, *Glomeridae*, *Polydesmidae*, *Chordeumidae*, *Lysiopetalidae* and *Iulidae*. The first and second of these Latzel places in the suborders Pselaphognatha and Colobognatha respectively. The remaining families constitute the Chilognatha proper. All except the *Glomeridae** have been reported from North America. The families may be distinguished as follows:

A.—Body small (2.5 mm. long), soft-skinned, more or less scaly or covered in parts by bushy hair; protomalæ without stipes, uncovered; anus in the penultimate segment; odoriferous glands wanting; 13 pairs of legs... *Fam.* 1. **Polyxenidae.**

Body covering crustaceous; legs not less than 17 pairs..... B.

B.—Head small, triangular; mouth more or less rostrate, thus appearing suctorial; protomalæ small; deutomalæ obsolete or wanting..... *Fam.* 2. **Polyzonidae.**

Mouth parts masticatory; protomalæ large; deutomalæ well developed..... C.

C.—Body composed of 19—20 segments; scuta often projecting laterally, forming laminæ; legs 28—31 pairs; eyes wanting..... *Fam.* 3. **Polydesmidae.**

Body composed of about 30 segments, frequently setose; legs 40—50 pairs; eyes usually distinct..... *Fam.* 4. **Chordeumidae.**

Body segments indefinite always more than 30 ..... D.

D.—Body long, slender, tapering; scuta usually deeply furrowed; antennæ long, slender, the seventh segment short and conic; legs very long, the eighth pair only modified in the ♂, the seventh and ninth pairs normal; sterna free..... *Fam.* 5. **Lysiopetalidae.**

Scuta moderately if at all furrowed, carinate or warty; antennæ and legs short or only moderately long; both pairs of legs of seventh segment of ♂ modified; sterna at least of anterior segments united so as to form complete rings..... *Fam.* 6. **Iulidae.**

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* The *Glomeridæ* of all Myriapods most resemble the pill-bugs or sow-bugs (*Oniscidæ*) in their general features and habits. They may be distinguished from other Myriapods by their short body composed of 11—13 segments, and by having only 17—23 pairs of legs.

Family 1. **POLYXENIDAE** Gray and Jones.

This family contains the single genus *Polyxenus* Latr., of which we have one species *P. fasciculatus* Say, distributed from Massachusetts to Georgia.

Family 2. **POLYZONIDAE** Gervais.

This family contains four American genera with five species; the genera may be distinguished as follows:

A.—Sixth and seventh joints of antennæ confluent with the fifth and with it forming a club; body segments 56. ..... **Andrognathus** Cope.* 1 sp.
Joints of antennæ normal, not forming a club..... B.

B.—Eyes wanting; rostrum shorter than the antennæ ...**Brachycybe** Wood.** 2 sp.
Eyes present, conspicuous..... C.

C.—Eyes 8; body segments about 45..... **Octoglena** Wood. 1 sp.
Eyes 2; antennæ large and stout; body segments 50–53..... **Petaserpes** Cope. 1 sp.

Family 3. **POLYDESMIDAE** Leach.

The *Polydesmidae* of this country have all been described under *Polydesmus* Latr.† of which twenty-one species are recorded. *Strongylosoma* Brandt, *Fontaria* Gray and perhaps other groups ranked as subgenera by Wood, will take generic rank; until, however, a careful study of the types can be made it will be best to leave the species in the original genus under which they have been described.

Family 4. **CHORDEUMIDAE** C. Koch.

With some hesitation I place in this family most of the forms hitherto ranked as *Lysiopetalidae* by American writers. In this I follow Dr. Latzel whose important work has been noticed above. In a note on the American *Chordeumidae*†† he unites *Scoterpes* Cope and *Zygonopus* Ryder and places them as a subgenus of *Craspedosoma* Leach-Rawlins. *Trichopetalum* Harger he also regards as forming part of *Craspedosoma*, and *Pseudotremia* Cope, he would place near the same genus. *Cryptotrichus* Packard, he places near *Campodes* Koch. The form of "*Polydesmus* with eyes" recently described by Packard,‡ Latzel‡‡ states is properly one of the

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* Forming according to Cope (Proc. Amer. Philos. Soc. XI. 182) the type of a new family *Andrognathidæ*.

** Latzel unites *Brachycybe* Wood with *Platydesmus* Lucas. The latter genus has priority.

† An apparent exception is *Stenonia hispida* Sager, Proc. Phila. Acad. VIII, 109 (1856). This undoubtedly belongs to *Polydesmus* though the description is very imperfect.

†† Die Myriapoden der Oest.-Ungar. Monarchie, II, pp. 213—214 (1884).

‡ American Naturalist XVII, 428 (1883).

‡‡ Latzel, loc. cit. p. 125, note.

Chordeumidae and Stuxberg has referred this also to *Craspedosoma*. In the light of these criticisms it will appear that this family needs another revision. Until this can be made it will be best to leave the genera as Dr. Packard has arranged them. I therefore append Dr. Packard's table as given in the Transactions Amer. Philos. Soc. XXI, p. 178, omitting of course Lysiopetalum which forms a family of its own.*

A.—Body not setose; antennæ long; eighth pair of legs of ♂ modified, six jointed; genital armature small.....**Pseudotremia** Cope. 1 sp.

Body setose.....B.

B.—Body short and thick; eyes triangular; antennæ slender; setæ one-fifth as long as body is thick; legs short.....**Cryptotrichus** Packard. 1 sp.

Body short and fusiform; eighth pair of legs of ♂ two-jointed; setæ half as long as body is thick.....**Trichopetalum** Harger. 3 sp.

Body slender; eighth pair of legs of ♂ two-jointed ending in a claw; setæ very long; eyeless.....**Scoterpes** Cope. 1 sp.

Like *Scoterpes*; setæ a little shorter; sixth pair of legs of ♂ greatly swollen.....**Zygonopus** Ryder. 1 sp.

Family 5. **LYSIOPETALIDAE** Wood.

This family as now restricted consists of the single genus *Lysiopetalum* Brandt, with a single species *L. lactarium* Packard, the form originally described by Say as *Iulus lactarius*.

Family 6. **IULIDAE** Leach.

The three American genera of *Iulidae* may be characterized as follows:

A.—Body long and slender; segments 59; scuta strongly carinate; antennæ short and thick; eyes in a linear series.....**Cambala** Gray. 1 sp.

Scuta not strongly carinate.....B.

B.—Scutum of second segment produced at the sides so as to reach the head; antennæ short and thick, the joints shorter than broad.....**Spirobolus** Brandt. 5 sp.

Scutum of second segment not produced; antennæ more slender; the joints much longer than broad.....**Iulus** Brandt. 19 sp.

III. CHILOPODA.

The Myriapods of this order are comprised in four well marked families all of which are represented in North America; they may be separated as follows;

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* I also append Latzel's diagnosis of **Craspedosoma**. *Corpus subteres et plus minusve iuliforme. Segmenta carinis evanescentibus aut nullis, tuberculis vel granulis senis setigeris majoribus vel minoribus ornata et sulco medio, longitudinali exarata. Oculi plerumque distincti. Antennæ longæ et tenues, articulo tertio maximo. Pedum paria feminæ (plerumque) 50, maris 48; pedes longi. Mas: Pedum paria duo in organa copulativa commutata.*

A.—Dorsal scuta 8; antennæ long, setaceous; legs long; tarsi many-jointed....
Fam. 1. **Scutigeridae.**

Dorsal scuta 15 or more; tarsi 3-jointed..... B.

B.—Feet-bearing segments 40—150; antennæ 14-jointed..... *Fam.* 2. **Geophilidae.**

Feet-bearing segments 20—25; antennæ 17—30-jointed.....
Fam. 3. **Scolopendridae.**

Feet-bearing segments less than 20; dorsal scuta in two sets, a smaller alternating with a larger..... *Fam.* 4. **Lithobiidae.**

Family 1. **SCUTIGERIDAE** Gervais.

The family *Scutigeridae* consists of a single genus *Scutigera* Lam., better known as *Cermatia* which is a more recent name. Two species are found in the United States: *S. forceps* (*Cermatia forceps* Wood) somewhat generally distributed east of the Mississippi, and *S. Linceci* (*Cermatia Linceci* Wood) from Texas. I have found the former at Bloomington, Ill., Philadelphia, Pa., Brooklyn and Utica, N. Y. In Brooklyn it appears to be somewhat common in cellars. In Utica a single specimen was taken running about the floors of the N. Y. Central station.

Family 2. **GEOPHILIDAE** Leach.

The *Geophilidae* of North America are divided among three genera as follows:

A.—Cephalic segment elongate; twice as long as broad; antennæ approximate.....
Mecistocephalus Newport. 4 sp.

Cephalic segment less than twice as long as broad, subquadrate or triangular..B.

B.—Cephalic segment subquadrate; joints of antennæ unequal .....
Geophilus Leach. 6 sp.

Cephalic segment narrowed in front; body attenuate anteriorly; antennæ approximate..... **Strigamia** Gray. 16 sp.

Family 3. **SCOLOPENDRIDAE** Newport.

This family contains the species popularly known and sometimes foolishly dreaded as "centipedes"; our genera are four in number and may be distinguished as follows.*

A.—Eyes distinct; feet-bearing segments 21; antennæ attenuate, 17—30-jointed.....
Scolopendra Newport. 9 sp.

Eyes wanting..... B.

B.—Feet-bearing segments 21..... C.

Feet-bearing segments 23; last segment narrow; antennæ 17-jointed.....
Scolopocryptops Newport. 4 sp.

C.—Last scutum the largest, quadrate..... **Opisthemega** Wood. 2 sp.

Last scutum not larger than the others..... **Cryptops** Leach. 3 sp.

* The genus *Theatops* Newport founded on *Cryptops postica* Say is doubtless a form of *Scolopendra.*

Family 4. **LITHOBIIDAE** Newport.

This family in some respects the highest of the Myriapoda, contains two genera whose characters are given below.

Ocelli 2—40 each side of head, variously arranged; labrum 3-toothed in the middle ....**Lithobius*** Leach. 18 sp.

A single large ocelius each side of head; labrum 1-toothed in the middle.. .... **Henicops** Newport (*Lamyctes* Meinert). 1 sp;

I have followed Stuxberg and Latzel in uniting *Bothropolys* Wood with *Lithobius*.

This completes the list of genera as now known in North America; species and probably genera are waiting discovery and description, for as we shall soon show, large areas of our country are still untouched and only very limited regions have been worked with any degree of thoroughness. The study of the Myriapods in America is only fairly begun.

So far we have given only the number of species in each genus. The following table will give a summary by families. For contrast the corresponding numbers for a much more limited European area are given, namely Austro-Hungary where the Myriapod Fauna has been thoroughly studied. The number of species already reported will be seen to be 129, distributed among 27 genera. A few of these however represent species early and imperfectly described which may not certainly be identified be recent writers.

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* Stuxberg (Ofversigt af k. Vetensk. Akad. Förhandl. 1875) has formed six subgenera of *Lithobius* all of which are represented with us. I subjoin his diagnoses.

I.—**Eulithobius** Stuxberg. *Scuta dorsualia* 6, 7, 9, 11, 13 *angulis posticis productis. Pori coxales in pedum paribus* 12, 13, 14, 15 (*L. multidentatus*).

II.—**Neolithobius** Stuxberg. *Scuta dorsualia* 7, 9, 11, 13 *angulis posticis productis. Pori coxales in pedum paribus* 12, 13, 14, 15 (*L. vorax, L. mordax, L. transmarinus*).

III.—**Lithobius** Leach *s. str. Scuta dorsualia* 9, 11, 13 *angulis posticis productis. Pori coxales in pedum paribus* 12, 13, 14, 15 (*L. xanti, L. planus, L. forficatus, L. pawcidens, L. pinetorum*).

IV.—**Pseudolithobius** Stuxberg. *Scuta dorsualia* 9, 11, 13 *angulis posticis productis. Pori coxales in pedum paribus* 11, 12, 13, 14, 15 (*L. megaloporus*).

V.—**Hemilithobius** Stuxberg. *Scuta dorsualia* 11, 13 *angulis posticis productis. Pori coxales in pedum paribus* 12, 13, 14, 15 (*L. eucnemis*).

VI.—**Archilithobius** Stuxberg. *Scuta dorsualia omnia angulis posticis rotundatis vel subrectis. Pori coxales in pedum paribus* 12, 13, 14, 15 (*L. bipunctata, L. monticola, L. pusio, L. Kochii, L. obesus, L. paradoxus, L. bilabiatus*).

Families.	North America.		Austro-Hungary.	
	Genera	Species	Genera	Species
Pauropodidae	1	2	1	2
Eurypauropodidae	1	1	2	4
Total Pauropoda	2	3	3	6
Polyxenidae	1	1	1	1
Polyzonidae	4	5	1	1
Glomeridae	—	—	2	15
Polydesmidae	1	21	4	19
Chordeumidae	5	8	4	17
Lysiopetalidae	1	1	1	7
Iulidae	3	25	3	36
Total Diplopoda	15	61	16	96
Scutigeridae	1	2	1	1
Geophilidae	3	26	9	22
Scolopendridae	4	18	3	6
Lithobiidae	2	19	2	39
Total Chilopoda	10	65	15	68
Totals	27	129	34	170

In order to show where the species have been most collected the following list of states with number of species reported therefrom may be of interest. California 27, Pennsylvania 25, Illinois 16, Georgia 13, Oregon 12, Virginia 10; Texas 8, New York and Florida each 7, Michigan 5, Louisiana and Tennessee each 4, Massachusetts and Kentucky each 3, Connecticut, New Jersey, Indiana, North Carolina, South Carolina and Missouri each 2, New Hampshire, Rhode Island, Maryland, District of Columbia, Alabama, Mississippi, Minnesota, Arkansas, Kansas, Colorado, Utah, New Mexico and Washington Territory each 1. It will thus be seen that Maine, Vermont, Delaware, West Virginia, Ohio, Wisconsin, Iowa, Nebraska, Dakota, Montana, Idaho, Wyoming, Nevada, Indian Territory and Arizona have had no Myriapods reported from within their limits. It should be said that several species have never been reported definitely in regard to locality. Consequently, in addition to the above we must report "United States" 6, "Eastern U. S." 6, "Western U. S." 1 and "Southern States" 2.

On the Classification of North American Diptera.

(Third paper. Concluded from p. 116 *ante*.)

By Dr. S. W. Williston.

BERIDINAE.

Abdomen with seven visible segments in the male, in the female with an additional ovipositor. Wings with a stigmatic spot; all the posterior veins arise from the discal cell.* Abdomen flattened.

1.—Three posterior veins; occiput flat 2
Four posterior veins; scutellum with spines 3
2.—Scutellum with spines; palpi rudimentary ..... **Beris** Latr.
Scutellum without spines (*Metoponia* Lw., non Macq.) ..... **Allognosta** O.S.
3.—Occiput excavated; hind femora thickened at the extremity ..... **Neoexaireta* O.S.
Occiput flat, hind femora simple; last two abdominal segments small ..... **Scoliopelta**, n. g.

SARGINAE.

Body usually elongate; rather small, nearly bare species. Four posterior veins, the last one arising from the basal cell. Antennæ short, the third joint rounded or subquadrate, with an apical or pre-apical arista. Scutellum without spines on its border. (Occiput deeply excavated.)

1.—Anterior ocellus more widely separated than the other two; males holoptic or dichoptic 2
Ocelli equidistant, more approximate 3
2.—Abdomen contracted toward the base, clavate or pedicillate ..... **Macrosargus** Bigot.
Abdomen not pedicillate in the male, in the female the second segment not concave on the sides ..... **Sargus**, Fabr.
3.—Second antennal joint prolonged on its inner side into a projection, extending on, and closely lying upon, the third joint ..... **Ptecticus** Loew.
Second joint not with such a projection 4
4.—Males dichoptic; eyes bare ..... **Chrysonotus** Loew.
Males holoptic; posterior veins weak 5
5.—Eyes thickly pilose ..... ***Chloromyia** Dunc.
Eyes bare, deep metallic species; front very broad in the female; arista terminal; abdomen short; eyes of male with an area of enlarged facets above ..... **Microchrysa** Loew.

STRATIOMYINAE.

Rather large species, the abdomen usually oval and more or less thickened. Five posterior cells; often, however, one or more of the three veins that arise from the discal cell are faint or entirely rudimentary, and the cells hence coalescent: in these cases, the discal cell will usually show angulations, indicating the origin of such veins. The last posterior vein

* This character I have found variable in species of Beris; its precise value in some other genera is yet to be decided.

is nearly always distinct, and arises from the second basal cell. Anterior veins often crowded anteriorly. Antennæ never with a long or slender bristle.

1.—First antennal joint three or four times as long as the second; scutellum with spines ..... **Stratiomyia** Geof.

First antennal joint not three times as long as the second 2

2.—Front projecting below, face much retreating, body narrow, abdomen narrower than the thorax, third longitudinal vein not furcate, scutellum with small spines (Texas, Mexico) ..... *__Myxosargus__ Brauer.

Front not projecting below, face convex, abdomen short, broad, scutellum usually with spines; third longitudinal vein usually furcate.... **Odontomyia** Meig.

Genera not yet known to occur in the United States: *Chordonota* Gerst. (Mexico), *Neorondania* O.S. (Mexico), *Cyphomyia* Wied. (Central America, West Indies), and *Nothomyia* Loew. (Cuba).

CLITELLARINAE.

Abdomen short, usually but little longer than broad; four posterior veins, all of which arise from the discal cell. Small or moderately large species, nearly bare.

1.—Scutellum without spines; face produced below into a projecting cone; posterior veins of wing weak; small species..... **Nemotelus** Geof.

Scutellum with spines 2

2.—Antennæ short, with a subterminal bristle ..... **Oxycera** Meig.

Antennæ more or less elongate, without bristle..... 3

3.—Scutellum with two spines on its border..... 4

Scutellum with six spines. (*Scoliopelta*).

4.—Antennæ much elongated, style not differentiated, eyes bare, smaller species.... **Euparhyphus** Gerst.

Antennæ less elongate, style more or less differentiated, eyes pilose, larger species..... **Clitellaria** Meig.

Additional N.A. genus: *Euryneura* Schiner.—Mexico.

PACHYGASTRINAE.

Small species, abdomen oval. Three posterior veins, all arising from the discal cell.

1.—Antennæ situated near the middle of the face in profile, third joint short, with a terminal arista, scutellum without spines..... **Pachygaster** Gerst.

Antennæ situated low down, near the mouth..... 2

2.—Third joint of the antennæ forked, the upper branch with an apical bristle..... *__Chauna__ Loew.

Third joint of the antennæ elongate, segmentate, scutellum with spines..... *__Acanthina__ Wied.

Additional N.A. genus: *Cynipimorpha* Brauer, l.c.—Mexico.

NOTES:

Subula, *Chrysonotus* and *Chauna* are all preoccupied. At least one of these of earlier date (*Chauna* Illig.) is now in use, and will necessitate a change.

The only North American species referred to *Chloromyia* is *Sargus viridis*

Say (= *S. nigribarbis* Big.). This species, however, as I identify it, is a true *Sargus*.

Sargus trivittatus Say is probably a *Ptecticus*. *S. xanthopus* Wied. is, I believe, a synonym of *S. decorus* Say.

Macrosargus is a genus of doubtful value; some of Loew's species of *Sargus* belong here.

Exochostoma caloceps Big., as Osten-Sacken suggests, is probably an *Odontomyia*.

Chrycochlora Lat. (Mexico) is placed by Brauer in a distinct group.

Scoliopelta n. g. Head similar to that in *Beris*. Eyes broadly contiguous in the male, pilose; ocellar tubercle prominent; face rather small, antennæ situated a little below the middle in profile, first two joints short, of nearly equal length; third joint moderately long, moderately thickened, and then uniformly attenuated to the tip, composed of eight segments, without style, first segment longest, about as long as the second joint, the following six joints very narrow and distinguishable only with difficulty, terminal segment longer; palpi cylindrical, not abbreviated. Scutellum nearly as broad as long, sub-triangular, with two larger, approximate spines at its tip, and on each side two smaller ones. Abdomen much flattened, nearly circular in out line, composed of seven segments, the last two small, the seventh scarcely distinguishable from above. Hypopygium small. Origin of the stem of the second and third veins opposite the base of the discal cell; origin of the second vein before the anterior cross-vein; the furcation of the third vein near the middle; discal cell with four posterior veins, the third abbreviated before reaching the margin, the first two nearly contiguous at their origin; fifth posterior cell broadly contiguous at the base with the discal cell. Legs a little more slender than in *Beris*.

Differs from *Beris* in the broad short abdomen, the elongate palpi, the presence of the third posterior vein, etc. From *Actina* it differs in the holoptic male, the shape of the abdomen, hind femora, etc.

Scoliopelta luteipes, n. sp. ♂. Length 7 mm. Black, legs luteous. Antennæ about two-thirds as long as the distance from their base to the ocelli. Dorsum of thorax shining, with a deep green reflection, clothed with short orange-colored pile; humeri and post-alar callosities obscurely luteous. Halteres yellow. Abdomen moderately shining, with sparse, very short, black pile. Legs luteous, the knees broadly, and the tarsi yellow. Wings brownish infuscated, darker in front, the stigma small; veins, except toward the base of the wing, brown.

Two specimens, collected in meadow-land, near the base of Mt. Washington, in the early part of August.

In the examination of my material I have observed a few general characters that appear not to have been previously described. I offer some of them here as merely suggestive.

In all the genera of *Stratiomyidae* known to me, except *Subula*, species of *Beris*, *Scoliopelta*, *Ptecticus* and *Pachygaster*, the second longitudinal vein takes its origin from beyond the anterior cross-vein. Its origin in the three species of *Ptecticus*, which I have examined, was unexpected.

In the *Stratiomyidae*, except the *Beridinae* (and *Subula*), the front coxal openings are more widely separated, the coxæ are shorter, the meso-

sternum longer and more developed, so that the front pair of legs are more widely separated from the other two, which are approximated at the back part of the sternum. This difference may most readily be perceived by a comparison of *Coenomyia* and *Hermetia* or *Stratiomyia*.

In the present and related families the second main vein-stem of the wings gives off, first the sixth longitudinal vein, and, at a short distance beyond, the fourth. In the family *Syrphidae* the reverse is invariably the case in the two hundred or more species examined by me. The *Conopidae* agree better with the *Muscidae calyptratae* in the origin of the fourth and sixth veins occuring at the same point.

ERRATA.—First paper, page 132, line 6, for "thickened" read flattened; p. 134, under Xanthogramminae, B. for "Ocelli" etc. read Face retreating, etc.; BB. for "Ocellar" etc., read Face projecting. Second paper, p. 11, line 6 from bottom, insert usually after "wings".

YALE COLLEGE, MAY 1885.

Notes on Platysamia Polyommata *Tepper*.

BY GEO. D. HULST.

Platysamia polyommata Tepper, described from a unique ♀ in Mr. Water's collection, Brookl. Bull. Vol. V, p. 66, and represented in that place also by a photograph, is, as any one may see, an insect with rather broader wings than *P. cecropia* L. and consequently without doubt a *Platysamia*. Since then Mr. Waters has received from Arizona a ♂ of this same species. In coloration it is very like the ♀, having the same bands and spots on wings and body. It has in addition a white basal crossband on the fore wings, and the black ground color is richer and very velvety in appearance. The shape of the wings is however altogether different from those of the ♀. In this it has almost the form as it consequently has very much the appearance of *Callosamia promethea*. The fore wings are just as distinctly falcate, and the external margin runs inward, shortening the internal margin and narrowing the wing. The hind legs are narrow and extent backward. The insect is thus put in the unfortunate position, that the ♂ is in one genus, the ♀ in another. *Samia cynthia* has gotten itself in a somewhat similar predicament. In China it is a *Samia* but in the few years it has been naturalized in this country, it has broadened its wings, so it has become a pretty fair *Platysamia*. I call attention to these facts only that those who are interested may see that some of these genera have no excuse for existing as at present limited; for they are, I believe, limited by the shape of the wings and the wing spots only: neither of which characters are constant or identical in the sexes of the same species.

Notes and News.

The collection of Lepidoptera made by Mr. O. Meske, of Albany, N.Y., has been acquired for the National Museum. The collection contains many types of American species and a well determined lot of European and other exotic species. With the Lepidoptera contained in the Riley collection and in the Belfrage collection, that order is now very fully represented:—American forms principally considered. When in shape, with the rich biological material of the Riley collection well worked in, it will rank among the best in the country.

* * *

We are pleased to be able to notify our readers that Mr. P. R. Uhler of Baltimore has handed us the mss. for a Check List of the *Hemiptera Heteroptera* for publication. That we need such a list no one will dispute, and that Mr. Uhler is the proper man to prepare it will be as little doubted.

* * *

The first specimen of *Rhopalopus Sanguinicollis* Horn, I got from Carrolltown on the Laurel Ridge Mts. Since then I have found it on the Chestnut Ridge in Westmoreland Co., Pa.; but only on the sweet black cherry tree. It does not seem to injure any other trees, for beside these trees stand sweet red and sour red cherry, apple, peach, pear etc., all untouched by the insect. It makes its appearance after the tree has blossomed and before the fruit is ripe (about middle of June) and a few specimens may be gotten as late as August. It is always taken in the afternoon on the shaded side of the tree. THADDEUS SEHER.

* * *

Owing to the length of other articles, the continuation of the Proceedings of the Ent. Club of the A. A. A. S. was crowded out of this number. A goodly portion will appear in our next.

* * *

In the June number of ENT. AM., under "Notes and News", I noticed the statement from Mr. L. O. Howard, that *Belostoma grandis* was attracted in great numbers to the electric lights in New Orleans during the month of December. This was also the case in the early part of the same year, and probably prevails to a greater or less extent all the year round. I might add that in Chicago the electric lights attract, besides other insects, great numbers of *Ephemeræ*. In the latter part of July I have seen myriads of these insects in the evening, attracted to the lights. In some places the stone pavement being entirely covered over with them, so that there was more danger of slipping up on their soft bodies and falling, than if the pavement had been carefully strewn with the proverbial banana peel. They undoubtedly breed by millions in the Chicago River, and are a constant source of annoyance during the greater part of the summer. C. H. T. TOWNSEND, Constantine, Mich.

Book Notices.

Dr. Carlos Berg of Buenos Aires, has sent us a series of his papers, mostly from the "Anales de la Sociedad Cientifica Argentina", and giving notes and descriptions on and of a large number of *Coleoptera*, *Lepidoptera* and *Hemiptera*. It is interesting to note, that in addition to our old and well known friends *Agrotis ypsilon*, and *saucia*, *A. incivis*, and *Cindaphia bicoloralis* also occur in the Argentine Republic. For *A. ypsilon* we have as synonyms *frivola* Wallgr. and *robusta* Blanch. *A. saucia* has as synonym *angulifera* Wallgr., and the Doctor thinks that *Spaelotis stictica* Blanch., *S. punctulata* Blanch., *Agrotis impacta* Wlk., and *Noctua aethiops* Phil., will also prove forms of this protean species. *A. incivis* is *A. anteposita* Gn., and *A. lenticulosa* Moritz. *Cindaphia bicoloralis* Dr. Berg himself had re-described as *Botis amiculatalis* and here corrects himself. It proves that the synonym mill is grinding there as well as here.

On the Parasites of the Hessian Fly. By C. V. Riley, Ph. D., Proc. U. S. Nat. Mus. VIII, 413—422, Pl. XXIII, Sept. 1885.

An interesting contribution to the history of this well known pest, describing and illustrating:—*Merisus destructor* (Say), *M.* (*Homoporus*) *subapterus* n. sp., *Eupelmus allynii* (French), *Tetrastichus productus* n. sp. and *Platygaster Herrickii* Pack An extract characterizing the species was read before the recent meeting of the A.A.A.S., and the life history of the species is carefully traced.

Fourteenth Report of the State Entomologist on the Noxious and Beneficial Insects of the State of Illinois. By S. A. Forbes (3d Rept.), for the year 1884. pp. 136, pl. XII. Also an Appendix containing "General Indexes to the first Twelve Reports of the State Entomologists of Illinois."

Contains an Entomological Calender, and articles on Corn Insects; Wheat Insects; Grape Insects; Black- and Raspberry Insects; *Agrotis C. nigrum*; Apple and Pear Insects; Maple and Elm Insects; and Miscellaneous Notes.

The Index to the 12 Reports is a valuable contribution, modelled upon Prof. Riley's Index to the Mo. Reports. The title page enumerates *Francis* LeBaron as one of the State Entomologists—we were under the impression that *William* LeBaron held that office.

Quite a large number of new species of several orders are described more or less completely, and a new *Tenthredid* genus (*Metallus*) is very incompletely characterized.

The article on Wheat Insects is interesting because it covers to an extent the ground covered in the publication by Prof. Riley (previously noticed) on the parasites of the Hessian fly.

In all but *Tetrastichus carinatus* the generic reference of the species

described, is either erroneous, or the name of a genus is used which has been long since subdivided. Descriptive work ought either to be left to competent specialists, or, as in the case of Prof. Riley's paper, a special and careful study of the group treated of, should be made. However good a general entomologist a man may be, he cannot have that special knowledge of any one order which is necessary to a describer of new species. *Pteromalus fulvipes* Forbes is the *Merisus subapterus* of Riley, and Prof. Riley's generic reference is reliable.

The figures are largely reproductions from Riley, or from the earlier Ill. Repts. The new figures are as a rule very poor, inaccurate, in some instances even misleading and they print miserably. A recent number of "Science" criticised the last report of the U. S. Dept. of Agriculture for its illustrations; acknowledging their artistic merit and scientific accuracy, but blaming the use of Photo-engraving for their reproduction. Curiously enough the new figures in this report, which show no traces of that careful supervision of the artist necessary to secure an accurate figure of an insect, are passed over without comment by that Journal. As a whole the report is a valuable contribution to economic entomology, though leaving in some points, much to be desired.

Further notes upon the markings and attitudes of lepidopterous larvæ, together with a complete account of the life history of *Sphinx ligustri* and *Selenia illunaria* (larvæ). By Edward B. Poulton. Tr. Ent. Soc. London, 1885. Part II (August 5) pp. 281—329. Pl. VII.

A valuable and exceedingly interesting contribution to the ontogeny of the species treated, of giving some interesting speculations as to the use and purpose of some of the appendages, and on the origin of the colors and markings and their philosophy. The article is too long to abstract, and we must refer students to the paper itself for its contents.

Wie entsteht die Gliederung der Insectenfuehler? By Dr. Fritz Müller. Kosmos, 1885. Vol. XVII, pp. 201—204.

Notes on the gradual increase in various stages of the number of joints in the antennæ of *Calotermes rugosus* and some species of *Cochliopsyche*, showing how the increase in number of joint stakes place by division, principally of the third and fourth joints.

The Butterflies of North America by William H. Edwards. 2nd series. Boston, *Houghton, Mifflin & Co.*, 1874—1884, pp. 445, pl. 51. 4°.

A recent number of "Science" contains a notice of the above work, which we can heartily indorse. After giving the author deserved credit for the quality of matter, and especially the fine plates (part of this praise

belongs to Mrs. Peart, the artist), the article reads as follows: "In this, [referring to the list of species closing the volume] however, in which the number of species is raised from 512 to 612, he retains in nearly every particular the antique classification adopted in the first volume. The studies which Mr. Edwards has undertaken upon the history of butterflies have rendered him an authority on that subject, and his skill in field investigation has been unexcelled. This, however, constitutes no claim whatever to any knowledge of the structure itself of butterflies, upon which classification must be founded; and as he has shown no such knowledge in his writings, we can only regret that he did not altogether omit this list, since it carries an authority to the public eye which it does not possess, the classification being not only false in many minute particulars, but fundamentally false to nature".

Society News.

Brooklyn Entomological Society, Oct. 6th, 1885.—Present 27 members and visitors; the president, Mr. Cramer in the chair. Mr. O. Dietz and Mr. A. T. Birkhoff were elected members of the Society. Mr. Smith proposed Mr. W. B. Taylor of Brooklyn; Mr. Weeks proposed Mr. Chas. Scott of N.Y., and Mr. Neumoegen proposed Mr. Chas. Palm of N.Y. as members of the Society. On motion of Mr. Neumoegen, seconded by Mr. Hulst, Senor Doctor Don Juan Gundlach, of Cuba, was elected an honorary member of the Society. Mr. Hulst presented additional evidence that *Danais archippus* occasionally presented a very dark, blackish suffusion. Mr. Hy. Edwards exhibited a specimen of *archippus* which before being put in cyanide was bright red; but was now dull blackish. He stated however, that he had this summer taken an even darker specimen in the field. He also exhibited a specimen of *Colias eurydice* dyed a brilliant red, by the action of a damp cyanide bottle.

Mr. Tepper exhibited a series of bred specimens of *Papilio asterias* and read a short paper* on their variation, especially noting the facts, that the anal ocellus varies in size and shape and is sometimes entirely absent, therefore not reliable as a test of specific distinction.

Mr. Smith stated, that he had of late examined every collection he had seen, for variations in *Papilio*, and considered the anal ocellus as of absolutely no value. Mr. Cramer states that a series of *turnus*, bred in Maine, so strongly resembled *rutulus* that he could scarcely distinguish them. Mr. Edwards had seen bred specimens of *asterias* showing even a greater range of variation, but he considered that Mr. W. H. Edwards placed more stress upon the shape of the anal spot than the presence of the ocellus, and hardly liked to consider the species classed under *machaon* as identical. He referred to *P. Hippocrates* which showed a peculiar departure from the normal form in the shape of ocellus, and said many of the

* Which will appear in a future number.

misunderstandings and differences of opinion had arisen from differing ideas of a species. An occasional resemblance of a specimen of one species to that of another, did not prove the identity of the two. Mr. Neumoegen spoke on the same subject. He had *P. asterius* from Cuba and from this locality the female instead of being larger and with less yellow than the ♂, resembles that sex in all respects. In other words, that sexual difference in color which is so prominent in U.S. specimens does not exist there. This is the form named *polyxenes* by Drury. In Central America the *asteroides* form becomes the prevailing one. Mr. Smith, referring to Mr. Edwards' remarks on species, said that the difficulty was, that some persons would not recognize the fact that species are not always a fixed quantity. The process of evolution is still going on, and the so called species that these disputes are about are undergoing change. Some forms never resemble anything but themselves and leave no doubt as to their distinctness. These are so far fixed that they may be called species; but the other forms that are changing, and have so far changed that locally they are constant, are not species, though they deserve a title explaining their relation to the parent stock. No sensible man will dispute the close relationship of *asterius*, *polyxenes*, *asteroides*, and some others, and it is generally assented that they come from the same stock. They have not yet branched so far as to leave the stem form behind, or to sever connection with it. Many others are in the same predicament. Several other examples were instanced. Mr. Hulst favored names to indicate the relationship of forms to each other and did not think the term species should be used for these partly separated forms. Referring to the species of *Papilio* allied to *machaon* he had been inclined to believe Dr. Hagen in the wrong, but carefully studying Mr. W. H. Edwards' reply, and the figures given with it, he became fully convinced that Dr. Hagen was in the main correct.

Mr. Hulst made some remarks on *Platysamia polyommata* Tepper which showed how little the genera in this group were based on actual characters, for the ♀ is a *Platysamia*, while the ♂ belongs to the genus *Callosamia*. Mr. Neumoegen agrees that the *Attaci* are badly separated generically. Take the variations of *Cynthia* in Japan, U. S. and Paraguay and you have entirely different wing form and habitus, so that your species in Paraguay belongs to one genus, while in the U. S. it belongs to another. Incidentally he mentioned that it had been proved by breeding that *Attacus splendidus* and *orizava* were identical.

Mr. Smith then introduced Mr. E. A. Schwarz, of Washington, who read a few notes on *Telmatophilus americanus*.* Mr. Leng read a few notes on the distribution of Cicindelidæ near N. Y.

Mr. Edwards called attention to the fact that diurnals were occasionally attracted to the electric light. He had observed *P. troilus*, *P. atalanta*, *cardui*, *huntera*, *V. antiopa*, *D. archippus*, and *L. pseudargiolus*. He had been informed by Dr. C. Hart Merriam that a Light-house keeper on Lake Ontario had been greatly annoyed by the large swarms of *archippus* that flew against it and obscured the light.

After informal discussion the Society adjourned. During the informal discussion a small lot of named Coleoptera, from So. Cal. donated by Dr. Horn were sold at auction for the benefit of the Society, and brought $9.50.

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* Which will appear in a future number.

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Aletia xylina vs. A. argillacea.*

By C. V. Riley.

Without entering into any general discussion, which would be out of place here, as to whether Hübner's names should be adopted or not—a question which has always divided entomologists—but following those who, taking the more conservative view, accept his species when his descriptions and figures leave no question as to what is intended, the purported description in connection with the figures, would have to be rejected even from this standpoint. In point of fact they leave every doubt as to the species intended, and give us no absolute certainty. The only descriptive part is that referring to the white dot, and this is conspicuously and well represented on the figure referred to; but it is this very character which makes it morally certain that some other species than *xylina* Say was intended; for while typical specimens of *xylina* invariably have the three white minute dots referred to on page 9, of this work, the conspicuous discal or reniform spot on primaries is almost invariably oval and dark, with two cinereous pupils, which are often dilated so as to represent a large cinereous spot, with a dark center and a dark border. Of the many hundreds, and we may say thousands, of specimens which we have examined, not one has had the distinct white spot described and

* This article is taken from advance sheets from the 4th Rept. U. S. Entomological Commission and to give point to it I reproduce Hübner's original description.

"Aletia Argillacea. Aus Bahia. Vom Herrn Sommer abgelassen. Eine *Noctua genuina* und *Heliophila lineata*. Sie ist der *A. Vitellina* sehr ähnlich, hat aber in nichts eine Gleichheit mit ihr und auf den Schwingen einen weissen Punkt. Ihre Fürbildung 399, 400, stellt ein männliches Muster vor."

This may be translated: "From Bahia. Left by Mr. Sommer. A *Noctua genuina* and *Heliophila lineata*. It is very similar to *A. Vitellina*, but is in nothing identical with it, and has a white dot on the wings. Figs. 399 and 400 represent the male."

The question as to what *argillacea* really is, will be considered in a special study of the genus *Anomis* which I hope soon to make. From material so far studied it is a species received from Bahia, somewhat smaller than *xylina*.

figured by Hübner. The figures in other respects bear out this conclusion; for while in the different copies of the Zuträge the coloring will vary according to the colorist and according as the colors have changed with age—two facts which in themselves should be sufficient to discard names founded on mere figures—yet in the three copies which we have examined the figures represent a smaller, feebler-bodied species, lacking in the characteristic olivaceous hues, and much more roseate superiorly and more highly colored with yellow and roseate on the under side. The under surfaces of *xylina* are of tolerably uniform pale gray, with a faint ochreous tinge, and in no specimen of *xylina* do we find the sharp black line on the under side of the hind border of the secondaries characteristic of Hübner's figure.

From these facts it will be seen that nothing can be absolutely settled from Hübner's description and figures, and so much has this been felt by previous authors that they have not been able to identify Hübner's *argillacea*. Thus Guenee, who had evidently better material to judge from than any previous, or for that matter subsequent, author whom we can call to mind, questioned whether his *grandipuncta* (=*xylina*) could be referred to *argillacea*, for the reason that this last is more yellow, more distinctly marked, with the reniform concolorous, marked with a very distinct white dot, and quite distinct on the under surface Even Mr. Grote, notwithstanding the assurance with which he identifies *argillacea* in the paper before the Association in 1874, expressed his uncertainty in his first published opinion on the subject. (Bulletin of the Buffalo Society of Natural Sciences, vol. i, p. 170, 1874.)

The figures on our Plate IV, 7a, were kindly copied for us by Mr. Skinner, from the copy of the Zuträge in the library of the American Entomological Society. The coloring has been slightly lightened in the printing, but otherwise shows the figures very well as they appear in that copy. In the copy in Dr. Hagen's possession,* as also in that which we have lately obtained for the Department of Agriculture, the figures are somewhat darker; but all are uniform in those particulars which we have just pointed out, and in which they differ from *xylina*. Hence, a careful and candid study of the subject, so far as Hübner's work permits, leaves very grave doubt as to the identity of his *argillacea*, and though from the fact that we had accepted Grote's determination in the first edition of this work (solely on his authority) we have tried to retain it rather than make a change in this second edition; yet an unbiased weighing of the facts presented by the published data would alone have forced us to reject *argillacea*. We are entirely of Dr. Hagen's mind, as

* This copy, as Dr. Hagen informs us, is on "geschöpftes Papier" with what is known as old coloring in good condition.

expressed in a letter written to us April 4, 1883, after full study of the facts, and before he was aware of our previously published opinion to the same effect. He remarks: "Compared with Say's excellent description, I believe it out of question not to accept Say's name, which has priority.

Forced thus, from the published data, to reject *argillacea* on the ground of uncertainty, we have endeavored to reach the definitive conclusion from non-published, historical data, *i. e.*, by an endeavor to ascertain whether types of Hübner's *argillacea* were still in existence. Dr. Hagen kindly informed us, in a letter dated April 12, 1883, that since *argillacea* was described from the collection of the late Mr. Sommer of Altona near Hamburg, it might perhaps be possible to find the type specimens still in that collection, as Mr. Sommer had his collection specimens kept in very good order. The Sommer collection was supposed to have been purchased by the Museum of the city of Hamburg, but upon inquiry we were informed by Mr. C. Crüger, who was formerly connected with the Museum Godeffroy of Hamburg, that the collection had long since been purchased by Dr. Staudinger, of Blasewitz near Dresden. Having thus traced the Sommer collection, we directed Mr. A. Koebele to proceed, with specimens, to Germany, and to visit Dresden and inquire into the facts. With the kind permission of Dr. Staudinger, Mr. Koebele was able to make an examination of the Sommer collection, but the results gave us no greater certainty; for, from the notes made, it would appear that very few of the labels in the Sommer collection are written by Sommer. The collection is, also, in great disorder, and has been neglected by Dr. Staudinger. Of the eight specimens of our *xylina* in the collection one is marked from Panama, another from Porto Rico; one is named "*Anomis grandipuncta* Guen.", another, unspread ♀ specimen "*argillacea* Hbn." and a third "*A. grandis*". If there were any way of considering these labels authoritative the evidence might be considered in favor of our *xylina* being Hübner's *argillacea*, but from all the facts it is evident that the labeling has been done by other hands, and there is other evidence to weaken the value of those labels. Thus the type of *argillacea* is distinctly stated by Hübner to be male, so that the female above referred to could not be the type, which must also have been spread to have permitted the artist to fully figure the upper and under surfaces of all wings. Again in the Sommer collection there are eight specimens of a closely allied moth—the *Anomis luridula*, of which one is labeled "*luridata?*" and a second "*modesta*" and a third "*exacta*". The species bears no resemblance whatever to the *exacta* of Hübner's figures, so that we have here positive evidence of the worthlessness of the labels as historical indications of Hübner's types.

Proceedings of the Entomological Club of the A.A.A.S.

(Continued from p. 125 *ante*.)

The following paper was then read by its author.

NOTES ON SOME STRUCTURAL CHARACTERS OF THE LEPIDOPTERA.

By John B. Smith.

I had hoped and expected to be able to present a rather complete review of the structural peculiarities of some groups or families of the Lepidoptera and to propose a new scheme of classification; but lack of time and too many other duties prevented the completion of the work, and I will present only brief notes of a suggestive character.

In many families in all orders, sexual peculiarities furnish characters of high systematic value; but in the Lepidoptera these organs have never been carefully studied and no systematic value has been attached to them. Lederer in the "Noctuinen Europas" gives a number of figures and describes a number of what he calls "after klappen", but his figures are imperfect and misleading and the most essential parts of the structural peculiarities were missed by him.

For some time past the Noctuidæ have been studied by Prof. Riley and myself with the view of preparing a monographic work on the family, and many interesting points in structure have been discovered. Working over the Noctuidæ suggested inquiries and studies in other families, partly to fix relationships, and partly for purposes of comparison. The discoveries of modifications of the genital organs of the ♂ are such, that a decided modification in our present classification of the Lepidoptera may have to be made. The diurnals are so well separated, that no special examinations of them have been made, though what little I have done shows that there is still much to be learned about them. The normal structure of the clasping organs of the ♂ among the Heterocera consists of a superior lunate or triangular corneous plate, which I call the supra-anal plate; a variously shaped corneous hook soldered to the tip, which I call the supra-anal hook: and an oblong, semi-chitinous piece on each side, called the side piece; to which are often attached corneous hooks or processes called claspers. The side pieces are moveable, are very differently shaped, and afford excellent specific and perhaps generic characters. The claspers also offer a wide—in fact infinite—variation: so great a one indeed that in some groups there are no two species alike, and the modifications are specific while in others they are so constant that they afford good generic characters.

My present purpose is to call attention to some modifications of

this structure in the Bombycidæ and the groups placed between them and the Rhopalocera. In the Hesperidæ, the males, so far as I have examined them, have the supra-anal plate small, lunate or crescent shaped, there is no supra-anal hook, and the side pieces are short, and illy, or not at all adapted for clasping. Some, perhaps many of the higher groups have the supra-anal plate well developed, but it is with the lowest of the group—those placed at the end of the series, that I have now to deal.

Among the *Heterocera* the *Zygaenidae* most nearly approach the *Hesperidae* in this respect; entirely lacking the supra anal plate, and having the side pieces scarcely modified into clasping organs.

The *Syntomidae* are closely allied in structure; but here, though the supra-anal hook is not, in the forms examined by me, fully developed, it is well indicated, and the side pieces are often corneous and furcate, or provided with separate corneous claspers. In *Didasys* these organs are very prominent and furnished with long tufts of hair.

Allied to the *Syntomidae* are the *Aegeridae*, or *Sesiidae* as some prefer to call them. But here the supra-anal plate undergoes a modification: instead of being solid, a triangular space is punched out of the center, leaving a triangle with its apex somewhat dilated. There is no supra-anal hook in those specimens examined by me, and the side piece is simple.

In the *Macroglossae* another peculiar modification appears. Here the plate is narrowed, thickened and takes a shape somewhat like a Lobster's claw. The side piece is simple, and there is a stout, straight, corneous spine below the intromittent organ.

Sphinx has usually a complete supra-anal plate and hook, and often corneous claspers.

In the higher *Bombycidae* we notice a curious and remarkably constant modification—the supra-anal plate is present though often much reduced in size, and the tip is somewhat prolonged, but instead of forming a spine it divides and forms points, or lobes, varying in the species. I illustrate *cynthia*, *cecropia*, *regalis*, *imperialis* and *Adelocephala bicolor* and all the other large species examined by me, present the same form.*

This modification gradually runs into the normal form; but through what stages it passes to do so I am not yet prepared to say.

Little as I have done yet, the results attained are still instructive—in combination with wing structure and habits they suggest a classification somewhat different from that usually adopted.

The *Syntomidae* with diurnal habits, clear, bright or contrastingly

* Figures of these peculiarities will be presented at a future date.—J.B·S.

colored wings with few veins, should head the list, followed by the *Aegeridae*, with similar appearance, similar habits and very similar structure: then come the clear wing sphinges or *Macroglossae* which are also largely diurnal and which differ very essentially in structure from the typical *Sphinx* as I have shown recently in "Entomologica Americana"; and the *Sphinges* with crepuscular habits again lead naturally to the typical *Bombyces*, through the nocturnal *Smerinthids*.

As the highest type of another series stand the *Zygaenidae*. Also largely diurnal in habit and often brightly colored they yet differ largely from any of the preceding in the numerous veins of both wings. The true *Zygaenidae* do not exist in the United States as I showed recently in the Transactions of the Am. Ent. Soc.; but their close allies, the *Pryomorphidae* do exist here in some number, and they very gradually lead into the *Lithosiids* and thence to the *Arctiids* and *Bombyces*.

We have here two distinct series: the *Syntomidae* and *Zygaenidae* rather closely allied, and diverging from thence, the one to the *Bombyces* through the *Sphinges*, the other to the same group through *Pyromorpha*, *Lithosia* and *Arctia*.

In the Lepidoptera Heterocera and especially those groups classed as *Zygaenidae* and *Bombycidae* systematists have shown a remarkable objection to the creation of families, or more correctly to the use of family terms to express relationships and define groups. The result is that there is a mass of species all classed under the general term *Bombyces*, or *Zygaenidae* which have absolutely not one character in common. Mr. Grote to be sure in his recent list makes some divisions, but unfortunately they are nowhere defined, based only on superficial resemblances and thoroughly unscientific. Coleopterists have by careful and hard work raised their branch of Entomology to the dignity of a scientific study, while Lepidopterists have wasted their time in studying the ornamention of insects, overlooking the most obvious structural details, and the classification of the order therefore leaves much to be desired. To call attention to the fact that there is yet plenty of work to be done before Lepidopterists can claim that they have a knowledge of their order equal to that of the Coleopterists, these brief notes are presented. Another and perhaps natural error has been made by many Lepidopterists: they have seized some one character, and rested their studies on that. Thus Dr. Herrich-Schaeffer made venation the ultimate test of family distinction while Dr. Packard with less felicity finds head characters controlling and ignores venation. The result gives us such assemblages as those heretofore mentioned. I wish it distinctly understood that I do not pretend to find the one controlling character in the genital structure of the ♂. I deem it a very important one in connection with other

characters, but no more. The legs afford excellent characters as yet entirely overlooked, while thoracic structure, and especially that of the dorsum will eventually furnish points of value to systematists.

Adding to these notes, I wish to call the attention of systematists to a character not made use of so far as I am aware, to the extent its importance warrants: It is the relative proportions of the hind legs. In Noctua and Geometra, using these terms in their widest sense, the posterior legs are uniformly longer than the others and very strong, proportionately, and the two pairs of spurs are well developed, often prominently so.* In the typical Bombycidæ on the other hand, the opposite is the case; the fore legs are strongest, often longer than the middle pair, and the posterior pair are small and weak, and the spurs are small, often wanting in part. This is a peculiarly Bombycoid character, and the strong relation that the *Smerinthids* have to the *Bombycids* finds an additional proof in the agreement in this respect—the obsolete tongue and short posterior legs separate them very sharply from the true Sphinges. I have recently pointed out that *Ellema* belongs to the *Smerinthid*, and not the *Sphingid* series.

In examining the large Bombycidæ, I have often been struck by the enormous development of the "epiphysis" of the anterior tibia. In most groups it is concealed, and in some *Rhopalocera* wanting. It is present in all the *Heterocera* so far as I know; but often very small. In *regalis*, *imperialis* and some others this organ is very largely developed and is bare of vestiture.

What purpose does it serve?

The following paper by Mr. Geo. D. Hulst was then read.

THE FAMILY POSITION OF EUPHANESSA MENDICA, WLK.

By Geo. D. Hulst.

Euphanessa mendica was first described as *Nudaria mendica* by Walker Cat. Brit. Mus. II, p. 576 (1854), and redescribed by Herrich-Schaeffer Lep. Exot. p. 19 as *Eudule biseriata*. By both of these authors, and afterwards by Dr. A. S. Packard Jr. (Synopsis Bombycidæ U. S. Pro. Ent. Phil. 1864 p. 102,) it was placed among the *Bombycidae*. In the latter place Dr. Packard describes the new genus, *Euphanessa*.

In the Canadian Naturalist III, p. 227 (1871) Mr. W. Saunders describes the larva as being in form a true Geometer, having only two pair of abdominal legs. In his Geometrid Moths p. 33 (1876) Dr. Packard refers to this, but still places the insect among the *Bombycidae*, and writes as follows: "I have carefully recompared this genus proposed

* Some Geometers, I am aware, lack the spurs; but the difference in proportion is, I believe, constant.

by myself and placed next to *Nudaria*, and am still of the opinion that this is its proper position. In the small head with the large occiput and the male genital armature it is much like *Crocata*. The antennæ and legs are much as in other *Lithosians*. The venation, though different in some important respects from that of *Crocota*, (there being a subcostal cell where there is none in *Crocota*, and but five subcostal veins where in *Crocota* there are six), is still Lithosian in plan there being four median veins. On a fresh comparison of *Euphanessa* with European examples of *Nudaria* I see no reason to doubt the clear subfamily relations of the two genera."

In the Trans. Ento. Soc. London, 1877, p. 371, Mr. A. G. Butler in a Catalogue of the *Lithosiidae* in the Brit. Museum places the insect near *Nudaria* without comment.

Having during the last few months given some study to the *Geometridae*, I have come to the conclusion that the proper and only possible place of this insect is among the *Geometridae*, and not among the *Lombycidae* where it is placed by the authors above quoted.

1st.—The *larva* is a true Geometer. The larvæ of the *Bombycidae* are, I believe, in no case Geometers. And those of *Crocota* and *Nudaria* are not only not Geometers, but are more or less clothed with hair and spines. From this characteristic *Euphanessa* is an anomaly among the *Bombycidae*, and has no relation whatever to its so called nearest allies.

2nd.—The *pupa* is just as anomalous if *Euphanessa* be placed among the *Bombycidae*. The pupæ were found in New Jersey by Mr. J. B. Smith, and the imagines emerged. The pupa skins are now in my possession by his kindness. Both *Crocota* and *Nudaria* I am told pupate in a cocoon. The pupa of *Euphanessa* was found under bark, entirely without cocoon, girthed and suspended by the tail. The pupa undoubtedly went beneath the bark only for protection from the weather, and was hanging free. The pupa of the *Bombycidae* are comparatively short and stout. That of *Euphanessa* is slender, angulate and elongated. The pupa can thus properly be referred only to the *Geometridae*. There are at least some corresponding examples, I have read of, among the *Geometridae* of Europe, but I have heard of none among the *Bombycidae*. Somewhat aberrant in the first family, it would be anomalous in the second.

3rd.—In *habits* the imago is entirely a Geometer. It is not only easily disturbed during the day, but has the habit of hiding on the under side of leaves, with the wings widely extended when at rest, and it has the loose uncertain weak Geometrid flight.

4th.—So far as the *head* is concerned the insect it seems to me must be considered a geometer rather than a Bombycid. In size, it is no smaller comparatively than many other Geometers. The antennæ tongue and palpi are Geometrid rather than Bombycid. And the shape of the front and occiput is paralleled in others of the Geometers. At the most the parts of the head which Dr. Packard emphasises as being of great importance in showing the Bombycid standing of the insect, might serve for generic but certainly not for family separation.

5th.—I have made no detailed examination of the *thorax*, and can not speak of any bearing this may have on determination. Superficially it agrees with the Geometers.

6th.—So far as the *venation* is concerned, Dr. Packard is as far as I can see, mistaken in saying there are four median veins, unless he acknowledge the same to be true of all Geometers. I have examined several wings, fully denuded by the Chloride of Lime and Carbolic acid process, and placed in Balsam and I can not find any feature which is not reproduced in the figures of venation given by Dr. Packard in his *Geometrid Moths*. In the position of vein 5 (the independent vein) it is very different from *Crocota*, though not from *Nudaria*. As a matter of fact however the venation of many of the *Geometridae* and *Bombycidae* exactly correspond, and little stress can be placed on venation. But *Euphanessa* is undoubtedly a Geometer on this basis, or I have made a very often repeated error in observation.

7th.—There is a great difference in the relative size of the *legs* of the *Bombycidae* and *Geometridae*. Mr. Smith has called my attention to the fact that in the *Bombycidae* the hind legs are usually as small and as weak or smaller and weaker than the fore legs. The contrary is the case in the *Geometridae*. On this basis *Euphanessa* is a strongly marked Geometer.

8th.—So far as my observation has gone, the *genitalia* of the male of *Euphanessa mendica* follow the type of the *Geometridae*. Certainly the genitalia differ very materially from those of *Crocota*. The lateral claspers are somewhat the same, but the supra-anal plate of *Euphanessa* is a slender down curved spine after the ordinary form of the *Geometridae*, while *Crocota* has at the termination of this plate, another spine beneath and within the terminal incurved point, which, curved backward, seems to have a scissors movement toward the terminal spine for clasping.

Thus there is nothing which would make the placing of this insect among the *Geometridae* an error, while many things make its position among the *Bombycidae* anomalous and forced. There are many things in which it agrees only with the *Geometridae*, none in which it agrees only with the *Bombycidae*. It seems therefore that *Euphanessa* must be catalogued with the Geometridae.

Prof. Riley commenting on the paper, thinks that Mr. Hulst makes out his case very well. The characters enumerated, make the insect an anomalous one wherever placed, still the bulk of the characters are geometrid and he thinks that most Lepidopterists would instinctively place it with the geometers, rather than the Bombycids. He had previously, in a note to some paper on the preparatory stages of other insects referred to the peculiar pupa of this species, which is the only instance known to him where a heterocerous pupa was girthed, and fastened by the cremaster as in the *Papilionidae*; and the resemblance was further heighthened by two small horns, or ears, which gave the insect the appearance of a miniature *Papilio cresphontes*. We have here the anomaly of a moth, low in the scale, mimicing a character peculiar to butterflies usually placed among the highest, by systematists. He thinks the only conclusion to be formed from this, is that the adolescent stages are not always to be depended on in defining the proper position of the mature insect. In reference to Mr. Smith's paper there were two points to be remarked on.

First,—the genitalia in some groups have been well and carefully studied, and as it is desirable that there should be uniformity in nomenclature, new names should not be proposed for the parts, but so far as possible the names used by others should be adopted.

Second,—he agreed entirely with Mr. Smith's strictures on the work of the Lepidopterists, which had heretofore been so superficial that it had been often made a reproach, and their work was looked on as unscientific. The specific descriptions are often very unsatisfactory, based on the most inconstant characters, and the generic descriptions are even worse. In reference to the genitalia he doubts whether they will be as useful in systematic work as is now supposed, and venation and other structures will still have to be relied upon.

When first the variability in this respect was discovered, it appeared valuable; but larger study he thinks will shake our faith. He says, too, that he finds more or less variability in the same species. He has found that some species otherwise closely allied are widely separated by this character, and again species perfectly distinct are nearly alike in this respect. He looks upon them as of secondary importance, and considers them as adaptations and special functional developments, that must not be too strongly urged, though undoubtedly of value as Mr. Smith suggests, in connection with other characters.

In reference to the anterior tibial epiphysis nothing certain can be said, though there is little doubt but it serves some purpose in the attraction of the sexes. He does not believe that it is a scent organ as has been suggested.

Prof. Lintner remarking on Mr. Hulst's paper, stated that he had started up *Euphanessa mendica* by the hundreds and had noticed their flight. They would just flutter for a short distance and then return to cover under the leaves. The pupal characters mentioned were new to him, and he asks Prof. Riley whether they were truly girthed as in Papilio or whether there was not a slight cocoon.

Prof. Riley replied that he had not seen them transform, but he considered it truly girthed, there being a single strong thread in a suture either at the end of the meta-notum or near the base of the abdomen. It was some time since he had seen them; Mr. Smith might recollect better.

Mr. Smith states that he found them under a piece of loose bark, fastened by the tail, and a distinct band, while there was no trace of a cocoon. The long slender pupa suggested *Tipula*, and he was utterly astonished when he found the imago that emerged. He certainly would never have imagined it a Bombycid pupa.

On motion the club then adjourned, to meet on the 26th inst. at the call of the President.

Club meet August 26th, at 7 P.M. pursuant to adjournment, 40 persons present, Prof. Lintner in the chair. The minutes of the previous meeting were read and adopted.

Dr. Kellicott read a paper

ON THE LARVAL PERIOD OF HARMONIA PINI, AND A PARASITE OF SAME.

The original description of this moth, together with the facts, so far as known, in its history, were published in the Canadian Entomologist, vol. XIII, 1885. The last week in June of this year I had an opportunity to visit the "old homestead" in Oswego Co., N. Y., where I obtained a limited number of imagines and certain additional facts pertaining to its preparatory stages; these I present for the consideration of this Club, together with specimens of the moth, the pitch-masses in which the pupæ form, with pupa shells protruding, and a dipterous fly-parasite of the species.

I have elsewhere, Canadian Entomologist XIII, 157, shown that the larva does not transform until, at least, two years old; I think now that I have evidence that it does not change until the third year. The facts are these: In June 1883 two pitch-exudations on a small pine were marked; these were fresh and were supposed to contain larvæ one year old and which would probably give moths in June 1884; accordingly I made arrangements for having the same cut out and sent to me at

Buffalo in May 1884; the plan failed, however, and, as it turned out, the oversight led to good results. On revisiting the spot in June of this year I at once identified the pitch-cocoons marked in June 1883, then one year old, and on examining them I could find no reason for thinking that moths escaped from them in 1884; on opening one of them a live chrysalid was found within; the other was cut out with an axe and on July 6th gave a moth, now in my collection.

These facts do not amount to demonstration, although to me they indicate a high degree of probability that the life-period of this Ægerian is completed the third year. For, by way of application, the fully formed pitch-masses of June 1883 were caused by larvæ hatched in 1882 since the imagos of 1883 were just appearing, and had moths issued in 1884 the opening, pupa-shell and pupa-cell would have been easily seen until 1885. It is scarcely possible that eggs were laid in 1883 from which larvæ occupied these masses formed by a previous generation or by some other animal. On examination of scores of examples I have failed to find traces of any other insect in the pitch, at least, such as could cause the exudation. *Pinipestis Zimmermani* causes somewhat similar formations, but they are readily separated from those of the Ægerian.

The egg and the very young larvæ have not been seen by me: the former is evidently deposited near a wound in the tree; the young not being able to penetrate the outer bark of the pine trunk. They rarely occupy branches and have not been found in small trunks, i.e. from three to five years growth; on the other hand they prefer young pines from six inches to a foot in diameter, especially such as have grown up when the original pine forests have been mostly removed.

For obvious reasons larvæ boring into woody stems or the roots of trees or shrubs are well protected from insect parasites. A few references occur, however, to instances of hymenopterous parasites of our wood-boring Ægerian larvæ; one, *Phœogmes ater*, parasitic in *Podosesia syringæ*, has been noticed by G. H. French, Papilio I, 106, and another, an *Ichneumon*, in the same, by Herbert Osborn, Papilio II, 71. Thus far I have found no mention of a dipterous parasite of any of our species of the group. The two-winged fly exhibited with the examples of *Harmonia pini* escaped from a pupa of the same and is a parasite of the same. May 30, 1885, at Portage, N. Y., I removed a mass of pitch that proved to contain a pupa; it was kept in a proper box when it soon lost its motion and the puparium of the fly was observed within its shell. The fly appeared June 20th. It has been sent to Dr. C. V. Riley for identification, but it was not in his collection and it was not specifically identified; it is a species of *Tachina*. I am at a loss to understand,

knowing the larval habits imperfectly, how the fly can possibly deposit its egg upon the moth larva, as it lives continuously, as I suppose, within the pitch. There must be some means of obtaining air and possibly there are openings left for that purpose: I have not been successful in finding out how the matter is managed. The pupa-cell is covered at the outer extremity by a thin layer of rather brittle pitch; it may be a fact that this is sometimes destroyed when the temporarily exposed inhabitant is victimized. Had the parasite occupied the body of the host since the previous summer, it seems that the latter would have been too much exhausted to have completed its transformations. But why guess out the history of this parasite and its relation to the host? Now that its existence is known of, the facts of its history may be readily determined.

Prof. Riley had been very much interested in the paper. He could not recollect any instance where the larval life has been so long, and the Ægeridæ as a rule are supposed to require only one year to undergo their transformation. As to the manner in which the *Tachina* reaches the Ægeria larva, it is probable that the latter must come to the surface rather often to expel the excrement from its burrow and the *Tachina* could take advantage of that. Once fastened, the egg is very secure.

Prof. Lintner asks whether the larva feeds on the pitch. Dr. Kellicott says that the excrement is mixed with pitch, but the larva makes regular burrows in the wood and undoubtedly feeds upon the wood. He says the larva is always more or less coated with pitch, and when removed from its burrow dies in a short time from the stiffening of this substance. He assumes that the larva must come out sometimes for air, but does not see that there is any arrangement similar to that of *Pædisca Scudderiana* which has a little trap-door-arrangement which it can open at will.

Prof Lintner says that *Nephopteryx Zimmermani*, or *Pinipestes* has the same pitch pine feeding habit and also lives in turpentine exudations.

Dr. Kellicott has observed this larva also which however does not make so large an excrescence. The excrescences are also more irregular, often a mere line or track of pitchy exudation marking the track of the larva from whorl to whorl or twig to twig. This larva when removed from its burrow also lives but a short time, owing to the hardening of the pitch.

Dr. Kellicott then read a paper

ON THE PREPARATORY STAGES OF AN UNDETERMINED COSSUS.

This short paper on the preparatory stages of an undetermined Cossus although in a somewhat unfinished state of preparation is presented

for friendly criticism, and whether or not it shall be completed finally, depends upon what is left of it after you have done. A few weeks since it was my pleasure to revisit the "old homestead" in Oswego Co., N Y., and to tramp for a few days over hills and swamps dwelling upon the memories of boyhood days and endeavoring to capture a few insects for mementos and for my collection In getting a *few* I was successful. One of interest among this number is the Cossus whose larva and pupa are the subjects of the following notes.

The discovery of the borer was accidental; passing along the border of a brook I came upon some alders, *A. incana*, which had been drawn out root and branch upon dry ground: one stem had been broken off near the root disclosing the cylindrical gallery of an insect borer very different from those made by a beetle larva common in the same stems. An examination brought to light numerous examples of a *Cossus* larva in the roots and stems of the alders in the vicinity. The facts in its history were partially made out.

Larvæ of two distinct sizes were about equally abundant: the larger ones at the time, June 29th, were moulting. As the imagos, probably, had escaped it seems pretty certain that the preparatory stage lasts three years, i.e., the smaller larvæ were one year old, the larger two and these transform next May or June. Several pupa-shells (all broken) were found in the openings in the bark, and one pupa, which was dead but in perfect condition. The larva, it seems bores principally in the roots until the second year, when it begins to work upward in the trunk, and before pupating in the spring of the third year, bores out to the surface a few inches above the ground. The pupa-cell, a mere enlargement of the burrow a little below the external opening, is not stopped or plugged with chips as is the case in the cell of *C. Centerensis*; none were found in the roots and no evidence was obtained that the larva bores in the trunks save towards the end of its period, when it moves upward to prepare a way for the moth to escape where it is out of the way of danger of water, as the alder grows in wet places. This moth escapes as others of its kind do, by the pupa worming its way out of the cell so that part of its body protrudes from the tree when the moth emerges leaving the skin in the opening.

I will describe the larger of the larvæ and compare the smaller one as it may differ.

Length 1.5 to 1.8 inches. Subcylindrical, tapering very slightly at extremities, slender, width of body .25 of an inch. Length of smaller ones .8 inch. The head is light yellowish brown above, black about the mouth parts, hemispherical, smooth, or slightly roughened, with a few dark dots from which arise dark hairs, usually

worn off the vertex of the larger examples. The second ring is smooth, lighter colored than the head; above the spiracle on either side there are three black spots situated at the corners of a right-angled triangle, the upper one at the right angle, bears a coarse brown hair, the other two have finer, lighter colored hairs; the top of the third ring is likewise smooth and brownish; the remaining body surface except the yellowish piliferous spots and top of ring thirteen is white; the longer hairs on the posterior rings are black. The body rings are strongly folded transversely; the yellowish dorsal spots bear brownish hairs; the anterior larger pair are situated rather near together on the broadest transverse fold; the smaller posterior pair are situated on a narrower fold and much farther from the slight dorsal furrow. The stigmata are broadly elliptical, the rings narrow, black scarcely raised above the surface, the color within the ring light brown. The legs are yellowish, hooks black; the prop legs with very many hooklets.

The *pupa* is slender, length 1.6 inches, width of thorax .33 inch, but slightly curved and of unusually uniform diameter, smooth, under a lens transversely striate, the three anterior rings black, shagreened, on the prothorax there are two conical protuberances which in profile under a strong lens prove to be double pointed; on the clypeus are two gouge-shaped spines, shining black on outer half, and on the upper roughened base of each of these there is a small conical tooth; on the under side of the head case, below the gouge-like spines is a pointed spine directed forwards; back of this are two smaller cusps, one either side of ventral line and still farther back apparently over the first tarsal joint of the fore legs are two smaller points. The transverse rows of dorso-abdominal teeth are as usual, but the teeth are exceedingly fine, increasing in size but little posteriorly; the black, blunt anal segment bears several small black conical teeth on either side.

I have mentioned this insect above as an undetermined *Cossus*; that it is one of the Cossidæ, there can be, I think, no doubt and as I understand the descriptions of the preparatory stages of the genus *Cossus*, it seems to me that it belongs to that genus. therefore I will for brevity of referrence call it provisionally *Cossus Alni*. It certainly is clearly distinct from *C. Centerensis* whose larva and pupa I have had an opportunity to examine from poplars at Corunna, Mich.; in fact it appears to be distinct from any species, whose history is know. It may prove to be one of the doubtful or partially known species. I am aware that Mr. Lintner has referred to a *Cossus* which bores in the trunk of white birch; I am also mindful that insects are as a rule pretty good botanists and that *Betula* and *Alnus* are closely related plants, so this insect may prove to be the one discovered in the birch by Mr. Lintner. It ought not to be a difficult matter to obtain the moth in May or June next.

For the above entomological guessing, my first attempt, I trust you, my friends, will pardon me; as most of you have at sometime and in some degree, committed the same error, I think you will.

Prof. Lintner says that the larva referred to as having been found by him in birch seems also a root borer; all those found being near the ground. He found only one broken pupa which is still in his possession and he

offers it to Prof. Kellicott for examination and study. The pupæ in this genus afford excellent specific characters.

Prof. Riley says Mr. Koebele last fall found in N. H. a larva boring in birch, which he thought was a Cossid. This died, or at least has not emerged, and as far as he recollects agreed very well with Dr. Kellicott's description. However, some examination had been made, and some discussion had been had with the result that it was doubtful whether the larva was Cossid, or whether it was not that of a *Zeuzera* or an *Aegeria*. He simply suggests this as a possibility as the larva seems to agree very well with Dr. Kellicott's account.

Dr. Kellicott says he is very sure it is not an *Aegeria* but a *Cossus*. He further mentions that he has found *querciperda* at Buffalo, in dry red oak. At first he thought them small specimens of *C. robiniæ*.

Prof. Lintner hopes that Dr. Kellicott will continue his experiments and observations on this interesting group.

Prof. Riley then gave some

NOTES ON THE PRINCIPAL INJURIOUS INSECTS OF THE YEAR.

We are aware that almost every year is characterized by some unusual prevalence of destructive insects, not previously observed in any such numbers. Examples were last year *Pulvinaria innumerabilis* and *Agrotis fennica*. A glance at the entomological events of the present season shows a comparative scarcity of such phenomena so far as noxious species are concerned and I can recall but few characteristic of the year. One worthy of mention is *Agrotis messoria* found at Goshen, N. Y., destructive to the onion. This had previously been known as destructive to vegetation, but principally to fruit trees by cutting out the buds in early spring; hence the habit noticed this summer has been exceptional. Another species, belonging to the Coleoptera, *Anthonomus musculus*, attracted considerable attention in the strawberry fields, on Staten Island, N. Y. This habit of the species is not new, because I had noticed it in Missouri many years ago, but its abundance and destructiveness were phenomenal. As is usual, where a great abundance of a form is collected, the species was found to have two names, and there is some doubt as to what the destructive species really is.

Another Lepidopterous insect, *Eurycreon rantalis*, a Pyralid, is worthy of mention as a conspicuously injurious insect in the South-Western States. It is astonishing what an amount of injury this insect has done, and the agricultural papers have been full of accounts of this "web worm", as this insect has popularly dubbed. This larva I first found in 1867, in Western States, and in Kansas in 1873, common on

Amaranthe. The present year it was destructive not only to the vegetables but many other plants. All through Texas, Indian Territory, Kansas and Arkansas, and also Iowa and Nebraska, the insect was most destructive. The larva, though of the usual Pyralid form, is still well distinguished by its pale green color and large piliferous spots.

During the present year *Cicada septendecim* has appeared in many portions of our country and I have been able to collect a large number of valuable notes that will enable us to better fix the limit of distribution and the extent of both the *septendecim* and *tredecim* broods.

In Central N. Y. the Hessian fly has done a great deal of damage. For some years past it has not attracted much attention there, and it has been the opinion of some even well known Entomologists that it had left its old haunts and migrated to the west. As a matter of fact however wheat culture has changed its center, and the only reason there have been no complaints in the East, is that there was little or no grain for them to attack; and this year the sudden increase in numbers has again called attention to the fact that the insect has not yet left its old haunts. So much injury has been done that many farmers abandoned the crop and did not harvest it.

On the Pacific Coast, locusts have been unusually abundant, and have done great damage. Hitherto the injury had mostly be done by *Camnula pellucida*, but this year the species has been *Melanoplus devastator*. I regret to say that Mr, L. Bruner, an agent sent to visit Montana, reports a great increase of the *Acrididæ* throughout that region and great fears are entertained of the future; but the prospects are not necessarily gloomy, for the weather has of late been unfavorable to their development, and unless there is a great change of conditions they will not be unduly abundant.

Melanoplus spretus is still most abundant, but native species are also very plentiful, and *Camnula pellucida* was found, indicating that all these species can become very destructive in the west. Many other species were locally abundant or destructive, but these can be considered characteristic of the year.

Dr. Kellicott mentioned that in Buffalo *Podosesia syringæ* has been destructive to the ash trees. Prof. Osborn and Mr. Hy. Edwards had stated in "Papilio" that the young shoots or branches were attacked, but in Buffalo it lives under the bark of the old trees. He has observed a number of the trees, has seen the pupa cases projecting and has watched 20 or more from a single tree in a single day. Often 100 or more were in a single tree.

A gentleman from Goshen, said he knew something about one of the insects mentioned by Prof. Riley. A friend of his had three acres of

onions, and all had been eaten up, so the land had to be plowed and put into potatoes. The larvæ never came out in the day, but in the evening they came out in vast numbers and all hands turned out to capture them. A man and wife had between 9 and 12 P.M., collected 8 quarts of larva. In regard to the Hessian fly, that is so abundant in that part of the State that wheat culture is simply abandoned.

Prof. Underwood says the maple ægerian has been common in Syracuse this year and many trees were literally full of larva.

Prof. Osborn says in referrence to *Sesia syringæ* that in 1—1½ inch ash twigs he has found them most abundant—tnose from larger trees contained mostly parasites. *Caloptenus femur-rubrum* has been abundant and attracted considerable attention—in fact some papers proclaimed the arrival of *M. spretus*. They have done considerable damage to oat fields, eating off the heads, and in pasture lands, where the damage is less evident.

In motion of Prof. Cook the meeting adjourned to meet again at the call of the President.

(To be continued.)

Notes and News.

Dr. Goding writes us as follows: I have another piece of good news to report. Tennessee—the most progressive of all the Southern States has made another advance and appointed a State Entomologist. Prof. E. W. Doran, Principal of the London (Tenn.) Academy is the appointee and will at once enter upon his duties.

Though not very well known to the entomological world, yet Prof. Doran has been a quiet, earnest student of the habits of insects for several years, and no doubt a bright future is before him.

Little entomological work has been done in Tennessee, and, with a rich soil and fine magnolia groves about him we may well expect some fine fruit following Prof. Doran's labors".

Prof. Doran is unknown to us, and we await with interest the result of his work. It is always a pleasure to us to learn of a new worker, and in this case there is added the gratification that another State has recognized the importance of having an Entomologist. It might, perhaps, have been better, had a more experienced man been appointed, but we are willing to give our new friend a fair show.

* * *

Occasionally, in a narrative of travels an interesting observation on insect habits is made, and is very apt to be overlooked. Mr. E. A. Schwarz has handed us the following notes from "Die Thierwelt im Holländischen Guiana" von Aug. Kappler.* *Ausland* 1885. P. 617. No. 31. Speaking of *Bradypus cuculiga* (Faulkner), an animal of the the size of a cat, covered with a fur of dense hair-like wool; and belonging to the *Edentata*, he says "In this thick fur there lives as a parasite, a Tineid,

* Animal Life in Dutch Guiana, by Aug. Kappler.

which when the animal is dead comes forth by the dozen and flies away". A parasitic Tineid is certainly a curiosity.

P. 699, No. 35. Speaking of birds of the genus *Cacicus*, several of which inhabit Guiana, he says "Very remarkable are their friendly relations with several species of *Polistes*, well known to the Indians and negroes. The nests of these birds are never seen without a nest of these wasps in the immediate vicinity —sometimes so near that the bird when entering its own nest, touches the combs of the wasps, which are not at all disturbed by this proceeding; but they vigorously resist any attempt to disturb the birds' nests. I know three species which are thus friendly with these birds".

* * *

The new Check List of Hemiptera Heteroptera will be ready for distribution toward the end of the present month. It will make about 30 pages, and will cost 50 Cents per copy. Subscriptions to be sent to the Editor, at the National Museum, Washington, D. C.

Book Notices.

List of the Coleoptera of America, North of Mexico. By Samuel Henshaw. Philadelphia. American Entomological Society. Roy. 8vo. pp. 161. Oct. 1885.

We have received this publication, and are heartily glad to see it. Mr. Henshaw has earned the gratitude of every American Coleopterist, and we doubt not he will receive it. But the Am. Ent. Soc. has also done its part, and has furnished us with a book that for quality of paper, neatness and accuracy of typography, seeks its equal. There are 9238 species numbered, representing those forms known to American students. Species not yet identified are left without a number, and we regret to say there are quite a large number of them. Every Coleopterist should have at least two copies.

Society News.

Brooklyn Entomological Society. November 3d, 1885. — Twenty-four persons present; Mr. Cramer, the President, in the chair. Messrs. W. B. Taylor, Chas. Scott and Chas. Palm were elected members of the society.

Mr. Smith read a paper on "*Cosmosoma omphale*," * illustrated by blackboard sketches, describing a peculiar secondary sexual character, of the ♂, noted at a previous meeting. Mr. Hy. Edwards exhibited the pupa and cocoon of the same insect, the latter of which is fine, rather loose, and of a bright lemon yellow. In response to a question, he stated that the larva was tufted, and somewhat *Arctia* form and he rather agreed with Mr. Butler that there ought to be a group *Arctio-zygænidæ* to which such species as this might belong as they had characters common to both groups. Mr. Smith illustrated the agreement of *Cosmosoma* with some of the *Bombycidæ* in genital structure, and stated, that, while undoubtedly strongly Bombycid in character, yet there were peculiarities enough to put this species in the *Syntomoidæ*. It is certainly not a *Zygænid*. Prof. Riley remarked on the peculiarity of the position of this structure. It had, he believed, the purpose of attracting the ♀ and he thought that a rivalry might exist among males—he credited insects with sufficient psychic development to believe that the ♀ might exercise choice in the matter

* Which will be published in the next number.

of which ♂ should be her mate. Mr. Weeks exhibited a series of *D. archippus* showing variations in depth of suffusion.

Prof. Riley exhibited to the Society several colored lithographic plates of *Acronycta*, imagines and larvæ, and also of *Cicada septendecim* in various stages of development. After informal discussion the Society adjourned.

Entomological Society of Washington, Nov. 19th. Mr. Otto Lugger read a paper on the larva of *Cænia dimidiata* (Fabr.), which is identical in appearance with fig. 433 of Packard's Guide, there called "related to *Drilus*" but which had never been bred. The larvæ were found in May 1883 in a cluster of 214 specimens at the base of a willow, slightly covered with dead leaves. They much resembled the cast-off skins of *Oniscus* found in similar locations. Amongst the larvæ were specimens of a young Helix evidently born there. Removed to a breeding cage they remained motionless for a few days, but then revived and moved about, but with extreme slowness of gait. The lateral appendages are hollow and inflexible. In ten days some transformed to pupæ within the larval skins. The imago issued in six days and was perfectly white on first appearing, changing rapidly through light sky-blue to the normal coloring of blue and orange. The imagos copulated freely, but only one unfertilized egg was obtained. The speaker believed the larva to be phytophagic and not carnivorous as suggested by Packard.

The paper was discussed by Mr. Mann and Prof. Riley. Prof. Riley called attention to the similarity of habit between the *Cænia* just described and *Lycus terminalis* which he believed to be also a vegetable-feeder.

Mr. B. P. Mann explained at length the Dewey decimal system of library arrangement and classification. His paper was discussed by Prof. Riley and Mr. Smith. Prof. Riley commended the system for large libraries but considered its use a waste of time for small private collections of books.

Mr. J. B. Smith read a translation of Dr. Gerstaecker's paper on the position of *Pleocoma* Lec., in the Lamellicorn series, from the Stettiner Entomol. Zeitung.

The paper was discussed by Messrs. Schwarz and Smith and Prof. Riley. Mr. Schwarz endorsed Dr. Gerstaecker's conclusions, but called attention to the lack of emphasis placed on Dr. Leconte's original statement that the specimen had no abdomen, and stated that after his second paper, Leconte made no redescription, and probably never re-examined his specimens, but based his conclusions as to the place of the genus on characters made out and embodied in his early articles. As to the larva called *Pleocoma* by Osten-Sacken, he remarked that it was difficult to consider it a *Lucanid*, for no *Lucanid* of sufficient size is known from California—yet the larva could scarcely belong to any other group, and there was either an error in the locality, or there must exist a species not yet discovered. Possibly also the specimen was accidentally carried to the place where found.

Mr. Howard made a statement to the effect that the *Thoracantha floridana* described by Mr. Ashmead in *Entomologica Americana* for August, as the first representative of its group found in the United States, is the same species which he (Mr. Howard) exhibited to the Society in June 1884, and which was originally collected by Mr. Schwarz at Haw Creek, Florida, in July, 1883.

L. O. HOWARD, *Corr. Secy.*

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Cosmosoma omphale.*

By John B. Smith.

At the Ann Arbor meeting of the A.A.A.S., Mr. H. G. Hubbard mentioned to me a peculiar flaxy or cottony substance concealed in a cavity in the abdomen of the ♂ of this species, and asked its use. The presence of this substance was entirely new to me, and so far as I have been able to discover since, no mention of it is made by any author. At my request, Mr. Hubbard who was prevented by indisposition from attending the meetings of the Entomological Club, sent some specimens through Mr. E. A. Schwarz, who presented the matter before the Club. He called attention to a broad plate at base of abdomen—much larger than the ventral portion of the sub-basal segment, and stated that this covered a cavity in which was concealed a downy substance, sufficient in quantity when teased out to fill a small pill box. Considerable discussion on the nature and use of this structure was had; but all present were absolutely ignorant of its existence before this time.

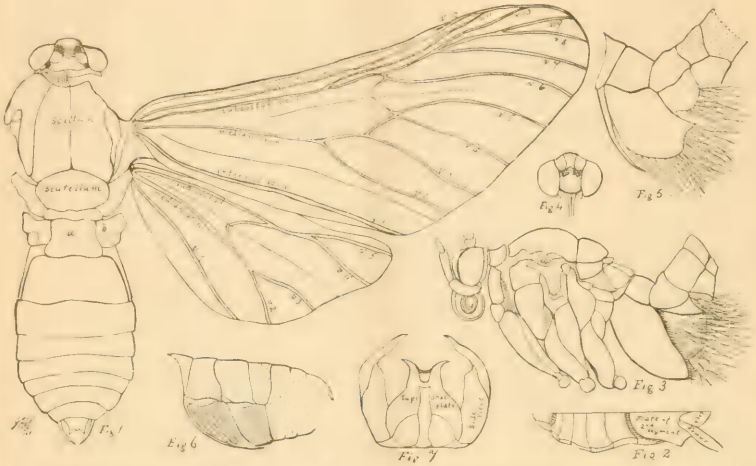
Mr. Hubbard has kindly given me a number of specimens of this insect and from them these notes are made. The intention at first was to give a description of this structure only; but on reflection it was decided to figure and briefly describe the external anatomy of the entire insect.

Lepidopterists have paid too little attention to the anatomical structure of their pets, and as, sooner or later the study must become more specific in structural detail, it may save the future student some labor to have at least one species carefully figured.

Right here it may perhaps be well to call attention to an error in my paper on the *Zygaenidae*, Tr. Am. Ent. Soc. XII, 77—84. On Pl. III, fig. 25 the figure instead of representing *Cosmosoma*, really represents *Didasys*. The error occured in labelling the slides from which the

* Read before the Brooklyn Entomological Society, Nov. 3, 1885.

drawings were afterward made, and the word *Cosmosoma* wherever it occurs should read *Didasys*. I had no ♂ specimen of *Cosmosoma* before me when that paper was written, hence my failure to note the peculiar structure hereafter described.



The head presents nothing noteworthy, and the figures sufficiently explain its structure. The front is somewhat protuberant, nearly quadrate, suddenly receding, and with a deep concavity below the base of the antennæ, leaving a distinctly marked intervening carina extending to the suture. The ocelli are distinct, as usual situated close to the compound eye and behind the base of the antennæ.

The dorsum of thorax appears slightly lengthened in the figure, because the convexity is not shown. Of the prothorax nothing is visible from above.

The mesonotum or scutum is, as usual, the most prominent, and is oblong, somewhat widening posteriorly. The upper surface presents nothing of note, and does not seem to differ from its allies. Viewed from the side it shows more that is characteristic, and differs essentially from that of *Zygaena* by the slight development of the meta-thorax. No comparisons can be made at present because of the lack of knowledge of allied forms, and I shall simply let the figure speak for itself.

The abdomen is most peculiar. It consists of 8 segments, including the membraneous connecting segment at base, and excluding the specialized rings forming the genital armature.

The membraneous ring at base consists of a dorsal plate *a*, an inflated process, covering a spiracle, *b*, and a minute sternal ring, not visible from below unless the abdomen is removed. The second dorsal

segment is longest, and wider than the thorax. The 3rd is shorter and wider, while the 4th and 5th are nearly equal in width and considerably shorter. From this point the segments narrow rapidly and shorten somewhat. The ventral surface at first view presents only six segments: the basal ring is hidden as above stated, by the thorax, while the second covers the two following rings, leaving only a narrow rim of the 4th segment exposed. The other segments present nothing remarkable, narrowing toward the tip; the last emarginate. The dorsal surface overlaps somewhat, and forms a beaded margin, more or less visible in various specimens and not marked in the ♀. The figure (2) will show the underside better than I can describe it.

Taking a specimen that had been softened, I lifted the abdomen from the tip, and found that it bent readily, separating along the posterior edge of the second dorsal segment and presenting an appearance from the side as shown at figure 3, except that the silky substance was not shown. Above the large plate is a cavity extending upward half the diameter of the whole segment and filled with a pure white cottony substance, consisting of very fine threads cut to exactly the same length, and compressed into the space as closely as it was possible to pack it. Taking it out carefully the pad measured nearly 2 mm. in width by 0.5 mm. in thickness; left to dry a few minutes a slight puff separated the mass, so that, sticking together as a ball, it had expanded to fully 7 mm. in diameter. In the fourth segment was found a similiar cavity with a somewhat smaller pad of this fine silky or cottony substance, and added to the other, a ball fully 10 mm. in diameter was formed, light as air, and fine as the finest floss silk. A section of the abdomen of a specimen barely softened, presented the appearance shown in figure 6.

In the 2nd segment the cavity opens and is exposed by the simple lifting of the abdomen or dropping the covering plate. The third segment is reduced ventrally to a narrow ring, lined inside with a fine elastic membrane to which the second pad is attached, and this rests in the ventral half of the fourth segment which is empty, but otherwise normal, except that it is not united to the 3rd at its anterior edge. By flexion of the abdomen the distance between the edges of the 3rd and 4th segments is widened and the pad, unattached inferiorly, is exposed. Fig. 3 shows the appearance of the cavities in profile, while fig. 6 represents a section of the abdomen, the fine lines indicating the pad.

The cavities extend upward to the center of the segments, where they are separated by a thin chitinous wall; below this, and lining the cavities, is a thin elastic membrane, forming a complete sac. On this the superior or attached portions of the pad rest.

The upper portion of segments 2 and 3 are empty—i.e. all the or-

gans of the abdomen are crowded into the terminal segments, leaving the 2nd and 3rd hollow. The stigmata opening into these segments are large and distinct.

Completely softening a specimen and detaching the abdomen, I flexed it so that the cavities were opened, and then inserting a tube into the upper portion of the segment, having first punctured the septum dividing segments 2 and 3 superiorly, I found that I could distend the fine membrane lining the lower cavity, causing it to present the appearance shown at fig. 5, in section, and in fig. 3 in profile.

It is very probable that the insect has the power of voluntarily flexing the abdomen, and thus opening the cavities, and also of inflating the membrane to protrude this silky substance, which a breath of air would then dilate, and this pure white substance contrasting with the deep black venter and bright red thorax and legs must present a very pretty appearance. The obvious explanation of this structure would seem to be that the display made would prove attractive to the female and the insect might strut about, exhibiting itself like a peacock or a turkey gobbler. There is however one difficulty in the way of this explanation. The attachment of the cottony pad to the membrane is so exceedingly slight, that the faintest puff of air, or a mere touch with a fine needle detaches it, and it seems scarcely possible that once displayed it could ever again be retracted and packed away into place. This would seem to indicate that the display would also mean the loss of the substance, and yet every male I have been able to find in collections, appeared to have this pad intact and all of them had the cavities tightly closed as well. Then too, it would seem likely that such a display would have been noticed, for these insects are not uncommon. Mr. Hubbard says tney are quit abundant in sunny spots in the woods near Crescent City, Fla., and he will try to observe them more carefully. It would be well if all Entomologists in the regions where this insect is found would try to observe its habits closely.

The genital structure allies the insect closely to some families of the *Bombycidae*. The supra-anal plate is broad and corneous, narrowing toward tip, where the sides are produced into moderately long acute hooks, bent outwards, and the points downward; while the middle is modified into a broad, rather short hook with rounded tip, bent downward. The side pieces are broad, chitinous and inwardly concave at base, suddenly narrowing half way to tip and produced into a long, corneous, curved hook. Fig. 7 will show the appearance of these organs from below, giving the names of the parts; The central, narrow plate is the sheath of penis.

The venation is shown at fig. 1. The primaries are twelve-veined.

No. 1 is the internal vein which is close to the hind margin. Between it and the median vein is a false vein, or fold, so closely resembling a true vein that until fully denuded, its spurious character is not apparent. In a species in which the wings are hyaline and only the veins clothed with scales this is especially likely to mislead, as here the false vein is as distinctly shown as any of the others

Vein two runs from the outer third of median vein with a downward curve to outer margin Vein three from meadian nearly half way between the inception of vein 2, and the end of the median, to outer margin. Vein six from a short spur at the end of sub-costal. The median cell is imperfectly closed by inward spurs from the end of median and sub-costal, which, perfectly distinct at their inception become faint and thread like before they join. Through the centre of the median cell, half way to the base, and the same distance toward the outer margin, runs a distinct fold or false vein. Vein seven forms the continuation of the sub-costal, and gives rise to veins 10 and 8, one quarter from its inception. Vein 8 runs to apex, giving rise to vein 9 at its middle. Vein 9 runs to costa, as does also vein 10. Vein 11 runs from the sub-costal, one fourth from tip to the costa, rather less than one fourth from apex of wing. Vein 12—the costal vein, runs from base to costa, rather less than one third from tip.

The secondaries have but five veins; No. 1 is the internal; 2 and 3 are together from the end of the median; 4 and 5 together from the end of the sub-costal. There is no costal vein. The median cell is closed by a long inward loop.

The figure will better explain the course of the veins than words of mine can do. The frenelum is present but is weak and hair like. It is simple in the ♂.

The legs are moderately long and slender; closely scaled. Anterior with tibial epiphyses small; median with a pair of terminal spurs and posterior with two pairs of spurs. The tarsi are not spinulated but clothed beneath with rather stiff hair. The claws are simple,

The antenna are lengthily bi-pectinate nearly to the tip, where the joints are serrate. In one specimen I counted sixty-three joints. In the ♀ the pectinations are not so long,

The palpi are of the usual form and proportion, and as shown in the figure.

In conclusion, the discovery of this remarkable structure in so prominent and well known a form as *Cosmosoma omphale,* shows how little we really know as yet of the Lepidoptera, and how wide a field exists for the careful and conscientious student.

COCOON OF *C. OMPHALE.*

At the November meeting of the Brooklyn Entomological Society Mr. Hy. Edwards exhibited the cocoon of this species as a supplement to the preceeding paper. It is a clear lemon yellow, oval, somewhat flattened and fastened to the underside of a leaf. There is a basis consisting of a thin silky fabric, and on this are ranged the long yellow hair that give the color to the whole. These hairs are long, apparently nearly equal in length, and furnished with minute hooks and bristles, enabling them to felt readily. Interpersed, are a few hair with black bushy tips and sometimes with also a circle of black bristles at middle. It would seem therefore that the larva must be somewhat *Arctia* like. The pupa is pale, rather sordid in color, with the wings, antennæ and legs well defined. It resembles very much the *Orgyia* pupa in color and shape, except that the abdomen is blunt and terminates abruptly. Both cocoon and pupa indicate a strong Bombycid relationship, not with the Arctiidæ however, but rather with the *Dasychirae.*

Note on Papilio Asterias *Fab.**

By Fr. Tepper.

I have brought with me this evening some specimens of *Papilio asterias* to show some of the variations, the species is subject to. In the first place I do not think it has ever been recorded that *asterias* occurs with a blind ocellus; that is with the orange anal spot without any trace of a black spot. I have such a specimen in my collection bred from the larva in Flatbush several years ago—the specimen as will be seen is in fine condition and leaves no question of a doubt that this form occurs. Moreover it is a male specimen, and this sex is much less given to branch off into aberrations than are the females. Besides we have what might be called inter-gradations, specimens in which the spot assumes different shapes, such as lobes or mere specks, all of which tends to show that there is a predisposition to take on abnormal forms. Now this is the main fact I desired to establish; but while on the subject I would point out some other variations into which the species is apt to run, and these are more frequently confined to the female sex. The yellow bands, as is generally known, are not so heavy in the females as in the males, although occasional females have these bands just as heavy as the males. I have found that the inner yellow band on the secondaries of the females is subject to very striking variations—in fact disappearing altogether in some instances. The specimens I exhibit will show this tendency very well indeed, as they range from the heavily banded ones to those lack-

* Read before ihe Brooklyn Entomological Society, Oct. 6, 1885.

ing this band entirely. Another tendency to branch off is shown in the marginal row of spots on the secondaries These in the normal form are yellow, but as my specimens will show, the same spots are sometimes yellow, sometimes greenish or bluish, and sometimes even bright orange —this variation, as far as I have noticed, is also confined to the females. All the specimens exhibited were bred from larvæ found on carrots in my garden at Flatbush. In connection with this subject I would say that collectors should endeavor to gather more material of our common species. I know well how it is. A collector has a pair of *asterias* in his collection and deems this sufficient. When in the field he disdains to look at *asterias*, much less to capture one. I myself would not advise old collectors to capture the mature insect, for the reason that the few met with are in the first place generally not fit for the cabinet, and in the second place I believe but occasional varieties are met with in the few that come under our notice. Collectors ought to bend their energy towards raising them, either from the egg, or from larvæ, which can be picked up in quantities in any carrot field. Among 50 or 100 specimens you are almost sure to find some interesting forms, which will pay one for the trouble taken.

Concerning Cremastochilus.

By Geo. H. Horn, M.D.

In the early part of this year I received word from Mr. J. J. Rivers of California that he had what he supposed might by a new species of *Cremastochilus*. The specimen was kindly loaned to me and on close examination proved to be a *C. Schaumii* in which an accidental notch of irregular triangular form had been made in the hind angles of the thorax. In this species the hind angles are formed of thin triangular plates. Shortly after this matter had been settled, a similar communication was received from Dr. Hamilton, and on seeing the specimen he referred to, it proved to be a *canaliculatus* in which both hind angles had been lost. The following letter from Dr. Hamilton gives the details.

"Dear Sir:

The two specimens of *Cremastochilus canaliculatus* submitted to you were taken in June of the present year (1885) about two weeks apart, and in the same ants' nest. The first one taken had the hind parts of the thorax so abnormal (the angles, or rather processes being entirely wanting) that I considered it a new species, till the other specimen was found with the enucleation of the angular pieces so far advanced that they were movable and might have been detached by a little pressure; though in the dried insect the mobility is lost, and the notch between it and the body of the thorax is much narrower than in life. On carefully

examining the first specimen it will be seen that it once possessed these processes, as there is in the basal excavation on each side a roughened or alveolate space showing the place of attachment. The uniformity of surface of these spaces in connection with what is seen in the other specimen proves conclusively that their loss is not owing to an accident. These, with other questions present themselves. Are these pieces deciduous like the horns of the Cervidæ, or are they gnawed out by the ants? And in the latter case, what for? Does the same thing occur in other species? Yours truly JOHN HAMILTON."

The specimen submitted to me by Mr. Rivers showed plainly an inequality in the notching of the hind angles of the thorax as well as an irregularity of the edges of the notch. It is my belief that the irregularities in the Rivers and Hamilton specimens are the work of the ants, with which the specimens were found and I have long held the opinion and have so published it, that the pubescens depressed spaces near the front and under the hind angles of most of the species, are glandular, and give a secretion very palatable to the ants, and these, almost reasoning insects, finding the processes in their way have deliberately removed them, either partially as in the Rivers specimen, or entirely as in the other. That the processes are naturally deciduous, as are the horns of the Cervidæ or the mandibular appendages of the Otiorhynchs is hardly supposable.

"Mr. Schwarz has also made some observations bearnig on this point, as follows:

In May 1883 while on an excursion in the vicinity of Washington, I came across a large ant hill constructed by a species of *Formica* which is allied to, but not identical with, *F. rufa*. My attention was at once attracted by three objects on top of the ant hill, which at first glance appeared to be compact masses of ants. Upon looking closer to each of the masses proved to consist of a living *Cremastochilus* attended by numerous ants which held on with their mandibles to the legs, the head, the sides of the thorax of the beetles, in short wherever there was a chance for them to hold on. That they did not intend to do any harm to the beetles was evident, and it seemed to me that they intended to prevent the escape of the Cremastochili from their colony. Herein they were evidently successful, as upon waiting for a considerable length of time there was no change in the situation. I then proceded to investigate the interior of the ant hill, which consisted of numerous layers of intricate galleries and chambers, all built of rather loose earth without any sticks or other debris. Within the chambers several more Cremastochilus were found but not attended to by ants. At this as well as at previous occasions I failed to find any trace of the larva or pupa of Cremastochilus either within or beneath the ant hill. E. A. SCHWARZ.

Hypocephalus Armatus. *Dej.**

By Chas. W. Leng, B. S.

My attention was drawn to this Brazilian beetle by an article of M. Lameere in the Annals of the Belg. Ent. Soc., which presents so many curious features that I have thought some account of it, and more particularly of the recent discoveries by Messrs. Sharp and Lameere would not be uninteresting.

In the first place, it has caused the students of classification, as much anxious thought as any insect in existence, and has occupied a place in almost every group known. It was described in 1832 by Desmarest, and placed by him among the *Silphidae*, where it remained until Westwood transferred it to the *Cucujidae*. From that family it travelled into the *Longicorns* under the guidance of several eminent entomologists, where it remains at present in the catalogue of Gemminger & Harold and in the estimation of our European colleagues. Curtis published however in 1854 a long dissertation attempting to prove its Lamellicorn affinities, and Gistl, Spinola, and Leconte have each made it the sole representative of a separate family, as to the name and affinities of which, however, no two agree. Dr. Leconte's view, based upon an examination of a specimen contained in the Brazilian exhibit, at our Centennial Exposition, is the most interesting. He considers it a survival of an ancient family the other members of which are extinct. He shows by a careful examination of those parts, which experience has shown are least liable to variation, that it cannot be included in any family as at present constituted, while its various parts show such relationships, with many of them, as to indicate the possibility of their being descended from it. M. Lameere devotes a considerable space to controverting this view, and by supposing a modification of these parts in recent times, makes it a member of the Longicorn group.

The principal features to which I would draw attention are as follows: The five-jointed tarsi, the very short antennæ, the fossorial legs, and especially the enormously developed hind femora; (these will be considered with the habits of the insect): the manner in which the head joins the thorax, leaving a large space beneath, filled with a soft membrane. (This character is found in very few families and is of the greatest interest.) The peculiar form of the mandibles is highly interesting, and they are capable of motion in a vertical plane, as well as outwards. This character is met with elsewhere only in the *Rhynchophora*. Of course the enormous thorax and short elytra attract attention at once. The thoracic interior is filled with powerful muscles operating the head and

* Read before the Brooklyn Entomological Society, Sept. 1, 1885.

mandibles. The creature is aptly characterized by Dr. Leconte as resembling no other beetle so much as an insect of an entirely different order—the mole cricket. And yet so wonderful are the operations of nature, that the discovery of the unique life history of this beetle shows a perfect adaptation of each of these discordant parts to the needs of its owner.

The first specimens were said to have been found in the carcass of a dead horse: which perhaps accounts for its original reference to the *Silphidae*. Subsequently specimens were found dead upon the ground, and the discovery that an Asiatic beetle somewhat resembling this pupated underground, led to the suspicion that it also might be subterraneanin habit; which suspicion the investigations of M. de Lacerde has practically converted to certainty. Under this hypothesis you can easily understand the value of its special adaptation. By the movement of head and mandibles, directed by the powerful muscles of the thorax, it can loosen and push aside the particles of decaying vegetable matter, of which the soil of Brazilian forests is composed, its front legs aiding in the work, while the strong hind legs push the entire body forward through the passage thus partially prepared. Even the extraordinarily developed fringe of hair at the margin of the prosternum would have its use in such a process, brushing the membrane clean of all particles of dirt each time the head was retracted within the thorax. If it wishes to retreat through the hole it has made, the tibiæ fit exactly into the femora, and they under the abdomen; leaving the pointed elytra to open the way for the passage of the large bulk of the insect: thus the creature is able to live and travel about for an indefinite period underground, feeding upon the tender roots, and perfectly secure from the attacks of its enemies. And now we can see how Dr. Leconte's theory of the very ancient origin of this beetle is confirmed, for it is not supposable that such forests as those of Brazil are of recent origin. On the contrary it is well known that portions of the globe were once covered with tropical-like growth, yielding among their roots a soil of softer consistency than we anywhere find now, thus affording ample opportunity for such subterranean beetles as *H. armatus* to gain a living in their own peculiar way. The presumption would therefore be, that their numbers would be proportionally great, and this bone of contention may well be the last living relic of a time when man was not upon the globe.

To come now to the recent discoveries which have been somewhat anticipated in the last paragraph. The function of the sharply prolonged lateral lobes of the head was unknown until Mr. Sharp's article explained them. I should also say that the capacity of movement contained in the head was known to very few. All specimens have been

found dead with the head in its position of retraction, that is, not only drawn in close to the thorax above, but completely bent under the thorax just as in the pupæ of many *Cerambycidae*. It is capable of this elsewhere unknown movement through the possession of the large membrane between the head and the thorax. The specimen Dr. Leconte had for examination was evidently in this position, for he makes no mention of the membrane, which could not have escaped his eye had it not been concealed within the thorax. The drawings of Curtis show it perfectly, but it appears to have been overlooked by subsequent writers. This fact explains also why so many have failed to appreciate the suggestion of a subterranean career in the beetle's appearance, for with its head tucked under its wing, as it were, the mighty and warlike *H. armatus* becomes heavy, purposeless, even stupid in aspect.

Mr. Sharp in an article in the Annals of the Belgian Soc for 1884 states, that having softened a damaged specimen, he found, that upon overcoming the resistance of the powerful muscles contained in the thorax, he was able to make the head execute the complete movement of flexion and contraction. Putting the head into its natural position, he was able to inspect carefully the soft membrane thus brought to light. In doing so he made the interesting discovery of the wound which had probably caused the death of the insect. That it had been inflicted during the life of the insect, was conclusively proved by the dried serum surrounding the wound: and, from the shape corresponding exactly with the shape of the genal processes of the head, it was highly probable that it had been inflicted by another individual with one of those parts. Instances of combats between males for the possession of females are known in many groups of animals, and even among man, so that there is nothing improbable in Mr. Sharp's supposition that the wound he discovered, was caused in such a combat. This, according to Mr. Sharp, would explain the great development of their genal processes; and, carrying out the theory of sexual selection, even the other characters. The beetles in their combats would endeavor to wound one another in the highly vulnerable soft membrane. An individual finding himself worsted in the fight, would need all the strength of the powerful muscles of contraction to hold his head close down to the thorax, and thus prevent his opponent reaching the weak point in his chitinous armor. His enemy on the other hand would use his mandibles to pry him open, and bracing himself with his stout hind legs, the struggle would go on until the weaker brother was defeated. Thus, according to Mr. Sharp, the individual deficient in the peculiar weapons of offense and defense, would often fail to secure a mate, and in the long run the majority would leave no offspring to perpetuate their failings: and in the series of ages

during which the species has existed, the gradual disappearance of poorly developed specimens has produced the present monstrosity—a monument to the evil passions of the Coleoptera.

Mr. Sharp is deeply grieved at such an immoral proceeding and I quote his closing and affecting words: "If I am correct in my suppositions "about this insect, those of us who are evolutionists will have to admit "that the organisation of this extraordinary creature has been evoluted "in correlation with sexual combats through a long series of ages, "and there has thus resulted a most extraordinary perfection of struct-"ures directly and indirectly connected with this object. This is so "abhorrent to our moral sense, that we may feel gratified that we can "also point to the fact, that these structures are unique, and that out "of hundreds of thousands of insects now known to us, there is nothing "to indicate that any other has passed through a similar evolutionary "record."

It will be observed that Mr Sharp does not allude to the subterranean life of the insect, of which ne appears in fact to have been ignorant, for he regrets that he can furnish no satisfactory explanation of the form of the hind femora, unless they assist in the sexual combats as sketched above. It was reserved for M. Lameere to revive the previously known fact of the insect being subterranean, and thus complete its history as I have given it above—taking most of my facts from M. Lameere's article. M. Lameere examined a number of specimens, and found in several, the wounds of which Mr. Sharp wrote, and in one specimen a similar one in the much smaller upper membrane. He therefore adopts Mr. Sharp's theory as to their cause and of the development of the lateral processes by sexual selection; but considers that the other parts have attained their present form entirely through a process of natural selection, due to the subterranean habit of the beetle.

To return to its position in classification for a moment; M. Lameere in support of his placing *H. armatus* among the Longicorns advances some interesting theories as to the antennæ and tarsi. In his own words: "It is scarcely necessary to remark that long antennæ would be ex-"tremely inconvenient for a longicorn so well adapted to a subterranean "life and that even on the surface they would be useless, since it has "lost its wings. And as to the tarsi, just as the limbs of *Mammalia* "were originally furnished with five fingers which diminished in number "under special circumstances, so the legs of Coleoptera seem to have once "uniformly terminated in five-jointed tarsi, which have varied in the "process of evolution, as they were needed for running or for attaching "the insect to trees. If the insect needed adaption to walking or "running habits, its tarsi would become as long as possible; and there-

"fore such families now present the primitive form of five-jointed tarsi. "If however the insect was, as in Longhorns, in the habit of attaching "itself to trees, these would need to be as short and compact as pos- "sible, and hence the fourth joint has disappeared. The subterranean "life of *Hypocephalus* has simply restored its primitive form."

Leaving these speculations, we certainly have in *Hypocephalus armatus* a most interesting addition to our knowledge of natural history, in a beetle so modified, that at first glance it does not resemble its order at all, and even after fifty years still baffles the attempts of our most learned Entomologists to place it properly in that order.

To those who are inclined to the theories of evolution, it furnishes once more a striking example of what changes peculiar circumstances can bring about, and of the perfect operation of the processes of Natural Selection.

Editorial vagaries.

We have just looked over the back Nos. of Ent. Am. with a feeling of satisfaction at the value of their contents; but we cannot help feeling also that some parts—even the most valuable—are dry; very dry. Science is, by outsiders, supposed to be dry, and Entomology as a science ought necessarily to be dry also. It seems an inevitable deduction that if Entomology is dry, Fntomologists also should suffer from drouth. And perhaps too, that explains the fact we have noticed, that all Entomological Societies that we have attended, have, without special motion, but with remarkable unanimity, wended their way, after adjournment, to some convenient locality where liquid refreshments were dispensed. When the Brooklyn Ent. Soc. arrives in force, there is always a new keg put up, for science is sometimes very dry indeed, and over the cup that cheers, the lights of our science hold forth to a group of special admirers, and in social chat experiences are exchanged, and much valuable information gained. With Messrs. Edwards, Neumoegen, Hulst,* Graef, Tepper, and other Lepidopterists of note at one end of the table, Dr. Horn, Messrs Julich, Leng, Roberts, Angell et al, Coleopterists, at the other, "ye editor"* oscillating between, the hours fly unheeded, and, with a sigh of regret, the meeting finally adjourns: each member fuller than before—of Entomological wisdom of course.

* Temperance drinks only!

Sometimes valuable observations are given at these "annex" meetings, which, but for the "chiel amang them taking notes" would never be "prented."

* * *

At the recent "annex" meeting of the Ent. Soc. of Washington—present C. V. Riley, Ph. D., President; Geo. Marx, M. D., Vice President; E. A. Schwarz; Rec. Secy.; L. O. Howard, Cor. Secy.; "ye editor," as representative of the rank and file, and Prof. H. Osborn as honored guest—there was observed a roach—*Blatta germanica*. Roaches are not so scarce in Washington as to merit special attention; but the members having all run *very* dry on Entomology generally, seized upon the subject with relish—i. e. not with the same relish that the *subject* of *Cicada* was seized upon by some members of this society on a previous occasion; but with a different, less gastronomical relish.

Prof. Riley related that in his office there was a roach that had become quite tame and familiar.* It manifested no fear of him, would watch him at his work and would, when a finger was presented climb on it, run round on his hand, and make itself very much at home.

Mr. Howard stated that he also had a tame roach, and this specimen had a fondness for tobacco. He would, when smoking, occasionally lay his cigar on the edge of one of the drawers of his desk, and the roach would come to the moist end and feast on nicotine. When taking up the cigar again he would shake off the roach who would wait until it was again replaced, and again resume his feast.

Another member, who modestly desires to have his name withheld, thought that insect intelligence had been much underrated. A young lady friend of his had a pet roach that used to frequent her dressing case drawers, and used to expect and appreciate, the little tendernesses and endearments its mistress accorded it. For three years, or thereabouts it lived happily; but then, for a short time its mistress refused to notice it—other matters on her mind probably—and this the little pet took so to heart that it deliberately made a feast on "Pearl Powder," knowing of its poisonous qualities, and died. Deliberately committing suicide! A marvelous instance of Insect intelligence!

* * *

Sea shore collecting, which is often very remunerative, has its disadvantages if pursued on frequented shores. Every passer-by stares: pityingly in some instances; curiously in others. That might be endured; but they ask questions: why do you collect? what do you do with them? Usually we tell them they are used to flavor chowder, which despite our

* The editor has also found Washington roaches very familiar indeed on very short acquaintance.

clerical appearance does not always seem to meet with entire belief. Mr. Schwarz says they are used in making fever medicine, and as Mr. S. has a thoroughly medical look, his explanation is usually deemed satisfactory.

Sometimes neither explanation will work and then such rencontres as the following may happen. Collecting industriously near Fortress Monroe, Mr. Lugger was accosted by an army officer who asked the usual questions. Considering his questioner Mr. Lugger tried to explain. "Hum"—replied the officer—"bugs eh! Humbugs I guess" and passed on. Later on the officer again came along with all the pride of uniform and a fair lady on each arm, and found Mr. Lugger examining a specimen of *Tetrodon turgidus* a bladder fish, which had been cast up and was inflated. "What's that; not a bug too is it?" was demanded. He was informed it was a fish. "What's its name; do you know?" That also was given as above. "Oh nonsense! I want an English name if it's got one." "Oh yes!" replied Mr. Lugger, remembering the "humbug", "we call it the officer fish." "Officer fish?" queried his now interested interlocutor "Why Officer fish?" "Because it is usually so puffed up" was the answer, which caused the ignominious retreat of the young magnate amid the laughter of his fair companions.

* * *

Curious mistakes sometimes occur in foreign Journals, commenting on American works, because of insufficient knowledge of English. In the "Relazioni intorno ai lavori della R. Stazioni di Entomologia Agraria, di Firenze 1879–82 issued in 1884, S. Targioni Tozetti gives a review of Prof. Comstock's paper on Coccidæ in the Rept. of the U. S. Entomologist some years ago; giving in parallel columns the species, and the plant or tree it infests and the locality where found. Among others we find *Mytilaspis pandanni* n. sp. feeding on *Trealease* at Cambridge. Mr. Trealease is pretty well known, but that he had a special *Coccid* infesting him may be news. Of course Mr. T. was in the original referred to as collector. Another error in the paper credits Prof. Comstok with the *Chalcididæ* described in his Report, while Mr. Howard is in reality answerable for them.

Prof. Comstock has hard luck—in the Berliner bot. Zeitschrift for 1882 he is three times referred to as "Prof. Cornstalk." Bound to make a botanical specimen even out the name it seems.

* * *

Our Editorial labors for the year are about closed—the present number especially has required serious thought and much deliberation, and with a sigh of relief we put away our editorial paraphernalia, wishing each of our readers most heartily "A Happy New Year;" and as we feel charitably disposed, we will also wish them anything else they may desire.

Food-Plants of Lepidoptera.*

(No. 2. Smerinthus excæcatus, A. & S.)

BY WM. BEUTENMÜLLER.

Leguminosae.

Wistaria sinensis, Dec. (Chinese Wistaria.)

Rosaceae.

Prunus virginiana, L. (Choke-Cherry.)
" serotina, Ehr. (Wild Black Cherry.)
Spiraea opulifolia, L. (Nine Bark.)
Rubus odoratus, L. (Purple-Flowering Raspberry.)
Pyrus malus, Tourn. (Apple.)

Urticaceae.

Ulmus fulva, Michx. (Slippery or Red Elm.)
" americana, L. (American or Wild Elm.)
Ulmus alata, Michx. (Whahoo or Winged Elm.)
" suberosa, Mouch.

Cupuliferae.

Quercus palustris, Du Roi. (Smamp or Pin Oak.)
" coccinea, Wang. (Scarlet Oak.)
Corylus americana, Walt. (Wild Hazel-Nut.)
Ostrya virginica, Willd. (American Hop Hornbeam.)
Carpinus americana, Michx. (Hornbeam.)

Betulaceae.

Betula alba, L. (White Birch.
Betula var. populifolia, Spach.

Salicaceae.

Salix cordata, Muhl. (Heart-leaved Willow.)
" lucida, Muhl. (Shining Willow.)
" fragilis, L. (Brittle Willow.)
" alba, L. (White Willow.)
" Babylonica, Tourn. (Weeping Willow.)
Populus tremuloides, Michx. (American Aspen.)
" grandidentata, Michx. (Large-toothed Aspen.)
" angulata, Ait. (Angled Cottonwood.)
" monilifera, Ait. (Cottonwood, Necklace Poplar.)

Notes and News.

The Rev. A. Matthews establishes** the new genus *Corylophodes* which is externally distinguished from *Corylophus* by the antennæ having 11 joints (9 in Corylophus) by the small thorax with the posterior angles either obtuse or rectangular (produced and acute in Corylophus), and by the elytra being much broader than the thorax. The mouth parts are said to differ strikingly in the two genera but are not described.

The new genus includes *Corylophus marginicollis* and *truncatus* from North America, two species from the Sandwich Islands and a number of species from Central America, the old genus Corylophus being restricted to the two European species and a third from the Atlantic Islands. E. A. SCHWARZ.

* Commenced in Papilio, Vol. IV, p. 155.

** Entomologist's Monthly Magazine, XXII, Dec. 1885, p. 160.

A generic Synopsis of the Hymenopterous family Chalcididae.

By L. O. Howard.

As an endorsement of the plan adopted by the editor of Entomologica Americana I present the following synopsis of one of the families of parasitic Hymenoptera which I have been studying in a somewhat desultory manner for the past few years. In it I lay no claim to originality, but present it as a simple compilation from Foerster, Thomson, Mayr, Walker, Halliday, Cameron, Rondani and other writers. I do not confine it to American genera for the obvious reason that the family has been so little studied in this country, that European genera new in America will be recognized almost every day by the student. I have followed Dr. Williston's synopses in marking with an asterisk all genera which have not up to this date been found in America north of Mexico. I shall preface the consideration of each sub-family, where practicable, with a statement of works of reference. I would remind those who have occasion to use these tables that they will find a tolerably complete list of the species so far described in North America in Bulletin 5 of the Division of Entomology, U. S. Department of Agriculture, and take this occasion to call attention to the only important omission so far discovered in this list, namely, the nineteen species of Chalcididæ described by l'Abbe L. Provancher in his "Petite Faune Entomologique de Canada". I much regret having inadvertently omitted these species. I shall carry my synopsis in this number only to the twenty sub-families into which the family is naturally subdivided. The style of arrangement which I have adopted is used at the suggestion of Mr. Cresson and to enable him to readily incorporate this work with his synopsis of the whole order Hymenoptera, which, I am glad to state, he intends to publish shortly.

Family **CHALCIDIDAE** (*Westwood*).

Tarsi 5-jointed. Anterior tibiæ armed with a large curved spur. Antennæ usually many jointed..... ....Section **MACROCENTRI**.

Tarsi usually 4-, rarely 3-jointed, very rarely heteromerous. Anterior tibiæ with a delicate, short, straight spur. Antennæ usually with few joints... ..... Section **MICROCENTRI**.

Section **MACROCENTRI** Thomson.

Posterior femora much swollen.

Fore wings folded. Ovipositor of female curved over dorsum of abdomen..... Subfamily **Leucospinae**.

Fore wings not folded. Ovipositor protruding but slightly..... Subfamily **Chalcidinae**.

Posterior femora not greatly enlarged.

Thorax strongly developed, much arched and deeply punctate.

Stigmal vein not developed. Second abdominal segment inclosing the rest.....
Subfamily **Eucharinae**.

Stigmal vein developed. All abdominal segments plainly seen.....
Subfamily **Perilampinae**.

Thorax not greatly developed.

Collar large. Antennæ many-jointed. Parapsidal sutures of mesonotum complete.

Body not metallic. Sides of the mesoscutellum almost straight.....
Subfamily **Eurytominae**.

Body metallic. Sides of the mesoscutellum both curved.....
Subfamily **Toryminae**.

Collar small, frequently not visible in the middle. Antennæ usually with few joints.

Mesosternal pleura not discernible. Middle legs long, saltatorial, with very long tibial spur.

Marginal vein long. Occipital border of vertex rounded. Antennæ 13-jointed..... Subfamily **Eupelminae**.

Marginal vein usually very short. Antennæ usually 11-jointed. Occipital margin of vertex usually acute. Parapsidal sutures of mesoscutum obliterated..... Subfamily **Encyrtinae**.

Mesosternal pleura usually well marked. Middle legs not saltatorial. First tarsal joint not swollen and incrassate.

Antennæ 8-jointed. Parapsidal sutures plain. Middle tibial spur moderately long..... Subfamily **Aphelininae**.

Antennæ 10—13-jointed.

Antennæ 10-jointed, inserted just above the mouth, rounded and produced at apex. Abdomen almost sessile..... Subfamily **Pireninae**.

Antennæ 12- or 13-jointed.

Antennæ 12-jointed, funicle 5-jointed. Pronotum very short, scarcely visible in the middle. Submarginal vein subangulate, stigmal club often large. Abdomen almost sessile. Parapsides of mesonotum distinct..... Subfamily **Tridyminae**.

Antennæ 12-jointed. Abdomen distinctly petiolate. Occipital line complete..... Subfamily **Spalanginae**.

Antennæ 13-jointed, club 3-jointed, ring joints 2. Occipital line not complete..... Subfamily **Pteromalinae**.

Section **MICROCENTRI** Thomson.

Antennæ many-jointed, funicle 6-jointed. Tarsi of ♀ 5-jointed.....
Subfamily **Tetracampinae**.

Antennæ at the most 9-jointed. Tarsi 4- or 3-jointed.

Tarsi 4-jointed.

Pronotum large. Mesoscutellum with four bristles. Submarginal vein not broken. post-marginal distinct, sub-marginal furnished with many bristles. Posterior tibiæ sometimes with two spurs.

Abdomen usually with a distinct petiole. Mesoscutar parapsides very distinct. Antennæ inserted below the middle of the face, simple with ♂.....
Subfamily **Elachistinae**.

Abdomen with a transverse, smooth and conspicuous petiole. Mesoscutar parapsides not defined, or indicated only by very slight grooves.

Posterior coxæ very large and strongly compressed. Head semi-globose, front deeply but sparsely punctate. Antennæ of ♂ flabellate... ...
Subfamily **Elasminae**.

Posterior coxæ normal. Postmarginal and stigmal veins rather long. Antennæ of ♂ often flabellate ..... Subfamily **Eulophinae**.

Submarginal vein broken, costal cellule narrow, postmarginal and stigmal short, the postmarginal sometimes wanting. Posterior tibiæ with a single spur. Antennæ of ♂ simple.

Submarginal vein with two bristles or it is ornate. Metapleura very small. Mesoscutellum with two bristles near the middle.....
Subfamily **Entedoninae**.

Submarginal vein with from 1 to 5 bristles. Metapleura triangular, not small. Postmarginal vein usually absent. Mesoscutellum with four bristles, all behind the middle, often with two longitudinal impressed lines. Abdomen sessile..... ..... Subfamily **Tetrastichinae**.

Tarsi 3-jomted. Pubescence of the wings arranged in lines.....
Subfamily **Trichogramminae**.

Book Notices.

First Contribution to a knowledge of the Orthoptera of Kansas, by Lawrence Bruner. Washburn Coll. Biol. Survey of Kansas. 1885, pp. 125—139.

Mr. Bruner gives an annotated list of 88 species, of which four are new and described here for the first time. The list as such, and the notes are valuable and interesting; but we are sorry to see the description of new species. It has gotten to be too much the fashion in the U.S., among economic Entomologists especially, to describe new species at random and in all sorts of places—agricultural reports—reports of experiment stations, agricultural and horticultural papers and sometimes even newspapers. These reports are not known to the great majority of Entomologists, the publications are usually not noticed, or obtainable in the ordinary course of trade, and the descriptions there form a positive hindrance to the advance of the science of Entomology in the less known orders. We do not mean to criticise Mr. Bruner's paper especially, but the evil referred to has already assumed serious dimensions and is growing. Unless something is done to check it, it will soon be necessary that the working entomologist subscribe to every agricultural and horticultural paper and get all the Reports of all kinds of surveys, explorations &c.

The balance of the Proceedings of the Ent. Club of the A.A.A.S. will be published in the next number.

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Dr. Horn and Mr. Hy. Edwards have donated to the Bkln. Ent. Soc. a small lot of good Coleoptera, which will be sold at auction at the next meeting, Jan. 5, 1886, the proceeds to go to the publication fund.

Society News.

Brooklyn Entomological Society. December 1, 1885.—Fifteen members present, Mr. Cramer the chair. On motion of Mr. Roberts it was resolved to purchase for the Society an album or albums in which should be preserved the portraits of members of the Society and of such other Entomologists as would send their portraits to the Society. Mr. Roberts read a short paper on habits of *Elmis*. Ordinarily they are found on sticks in running water or in moss or weeds in the streams. While digging out a *Bembidium* in gravel, some little distance from a stagnant pool, but still near enough for water to percolate easily, he came upon an *Elmis*, species not yet determined. He dug further and made a little pool, stirring continually, and in short time took 30 specimens.

Mr. Weeks read an article "Concerning Cremastochilus"* sent in by Dr. Horn with an added note by Mr. Schwarz. Prof. Mayer exhibited a pupa-nest of *Enchira socialis* from the Rio Negro, S. A.

Mr. Hy. Edwards presented to the Society a box of rare Coleoptera, suggesting that they be sold at auction for the benefit of the Society. After informal discussion and exhibition of specimens, the meeting adjourned.

Entomological Society of Washington, Dec. 3, 1885. Mr. Otto Lugger in a humorous speech presented a persimmon walking-stick to the Society which had been curiously carved by the larva of *Dicerca obscura* while in use. A discussion followed on the breeding habits of Buprestidae.

Mr. J. B. Smith gave Utah Territory as a new locality for *Pleocoma Behrensi* and exhibited a specimen and proceeded to read a paper on the larva of *Mycetina vittata*. A number of these larvæ had been found by Messrs Smith and Schwarz under a log in November, feeding upon a mold. Mr. Smith exhibited careful drawings of the larva and specimens of both larva and adult. A discussion followed upon the lateral appendages of this and similar larvæ, and their uses, in which Prof. Riley and Messrs Schwarz, Smith, Osborne, Lugger and Howard took part.

Prof. Riley made some remarks on the larval habits of *Lixus*. He had bred *L. macer* in 1872 in Missouri from stems of *Chenopodium hybridum* in which the larva bored, and from which the beetle issued normally from a hole at the end of the burrow. He had recently however from Mr. F. M. Webster, evidence that the same species works in the stems of *Helianthus* in Illinois; but that instead of issuing through a round hole, the stem is cut through from the inside at the upper end of the burrow and plugged with fibre, the beetle issuing from the cut end. *Lixus parcus* makes a gall on *Amelanchier* in California. He also spoke of *Pædiscus obfuscata* Riley Mss. as a twig-girdler, issuing from the orifice of amputation, but that the orifice instead of being plugged as with *Lixus*, was webbed up with silk.

Mr. Mann spoke of the use of the Dewey decimal system for purposes of indexing as adopted in *Psyche*. Mr. Howard and Prof. Riley spoke on the lateral appendages of the larva of *Corydalus cornutus* and their probable function and the former mentioned the relation between the heart-beat of this larva and the contractions of the groups of branchiæ.

Mr. E. A. Schwarz called attention to the food habits of an undescribed Calandrid beetle allied to *Macrancylus* which was found by Mr. H. G. Hubbard to develope in the stems ane roots of *Acrostichum aureum* in Southern Florida.

L. O. HOWARD, *Corr. Secy.*

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* Published in full, *ante* p. 187.

ENTOMOLOGICA AMERICANA

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New Species and Varieties of Geometridae.

By Geo. D. Hulst.

Some months since I began the study of the *Geometridæ* of N. A., having more particularly in view a looking into the systematic arrangement of genera and species. With this object, in addition to my own collection, I have obtained for my use, wholly or in part as I have desired, the collections of the Lepidopterists in the vicinity of New York, as well as of many others from other parts of our country. Many of these are especially rich from the collecting of Messrs. Hy. Edwards, Morrison and Doll, and variations from normal forms are largely represented. So far my study has been in the *Ennomina* only. My conclusions as to genera I will probably not give until the whole family has been studied. In the material at hand, I have found as they seem to me the following new species and varieties. The generic references are to be regarded as provisional. These descriptions may be followed by brief notes on already named species.

1. **Oxydia zonulata** sp. nov. Expands 46 mm. Head and antennæ pale ochreous, the vertex, anterior edge of hind wings and abdomen shading somewhat lighter. Wings otherwise a pale yellow ochreous. T.a. line wanting. T.p. line present on both wings, reflected on fore wings near apex towards costa at an acute angle, and somewhat curved inwardly in its course across the fore wing; straight on hind wing. Its color is buff on fore wing, tawny on hind wing. There is a small smoky spot near anal angle. Beneath very light ochreous, without lines but with two or three shadings near apex.

The above is close to *O. mundata* Guen. but lacks the shadings o the wings above, the cross line is not extended to the apex, and the fore

wings are considerably more bent downward at apex. 1 ♂. Texas. Coll. Meyer.

2. **Ripula virginaria** sp. nov. Expands 44 mm. Palpi brown tawny. Thorax, abdomen and wings pure white. The fore wings have a triangular spot near apex, black outwardly, reddish and olive otherwise, and another narrow olive spot near anal angle. On the hind wing is a divided olive band faint anteriorly, wavy on both sides, inwardly forming with the inclosed wing space a continuous waved white line. Beneath pure white. Fore and middle legs tawny, hind legs white.

1 ♂. Florida. Coll. Hy. Edwards. Very near to *R. mexicaria* Guen. but it differs in design of markings on wings, and in the color of the legs.

3. **Eutrapela anfractata** sp. nov. Expands 40 mm. Head, thorax, abdomen and ground color of wings, of an even light pearl gray. Wings with two darkish lines, the basal sinuous, curved outward, faint and on fore wings only; the outer slightly waved, straight however in its general direction, reflected near apex at an angle more obtuse than is usual, and with the reflected part not straight but curved outwardly to costa. The outer lines are edged with whitish outwardly, and shade gradually and broadly into the ground color. There is a broad submarginal fawn shading also. Discal spot distinct. Beneath light even gray, sometimes with an ochry shade. Lines wanting or outer lines very faintly perceptible.

2 ♂, 1 ♀. Ariz: Coll. Hy. Edwards, Hulst. Nearest *nubilata* Pack. and *catenulata* Grt. It is quite possible that all are variations of one species, *anfractata* being the Arizona form and *catenulata* the form having the median space fawn brown, darker than the rest of the wing.

4. **Tetracis mellitularia** sp. nov. Expands 35–45 mm.

This is the species described by Packard, Geom. Moths p. 551 and figured plate XIII, f. 43, and called *T. paralleliaria*. The description and figure are of one of the darker specimens. The original description by Packard of *T. paralleliaria*, Bost. Pro. Nat. Hist. Vol. XVI, p. 38, is very brief, simply, "lighter than *T. truxaliata*. A fresh specimen from Mr. Behrens is ochreous." The specimen labelled "type" in the Museum of Comp. Zool. Cambridge, Mass., is probably the fresh specimen referred to, and is the insect figured plate XIII, f. 42. But this is not the same species with fig. 43 but is another, found commonly in Colorado and less so in Arizona and California and which varies from reddish ochreous to light ochreous. To attach the name of Packard to the one species we have what there is of the original description, the type specimen, and the fig. 42, pl. XIII. To attach it to the species I call *mellitularia* we have the description given in Geom. Moths, p. 551, and fig. 43, pl. XIII. The name it seems to me must go with the original description and the type. *T. paralleliaria* Pack. as thus determined, was afterwards named *Eurymene excelsa* by Mr. Strecker, Report Explor. and Surv. Dept. of Missouri, Ruffner, 1878, p. 1863, pl. 2, f. 9. And a

lighter form, more common in Ariz., was described by Mr Grote, Can. Ent. Vol. XV, p. 27, and called *T. simpliciaria*. Mr Grote's *T. obientaria* (which must be *T. oblentata*) is close in appearance, but the cross lines are much wider apart, the antennæ of the ♂ are simple and the palpi very much less prominent. I have both his types before me for comparison. 5 ♂, 3 ♀. Ariz., Nev., Cal.: Coll. Hy. Edwards, Tepper, Hulst.

5. **Tetracis cavillaria** sp. nov. Expands 41 mm. Head, b dy and wings of a dull light ochreous fawn color. The outer part of the wings with the color a little more decided, and over all a faint flesh colored flush. Lines faint, the t.a. nearly straight, the t.p. nearer median than usual, present on both wings, dull fawn. Another line beyond, faint, reaching from costa half way across fore wing. Beneath as above, somewhat lighter. Antennæ in ♂ rather shorter and pectinations more lengthy than usual. Fore wings slightly, hind wings very slightly angulated. 1 ♂. Ariz.: Coll. Hulst.

6. **Tetracis morsicaria** sp. nov. Expands 37 mm. Head, thorax and abdomen light ochreous, lines dark fawn edged t.a. line inwardly, t.p. line outwardly with white. T.a. line straight, reaching twice as far out on costa as on inner margin. T.p. line oblique, starting from costa just within apex. Hing wings very light ochreous outwardly, nearly white inwardly. Beneath lighter than above, t.p. line alone indistinctly evident. Margins of fore wings not falcate, but waved, fringes red.

1 ♀. Texas. Coll. Hulst. Very like in appearance to *T. parallelaria* var. *simpliciaria*, but the fore wings are much more extended, both lines, especially the outer, more oblique. The outer margin of the fore wing is much less falcate and angulated, and the margin itself is wavy and edged with reddish.

7. **Tetracis trianguliferaria** Pack. var. **notataria** var. nov.

This variety differs from the type form in having just within the posterior angle of the fore wings a dark brown spot, reaching from the inner border to vein 4. It is undoubtedly a part of a band corresponding with that of *T. coloradaria* Grt. and Rob., but not connected with the outer costal spot.

8. **Tetracis edwardsata** Sp. nov. Expands 35 mm. Head, antennæ, thorax and abdomen cream white. Fore wings a light yellow ochre, crossed with a dark tawny band which is edged on both sides with white shading into the ground color. The band is broad at costa embracing one-third of the wing and reaching nearly to apex, then narrowing runs with nearly parallel sides first outwardly, then inwardly, and finally widens rapidly to inner margin. The outer margin of the wing is slightly darker than the ground color. Hind wings very light in color, a little clouded outwardly, without band, and very slightly angulated at the middle. Fore wings angulated, and slightly falcate. Beneath very light cinereous, satiny, unicolorous.

1 ♀ Siskayou Co., Cal.: Coll. of Hy. Edwards in whose honor it is named.

9. **Tetracis geniculata** sp. nov. Expands 30 mm. Head, thorax and abdomen light ochreous. Fore wings of the same color, hind wings lighter. Apex of fore wings rectangular. Median angle on all wings obtuse. Two lines on fore wings reddish brown, the inner angulated below costa, edged outwardly with whitish, the outer reflected near costa at a right angle, continued across hind wings, and edged outwardly its whole length with whitish. Discal spots minute, black. Beneath lighter, except on costal half of fore wings. Outer line partly evident on fore wings only.

1 ♂, Col.: Coll. Hulst.

10. **Metanema novellata** sp. nov. Expands 36 mm. Wings uniform light yellow ochreous. Two lines on fore wings, the outer continued on hind wings, buff, straight, more distinct than usual. The hind wings have a brown hair line, sometimes very faint, in the submarginal space. Fore wings acute at apex, strongly falcate, median angle rather strong, as also on hind wings. Beneath even glistening light cinereous, the ordinary lines faint but the brown submarginal hair line present on all wings. Discal spots, black points above and below.

1 ♂, 1 ♀. Coll. Tepper, Neumoegen. The wings of this species approach in appearance *Metanema quercivoraria* Guen.

11. **Metanema argillaria** sp. nov. Expands 34 mm. Head, antennæ, thorax and abdomen light fawn, each segment of the latter edged with a line of lighter color. Wings of uniform light fawn, formed by a clay ground color, heavily striated and powdered with fawn. T.a. line on fore wings brown, fine, sinuous, rounded outwardly. T.p. line brown, edged outwardly with clay white, common to both wings, and reflected on fore wing near apex to costa. Discal spots on fore wings distinct, black. The fore wings are falcate without darker color in curve, the median angle not so projected as in the rest of the genus. Angle of the hind wings dentate, strong. Beneath, dull light ochreous, striated with fawn. Outer line apparent only on fore wings, rather broader and more indistinct, fawn colored and rounded not angulated to costa.

1 ♂ Arizona. Coll. Neumoegen.

12. **Caberodes confusaria** var. **mimaria** var. nov. Expands 42 mm. Lines as in *confusaria* but with basal and outer space tawny, and median space yellow. Also a row of submarginal clouded spots.

1 ♀ Georgia. Coll. Hy. Edwards.

13. **Caberodes galbanaria** Sp. nov. Expands 35 mm. Fore wings a light yellow ochreous with outer third of both wings of a light pink brown. A faint white t.p. line passing through this, on both wings from apex of fore wings. Fore wings with apex produced, pointed, strongly falcate and angled. Hind wings angulated, outer edge of wings straight to point of angle, not rounded. Discal spots on all wings black. Beneath, light pinkish brown, somewhat more pronounced on anterior two-thirds of fore wings. Discal spot as above.

1 ♀ Arizona. Coll. Hulst.

14. **Drepanodes effascinaria** sp. nov. Expands 42 mm. Head, thorax and abdomen ochreous. Fore wings pointed at apex, not excavated beneath, but strongly falcate and angulate. Hind wings rounded. T.a. line on fore wings reddish brown, rounding outwardly, and biangulate externally. T.p. line reddish brown, edged outwardly with light ochreous reaching from apex in a straight line across both wings.

Fore wings within t.a. line and both wings beyond t.p. line, reddish brown. The median space varies from clouded to bright yellow. Submarginal clouded spots sometimes apparent. Discal spots small, black. Beneath, outer line more faint on both wings. Color yellowish, with more or less buff, darker beyond t.p. line. Discal spots as above.

2 ♀ S. C. and Fla.: Coll. Neumoegen and Tepper. The largest of our *Drepanodes*, and allied to *D. panamaria* Pack.

15. **Drepanodes hortularia** sp. nov. Expands 26 mm. Head, antennæ, body and wings ochreous buff with median space somewhat darker. T.a. line present on both wings, very nearly median, bending outward, somewhat zig-zag. T.p. line present on both wings, slight; on fore wings oblique, flexuous, and rounded to costa near apex. The ♀ has on hind wings two submarginal rows of small black spots arranged parallel with outer margin. Beneath, color as above, or a little lighter, slightly speckled with black. Lines obsolete or outer one indistinct. Rows of black spots repeated on hind wings of ♀.

1 ♂, 1 ♀ N. J. and Fla.: Coll. Hulst.

16. **Drepanodes perizomaria** sp. nov. Expands 36 mm. Plain, uniform, very even fulvous, with a decided lilaceous tinge. T.p. line only present, white in ♂, dark brown edged slightly with white outwardly in ♀, oblique reflected at a sharp angle, very near apex to costa. Discal spots minute, black. Fore wing pointed, falcate in ♂, pointed, strongly falcate and excurvated in ♀. Apex of fore wings in ♀ black. Beneath more of a buff color with lilaceous tinge lost, speckled with black dots. Lines indistinct.

1 ♂, 2 ♀ Va. Mon. Ariz.: Coll. Graef, Doll, Hulst. Considerably larger than heretofore named species, though in the ♂ somewhat resembling some forms of *D. puberaria*, Grt.

17. **Azelina hubnerata** var. **atrocolorata** var. nov. A form of *hubnerata* in which the basal and median space is smoky black, becoming deep black as it merges in the deep black t.p. line. T.a. line evident near costa, deep black. Hind wings on median and basal spaces lighter. Outer space of all wings cinereous, with more or less of dark striations, giving a smoky appearance. Beneath, smoky cinereous, tinged with lilac.

7 specimens U. S.: Coll. Tepper, Hill, Neumoegen, Hulst.

18. **Azelina australata** sp. nov. Expands 40 mm. Head, thorax and abdomen russet, thorax darker posteriorly, and a dark line on each abdominal segment above. The wings are crossed by three distinct somewhat heavy black lines; the first basal, straight; the second submedian, slightly angulated outwardly at middle; the third extra discal, wavy and with a large sinus outwardly just above middle. Between the first and second is a slight clouded indistinct line. Between the second and third are two black hair lines, the inner parallel to the second, the outer parallel to the third line. Beyond the third, the space is clouded with irregular and broken dark bands. There is a zig-zag submarginal white line, and at the middle a marginal whitish rectangular spot. The wings are clay white in the median space, darker beyond the hair lines, and smoky ochreous beyond, the colors being limited by the lines. All the wings are rounded, unangulated. The hind wings are brown with a median black line, the submarginal space dull black, and the margin much lighter

including 3 or 4 black points near anal angle. Beneath all wings ochrey yellow at base, a median black line angulated outwardly near middle, then a parallel band of white, then a broad black band broken outwardly, then a marginal white band. Discal spots prominent, black. The insect beneath has something of a *Catocala* appearance.

1 ♂ Fla : Coll. Hy Edwards.

19 **Azelina radiosaria** sp. nov. Expands 35 mm. Palpi, thorax and abdomen a very light ochre. Vertex white. Antennæ of ♂ pectinated for half their length. Fore wings acute at apex, falcate waved on outer margin. Hind wings with a slight projection at middle of margin. T.a. line present on fore wings, straight, white. T.p. line curved, nearly parallel with outer margin, extended faintly across hind wing. T.a. line outwardly, t.p. line inwardly, on both wings edged with brown. Color of fore wings light ochre, but within t.p. line having a distinct pink shading, becoming fainter towards base. Hind wings very light ochreous. Beneath, lighter and more uniform than above, the outer brown shading being apparent on both wings. Discal spots diffuse but distinct.

2 ♂, 1 ♀ Ariz.: Coll. Graef, Doll, Hulst. Nearest to *A. zalissaria*, Wlk.

20. **Endropia bilinearia** Pack. var. **mollisaria** var. nov.

The type form from the East is dark brown, with all wings strongly dentated. The variety is the form, almost the only form, found west of the plains, and is of a dull yellow ochreous color, with wings not nearly so dentate.

21. **Endropia bilinearia** Pack. var. **minoraria** var. nov.

A form of a dull yellow ochreous color, very much smaller than the ordinary type form, with black submarginal spots and cloudings on fore wings, and with all wings entirely without dentations or angulations, or these showing but slightly.

I can hardly make myself believe this is not a valid species. It is uniformly only about one-half to two-thirds the expanse of *bilinearia*, and the wings are altogether differently shaped But the lines are exactly the same and while not common, intergrades in both size and form are before me.

22. **Endropia hilumaria** sp. nov. Expands 40 mm. Of the general appearance of *E. warneraria* Harv. Thorax, abdomen, base and along costa of fore wings fawn. T.a. line indistinct, hardly reaching inner margin. Median space dark fawn with a cloud along costa and a light fawn space just beyond reaching along costa to t.p. line. T.p. line reflected near costa at a rounded angle, sinuous with a large inner band at middle of wing, and another at inner margin, lined outwardly with white. Space beyond light fawn, with an undulating indistinct submarginal white band clearest towards apical space, forming there a crescent. Two dark spots in submarginal space near middle. Wings pointed, falcate. Hind wings fawn to t.p. line, light fawn beyond, outer edge undulating, t.p. line nearly straight. Beneath, ochraceous

fawn, striated; t.p. lines quite distinct, quite straight on fore wings, apical white crescent distinct as above.

2 ♂ Colorado. Coll. Graef, Tepper.

23. Endropia occantaria sp. nov. Expands 46 mm. Head, thorax, abdomen, and wings of a light clay fawn color, the median space being somewhat lighter. A faint lilaceous tinge over the wings a little more apparent beyond t.p. line. Fine scattered striations of dark fawn over the wings. A blurred submarginal clouding, obsolete near middle. A whitish apical spot. Lines fine, reddish, somewhat rounded. Wings broader than usual, dentate at the end of each vein. Beneath, color a little lighter. Striations and t.p. lines more pronounced. Some orange ochreous shadings present.

2 ♀ Nev.: Coll. Graef, Tepper. Appearently nearest *E. bilinearia*, Pack., of which it may be a distant variety.

24. Endropia decoloraria sp. nov. Expands 28 mm. Head, body and ground color of wings fawn brown, with a faint lilaceous shade. Wings with a dark brown extra median band, This band is strongly sinuous, having especially a large sinus outward, just beyond discal space. Within this band some coarse ochreous striations forming somewhat of a band, also a narrow indistinct submarginal band of the same color formed in the same way. Fore wings nearly rectangular at apex with dark brown edge beneath apex, outer margin sinuous, not dentate nor angulate, swollen out at middle and somewhat bent inwardly close to outer angle, where there is a small spot of dark brown. Hind wings obtusely dentate with large double tooth near middle, and another single tooth near outer angle, with a deep sinus between. Beneath as above, without the darker bands and spots.

2 ♂ Coll. Graef and Tepper. No locality with either specimen.

This is nearest the insect represented by Dr. Packard as a var. of *End. armataria* H. Sch. (Geom. Moths, p. 511, Plate XII, f. 20.) Dr. Packard speaks of the wings being the same as in *armataria* though not so represented in the figure, and there they are not so diverse as in *decoloraria*. It differs from *armataria* in the entire difference of color of wings and shape of bands above and below, has no suggestion of the very marked and brilliant appearance of *armataria* below, and there is an entire difference in the shape of both wings.

25. Endropia lentaria sp. nov. Expands 32 mm. Palpi dark drab. Antennæ and abdomen drab. Thorax and wings to t.p. line reddish ochreous. Beyond, the color varies from cinereous to dark brown. T.p. line on both wings, nearly straight on front wings reaching costa considerably within apex, reddish brown, edged outwardly with a narrow white line. Fringes dark brown. T.a. line faintly evident on fore wings. Discal spots distinct, annulate on fore wings, faint on hind wings. Beneath a dull reddish brown irrorrated with dark brown, much darker beyond t.p. line. The lines are faintly evident, discal spots distinct. All wings rounded without angles or dentations.

4 ♂ Fla.: Coll. Neumoegen, Doll, Hulst.

26. Endropia manubiaria sp. nov. Expands 44 mm. Very much as in *E. serrataria* Dru., but with a single angle to each wing with the space beyond the t.p.

line either as light as median space or slightly darker: with no inner line to hind wings and with a looped hair line outwardly from t.p. line. Beneath, as above, but with lines somewhat more distinct.

2 ♂, 1 ♀ Colorado. Coll. Tepper, Hulst.

27. **Ellopia somniaria** sp. nov. Expands 44 mm.

This is a form from N. W. U. S and Brit. Columbia which Packard (Geom. Moths p. 494) does not separate from *E. fervidaria*. On comparing 28 specimens of *fervidaria* with 10 of *somniaria* I find no intergrading, and I see no reason why *somniaria* should not be considered a good species. It is larger, somewhat more yellowish, the dark speckles larger and more evenly distributed; the cross lines are broader and more distinct, the outer ones broadly edged outwardly and the inner ones inwardly with orange.

8 ♂, 2 ♀ Or. W. T., Van. I: Coll. Graef, Tepper, Neumoegen, Hulst.

28. **Eurymene arrogaria** sp. nov. Expands 34 mm. Very much like *E. fervidaria* H. S. and *E. phlogosaria* Guen., but without striations or cross lines. The outer cross line is faintly suggested by the outer shadings, but so far as suggested is not straight, but rounded outwardly. Basal and median space ochreous fawn, outer space fawn with brown cloud at inner angle. Hind wings ochreous yellow, with dark brown or black cloud at anal angle, this in part being the beginning of the t.p. line. Discal spots prominent on fore wings. Beneath, orange yellow on costal half of fore wing from base to outer third, light yellow on posterior half. Outwardly orange to turn of wing on outer margin. The space at inner angle, the outer third of hind wings, and all fringes vary from flesh color to lilaceous. Basal and median portions of hind wings orange yellow, striated with orange. Discal spot on fore wings somewhat blurred.

3 ♂, 2 ♀ Eastern States. Coll. Graef, Tepper, Neumoegen, Hulst.

29. **Rumia ochrearia** var. **unicoloraria** var. nov.

Differs from the type form in being of a clear bright yellow, without any markings whatever.

30. **Angerona crocataria** Fab. var. **caelaria** var. nov.

This variety differs from the type form in having the brown spots and markings quite obsolete and having the spots near outer angle of a pale white, faintly edged with brown.

Proceedings of the Entomological Club of the A.A.A.S.

(Continued from page 123 *ante*.)

Aug. 27th. The Club met pursuant to adjournment, at 7 P.M. Prof. Lintner in the chair, 12 persons present. The minutes of the previous meeting were read and adopted. Continuing the discussion of the previous meeting, Prof. J. A. Cook stated that the grass-hoppers (*C. femur-rubrum*) had been very destructive in Michigan. Many fields of oats had been nearly destroyed. The heads had not been eaten off as stated by Prof. Osborn to be the case in Iowa, but the separate berries or grains had been cut off, and often covered the ground. Meadows and pastures had also suffered greatly. These insects seemed worst where the season had been characterized by a drouth. Several years ago a similar devastation occured in this State, but was serious only for a single year. The Army Worm, *L. unipuncta* Haw., had been seriously destructive in the south-western portion of the State, where it also did serious damage three years ago. Neither of these visitations could be accounted for on the explanation given years ago by Fitch, as the wet and dry years of the first raid were the reverse of Fitch's rule, while this year and last had both been very dry in this region. The "Black Army Worm" *Agrotis fennica* was very abundant and destructive last year about Bay City and up the Saginaw River as far as Saginaw City. The numbers were fairly prodigious: bushels could be gathered in a few minutes. Hundreds could be crushed by a single foot-fall. Gardens and meadows were totally stripped of every green thing. This year the region devastated last year had wholly escaped damage, though a similar attack had been suffered farther up the Huron Shore. Other cut-worms had been unusually abundant and destructive in the State the past year. *Anthonomus musculus* Say, had done much damage to strawberries in the Northern Peninsula last year and the year before. This year it had done little harm. *Byturus unicolor* Say, for the first time had done much damage to raspberries in Michigan this season. These insects were much more gray than the description of Say, or specimens in the College Cabinet previously collected would indicate. They are easily destroyed by the use of Paris Green. Prof. Cook also referred to a species of Noctuid Moth, the larva of which was doing much damage by eating the wheat in the bin. This insect had done much damage both last year and this. He had been unable to rear the insect.

Prof. Osborn says that the habits of the grass-hoppers in Iowa were as Prof. Cook describes them. He said they ate off the heads of the oats; it would have been more correct to say that usually they ate the separate kernels.

Prof. Riley asks Prof. Cook to state more particulars about this larva which injures stored grains.

Prof. Cook says they came with the samples of injured grain, looked like a Noctuid, and were ¾ of an inch long. They ate the kernel, as the samples plainly showed, but how they did it he could not tell, though he had tried his best to bring them to maturity.

Prof. Riley does not see how a Noctuid larva could damage stored grain. It is so contrary to the ordinary habits of the species that he cannot understand it. *A. fennica* has taken on much more of the army worm habit than *messoria*, but this may be because onions are planted in rows rather widely apart, and it would be impossible for such large numbers to subsist there for even a short time. In reference to injury done to grain in bins, a species of *Ephestia* had probably done a great part of it.

He also said that he had this year succeeded in raising in considerable numbers the pear *Ceidomyid* which Prof. Cook had mentioned in one of his recent reports. He speaks of this insect to illustrate the great difficulty there is in determinations in this genus. He could not find that it differed in any respect from the descriptions of *Ceidomyia pyri* of Europe but to make sure he sent a series to that country and Mr. Transleeve could not find any differences from the description, but the descriptions were so poor, and there were no existent types, so that there could be no certainty. Prof. Mig suggests describing it as a new species with good figures and then there could at least be no doubt as to what was intended. This however was rather a violent remedy, and if generally applied would necessitate a great many redescriptions.

Mr. Smith states, in reference to the abundance of *Ag. messoria* larva that onion rows are about 18 inches apart, and in 1 ft. square between the rows he picked up between 40 and 50 larva just under the surface of the soil.

Prof. Lintner says there seems to be a general belief, and older authors have stated, that Noctuid larva are very difficult to raise. He has during the past year raised *Agrotis saucia* without any difficulty on plantain.

Prof. Riley says *saucia* is very easily raised and stands any amount of bad treatment—of *messoria* on the contrary of which hundreds of larva were sent to the Department, very few reached maturity. This difference often occurs—*Pœdisca scudderiana*, or more properly *P. saligna* Clem. is very easily raised. Another species of the same genus, Miss Murtfeld, Prof. Kellicott and he himself had tried their best to bring to maturity, for 4 or 5 years, but with very little success.

Prof. Westcott says that he has had the same experience with these species feeding on solidago.

Mr. Osborn gave a note on the habitat of a *Chironomus*: he said his attention had been called by Dr. B. D. Halstead to certain larvæ living in the water contained in the cups surrounding the stem of *Silphium perfoliatum*.

The principal form thus found is a species of Chironomidæ, nearly transparent and colorless and closely resembling the figures of *Chironomus oceanicus* Packard. The larvæ were quite abundant in a large share of the cups examined, as many as forty and fifty occuring in a single cup. A number were placed in a glass of water and their transformations watched. Before pupating the larvæ usually came to rest at the surface of the water against the glass, enclosing themselves in a gelatinous mass. Length of pupation appeared to be about two days though not constant in different individuals.

Before emergence of the imago the pupa assumes a bright silvery appearance from the separation of the outer membrane. The final process of emergence is passed through very rapidly, the imago resting for an instant on the surface of the water, and assuming very rapidly the full size. The cups must become dry occasionally and it would be interesting to know the time required for the entire development of the species.

Prof. Riley says that most of Prof. Osborn's notes would apply to most of the species; but the developing in the cups *Silphium perfoliatum* is very curious, and interesting.

Prof. Cook then gave some notes on the functions of the secretion of Bark lice, *Leucanium tiliæ*, Fitch.

These lice attack many species of our forest and fruit trees. Though the scales on different trees vary considerably in size and form, and were similarly peculiar on each species of tree, yet they were doubtless of the same species of insect. Larvæ lice from the Linden where they were largest, transferred to butternut where they were smallest and very convex, developed into the peculiar type of the latter tree. These lice secreted much bitter unwholesome nectar, which attracted the bees. Early in the spring, it was observed that the Baltimore Oriole and our two most common Sparrows were feeding extensively on the lice. The birds would take a limb and almost strip it of the lice. When the bees and wasps commenced to swarm in the trees in quest of the nectar, the birds all left this feeding ground. Soon the flowers lured the bees to more inviting fields, when the birds again commenced to feed on the rapidly growing scales. The nectar secretion seems surely to serve the insects that secrete it as it attracts the bees, which frighten away the birds.

Prof. Riley says this feeding of birds upon the Bark Lice is interesting and novel, and has never been observed before.

Prof. Lintner says this theory of the secretion attracting bees, to keep off the birds was new to him.

Prof. Cook remarks that the secretion of the Aphids gives excellent honey. He has tasted it from those on elm and poplar, and it is delicious. That from the bark lice is horrible, and last year when the bees, during the abundance of these lice gathered so much of it, tons of honey were spoiled and had to be sold for manufacturing and commercial purposes.

Dr. Cook also made some remarks on "The Choke Cherry Tortricid Moth *Cacoecia cerasivorana* Fitch."

The larva of this insect which had been very common in Michigan this summer, spun an immense quantity of Silk, much like the tent of the tent Catipillar *C. americana*, Harr., though it not only lived but fed in the tent, obtaining fresh food by drawing twigs and branches into its web. In some cases shrubs two inches in diameter and ten feet high had been deflected several inches from the usual vertical position by this strong net. Prof. Cook had taken bushes to his Laboratory, and found that these large bushes were drawn to the wall of the room several inches distant. It was asked how such small insects could exert such force, except that the fibers of the web contracted. Prof. Lintner thought the force came from the numerous and repeated attachments to the threads. Each time drawing the object a little nearer.

Prof. Riley agrees with Prof. Lintner; the thread is so strong, so often crossed and doubled, and, always a little stretched, that very gradually and almost imperceptibly these results are obtained.

Prof. Riley then described a very peculiar Tineid cocoon obtained from a larva on apple. The larva spins three stout threads, fastened to as many distinct points, and converging to a common centre and at this point it spins a loose mesh-like cocoon in which it pupates. The cocoon swings free, and is supported anteriorly by two and posteriorly by one of these threads. He asks whether any similar structure had been noticed.

Prof. Westcott says that on two evenings the past season *Lachnosterna futilis* came to light in immense numbers. His son and himself at his street lamp gathered 780 of the insects. Usually *fusca* is the common species there, but of those taken this season less than 3 per cent were *fusca* and the balance *futilis*. In the face of the severe weather they had last winter this was somewhat remarkable.

On motion of Prof. Riley the club adjourned until Aug. 28.

August 28. The club met pursuant to adjournment at 7 P. M. Prof. J. A. Lintner in the chair, 12 members present.

On motion of Prof. Kellicott, seconded by Prof. Riley, Mr. Smith was appointed a committee to provide a distinctive badge for members of

the Club, to be used at the next meeting; the badge to be of a deep blue color, and the words "Entomological Club" to be in some way printed thereon.

On motion of Prof. C. V. Riley, the secretary was authorized to print the minutes of the present meeting of the Club, in "Entomologica Americana."

Prof. Osborn moved that hereafter the club shall not meet prior to the first day of the meeting of the Association—after some discussion, the motion not being seconded was lost.

Prof. Riley moved that a committee of three be appointed to arrange a programme for the next meeting, and that the chair and the secretary be members of that committee. Carried; and the chair appointed Prof. Riley as the 3d member of the committee.

Prof. Osborn gave a few "Random notes on Mallophaga."

The secretary read the following letter from Mr. W. H. Edwards to Prof. J. A. Lintner.

"I wish you to mention at the meeting of the Entomological Club, that whereas it was stated at the meeting one year ago, by Mr. E. M. Aaron, that in Tennessee, he had found *Papilio ajax* larvæ on spice-wood and sassafras, *I have experimented this season on these larvæ, and in every case the larvæ of *Ajax*, on either spice-wood or sassafras, refused the food, and died of starvation. I tried several larva just out of egg, before they had tasted pawpaw; also larvæ just past 4th molt, before they had eaten (after the molt); and I tried half grown larvæ, and in every case, the result was the same. I do not say that Mr. Aaron was mistaken, but I say West Virginia larvæ refuse these two plants.

You may say, if you like, that I have this season, bred *Conympha galactinus* larvæ from egg to imago and the result was the form *californica*; therefore the species is seasonably dimorphic:—that I have bred *Conympha mornata*, from Vancouver Island, from egg to imago, and got the same type butterfly:—that I have bred *Conympha ochracea* to last molt, but not to Chrysalis:—that I have bred *Satyrus charon*, egg to imago; and have larvæ of *Oetus* hibernating:—that I have bred *Argynnis halcyone* from egg to imago, and whereas the butterflies are near to *Argynnis alcestis*, the larvæ are almost as different as *A. Idalia* larvæ from either *alcestis* or *aphrodite*. And you may say that I should be greatly obliged for eggs from butterflies, especially of species which are not likely to be found in West Virginia."

Mr. E. A. Schwarz exhibited specimens of *Cosmosoma omphale* from

* Mr. Aaron said Upland huckleberry not sassafras. See Brooklyn Bull. VII. p. 91.—Ed.

Florida, and called attention to a peculiar character of the male, observed by Mr. Hubbard. There is at base of the abdomen a deep cavity, normally closed by a flat plate, filled with white, cottony hair, so closely packed, that when the covering plate was forcibly opened, the downy hair burst out in quantity sufficient to fill a small pill box. No living specimen had ever been observed with this cavity open, and in dried specimens the structure is easily overlooked, though in each case visible when closely examined.

Prof. Riley asks whether all specimens show this character, and whether it never occurred in the ♀. Mr. Schwarz says it occurs in all ♂♂ seen, and in no ♀.

Mr. Smith said he had examined the structure so far as dry specimens would allow, and finds that there is a cavity, evidently a structural feature, and not the result of disease. No character of this nature had been previously observed, but he would study the structure carefully.

The possibility of this substance being of a fungoid nature was discussed by Messrs Riley, Westcott, Schwarz and Smith. Mr. Schwarz states that Mr. Ashmead claims to have found the larva of this species boring in the Japanese plum, but the insect occurs also in considerable numbers where there is no Japanese plum, and there is probably also some other food plant. He says also that a very common species of *Lygranthoecia** shows a somewhat analogous structure in the shape of a long chitinous pedicil at the base of the abdomen, having a long brush of hair at the tip. The pedicil is fitted into a groove at the side of the abdomen, and the brush of hair is folded over the back, and is not visible in the dry insect.

Mr. Smith says in his studies on the *Heliothinæ* he noticed nothing of the kind, though such a structure as Mr. Schwarz describes might easily have escaped him.

Prof. Riley thinks he has noticed the character last mentioned by Mr. Schwarz, in probably the same species. It is strange what elastic properties some of the organs of the Lepidoptera, have. The peculiar organs in *Spilosoma acraea* and other species were cited as examples, and he says he has drawings of somewhat similar organs in *Aletia xylina* which have not yet been described.

Prof. Peabody has witnessed something similar in the living *Phakellura nitidalis*.

Prof. Riley has also observed that character in the latter species.

(To be continued.)

* Afterward seen by me it is *Schinia* (*Lygranthoecia*) *marginata* Haw. Ed.

A generic Synopsis of the Hymenopterous Family Chalcididae.

By L. O. Howard.

(Continued from p. 197.*)

Subfamily LEUCOSPIDINAE.

This subfamily consists of the single genus *Leucospis*, Fab. for which the characters given in the subfamily synopsis will be sufficient.

Subfamily CHALCIDINAE.

Abdomen with a long petiole. Postmarginal vein long. Posterior tibiæ not spurred, produced at tip into a spine.

Ovipositor not exserted.

Thorax immaculate. Middle tibiæ not spurred at apex..*Genus **Smicra** Spinola.

Thorax maculate. Middle tibiæ with spurs ... Genus **Spilochalcis** Thomson.

Ovipositor exserted, longer than the whole body .....Genus **Podagrion** Spinola.

Abdomen almost sessile. Middle tibiæ spurred.

Antennæ inserted in the middle of the face.

Abdomen much produced.....*Genus **Phasgonophora** Sichel.

Abdomen sub-globose..... ....Genus **Chalcis** Fabr.

Antennæ inserted near or not far from mouth.

Ovipositor exserted, as long as abdomen ....*Genus **Acanthochalcis** Cameron.

Ovipositor short, usually hidden. Posterior tibiæ two-spurred. Hind femora normal ....Genus **Halticella** Spinola.

Ovipositor short. Hind femora with a single large tooth.....
Genus **Notaspis** Walker.

Note.—In this subfamily I have followed Cameron, the latest author, in retaining *Phasgonophora* which Andre would combine with *Halticella*, but have added Thomson's *Spilochalcis* with a view of accepting any good separation of the unwieldy old genus *Smicra*. All the species of the old genus, however, which I have seen from this country belong to the new division.

Subfamily TORYMINAE.

Ovipositor exserted.

Antennæ with two ring-joints, the flagellum thence 8-jointed.....
*Genus **Lochites** Foerster.

Antennæ with one ring-joint, flagellum thence 8-jointed.

Stigmal vein with a very large knob. Abdomen of male much narrowed at base..... .....Genus **Megastigmus** Dalman.

Stigmal vein with no such knob, or with a small knob. Male abdomen not narrowed.

* In the synopsis of the subfamilies on p. 197 I inadvertently inserted, opposite the subfamily Chalcidinæ, the character "ovipositor protruding but slightly", which should be changed to "ovipositor not curved over dorsum of abdomen", in contradistinction to the Leucospidinæ. The character as it stood is wrong, as in the recently described genus *Acanthochalcis*, the ovipositor is normally exserted to a considerable length, and in *Podagrion*, formerly placed with the Toryminæ, but now more properly included among the Chalcidinæ, the same character is found.

Hind femora beneath smooth, with a single tooth at some distance from the knee.

Scutellum with a cross furrow behind the middle.

Hind border of first abdominal segment straight in both sexes.....
Genus **Monodontomerus** Westwood.

Hind border of first abdominal segment incised in the middle with the female, straight or incised with the male.....
*Genus **Diomorus** Walker.

Scutellum without a cross furrow.....*Genus **Holaspis** Mayr.

Hind femora below finely dentate and usually with a single larger tooth at some distance from the knee.

Hind border of first abdominal segment not incised; tooth of hind femora often wanting.....*Genus **Oligosthenus** Foerster.

Hind border of first abdominal segment acutely incised with female: straight with male; femoral tooth always present.....
*Genus **Cryptopristus** Foerster.

Hind femora below not finely dentate and with no larger tooth.

Scutellum with a clear sharp cross-furrow. Hind border of the first abdominal segment of the male entire or incised.....
Genus **Syntomaspis** Foerster.

Scutellum without trace of a cross-furrow. Hind border of first abdominal segment of male incised..... Genus **Torymus** Dalman.

Ovipositor not exserted.....Genus **Ormyrus** Westwood.

Subfamily EUPELMINAE.

Eyes hairy.

Second abdominal segment short, not incised.....*Genus **Brasema** Cameron.

Second abdominal segment as long as all the others together, deeply incised at apex.....*Genus **Lutnes** Cameron.

Second abdominal segment very large, slightly rounded at tip.....
*Genus **Aseirba** Cameron.

Eyes not hairy.

Hind tibiæ and first tarsal joint compressed, broad.....Genus **Halidea** Foerster.

Hind tibiæ and first tarsal joint neither compressed nor broad.

Front below the antennal grooves indented. The middle ocellus in the antennal groove.

Middle tibiæ very long.

Antennæ arise near the border of the mouth.....*Genus **Stenocera** Walker.

Antennæ arise far above the mouth-border....*Genus **Polymoria** Foerster.

Middle tibiæ not very long.....*Genus **Ratzeburgia** Foerster.

Front not indented below the antennal grooves. Middle ocellus not situate in groove.

Scutellum with a broad base against mesoscutum....*Genus **Calosoter** Walker.

Scutellum with a narrow base.

First tarsal joint of middle legs with strong spines beneath.....
Genus **Eupelmus** Dalmann.

First tarsal joint of middle legs with no strong spines beneath.....
*Genus **Charitopus** Foerster.

Subfamily ENCYRTINAE.

FEMALES.

Funicle 4-jointed.....*Genus **Cercobelus** Walker.

Funicle 5-jointed.....Genus **Rhopus** Foerster.

Funicle 6-jointed.*

Head with a sharp angle between face and vertex ....*Genus **Habrolepis** Foerster.

Face not angled.

Scape, funicle and club broadly flattened.

Wings developed and colored with brown.....
*Genus **Cerapterocerus** Westwood.

Wings almost always rudimentary; when developed, are hyaline.

Head narrow, facial impression not extending up between the eyes.....
*Genus **Anusia** Foerster.

Head thick, facial impression extending between the eyes.....
*Genus **Mira** Schellenberg.

Scape, funicle and club not at all flattened.

Scutellum at base with two deep impressions, wings rudimentary.....
*Genus **Ectroma** Westwood.

Scutellum without grooves.

Scutellum crescent-shaped. Wings rudimentary.....
*Genus **Baeocharis** Mayr.

Scutellum three-cornered, with rounded or not rounded tip.

Scutellum with a large bunch of hair at tip.

Pedicel shorter than first funicle joint. Mesonotum without silver-white hairs. Marginal vein shorter than stigmal .....
Genus **Comys** Foerster.

Pedicel longer than first funicle joint. Mesonotum with silver-white hairs. Marginal vein at least as long as stigmal.....
Genus **Chiloneurus** Westwood.

Scutellum without a large bunch of hair.

Head with very large thimble-like punctures.

Wings clear; marginal vein wanting or very short .....
Genus **Bothriothorax** Ratzeburg.

Wings entirely or somewhat fuscous; marginal vein never very short.....Genus **Phaenodiscus** Foerster.

Head not with very large punctures. Antennal club obliquely truncate.

Facial groove very pronounced....Genus **Copidosoma** Ratzeburg.

Facial groove slight.....Genus **Homalotylus** Mayr.

Antennal club not oblique truncate.

Wings rudimentary, or if developed the scutellum is flat or its tip is light colored.

Scape strongly broadened below....Genus **Dinocarsis** Foersser.

Scape not broadened below.

First funicle joint only as long as thick, the scape reaching only to the upper border of the facial impression .....
*Genus **Choreia** Westwood.

First funicle joint longer than thick, the scape reaching beyond the facial impression....*Genus **Erycidnus** Walker.

Wings developed. The scutellum arched and with smooth tip.

* Except with *Holcothorax testaceipes* in which the body is not flat, is dark colored, not smooth, and the wings with short cilia.

Mesonotum lusterless.

Mesonotum with fine, sharp, longitudinal striæ. Body short. Scape very slightly broadened, if at all; funicle 5- or 6-jointed.....*Genus **Holcothorax** Mayr.

Mesonotum with thick, sharp and fine thimble-like punctures. Funicle 6-jointed.

Funicle joints thicker than long. Marginal vein wanting..... Genus **Aphycus** Mayr.

First five funicle joints longer than thick. Marginal vein present, although short.....Genus **Blastothrix** Mayr.

Mesonotum more or less lustrous.

Fore wings not ciliate. Antennæ very long and thin; 6th funicle joint shortest, but five times as long as wide..... Genus **Psilophrys** Mayr.

Fore wings ciliate. Last funicle joint not so long.

Marginal vein one-half as long again as stigmal. Scapulæ meet in a short carina. Antennæ longer than body... Genus **Leptomastix** Foerster.

Marginal vein much shorter. Scapulæ make no median carina.

Antennæ very thin; pedicel three times as long as thick; club almost as thin as the funicle joints..... *Genus **Liothorax** Mayr.

Antennæ thicker; pedicel shorter; club stouter than funicle.....Genus **Encyrtus** Dalman.

MALES.

Funicle with only two short joints. The club unusually long, cylindrical..... *Genus **Habrolepis** Foerster.

Funicle 6-jointed.

Mesonotum before tegulæ with a deep impression. Second and fifth funicle joint 3-cornered when seen from the side.....*Genus **Prionomitus** Mayr.

Mesonotum with no impression. Funicle joints not triangular.

Funicle joints each with two half whorls of long hairs.

Marginal vein longer than stigmal.

Mesonotum with close flat silver-white hairs, scutellum usually with a bunch of upright spiny hairs at tip ..... Genus **Chiloneurus** Westwood.

Mesonotum with brownish-yellow hairs, scutellum with no erect bunch of hairs.

Marginal vein shorter than stigmal.....*Genus **Cerapterocerus** Westwood.

Head and upper side of thorax thickly covered with very large round punctures.....Genus **Bothriothorax** Ratzeburg.

Head and thorax not so sculptured.

Wings with long cilia. Head and thorax very finely shaggreened and lustrous. Body small and flat.....Genus **Rhopus** Foerster.

Wings with short cilia. Body finely punctate, lusterless..... Genus **Blastothrix** Mayr.

Funicle joints equally clothed with long or short hairs; no half whorls.

Scutellum before its tip with a bunch of erect, black hairs..... Genus **Comys** Foerster.

Scutellum with no bunch of hairs.

Funicle strongly compressed.

Scape quite strongly broadened below; scutellum flat; wings rudimentary ....*Genus **Dinocarsis** Foerster.

Scape not compressed; scutellum strongly transversely arched; wings developed .....*Genus **Prionomastix** Mayr.

Funicle not or but slightly compressed.

Head and mesonotum with thick and sharp round punctures; marginal vein wanting or very short. .....Genus **Copidosoma** Ratzeburg.

Head and mesonotum not so sculptured.

Mesonotum lusterless, no sculpture perceptible with a low power.

Middle of face transversely strongly arched. Mesonotum under a high power with close longitudinal line or impressions. Pedicel shorter than first funicle joint..... *Genus **Holcothorax** Mayr.

Face delicately arched. Pedicel longer than first funicle joint.....
Genus **Aphycus** Mayr.

Mesonotum moderately or strongly lustrous and usually with easily perceptible sculpture.

Marginal vein evidently longer than the stigmal.....
*Genus **Ericydnus** Walker.

Marginal vein usually shorter than stigmal, seldom as long, or the wings are rudimentary.

Wings rudimentary.

Scutellum large, very flat, reaching behind to the base of the first abdominal segment.....*Genus **Choreia** Westwood.

Scutellum small, arched, not reaching to abdomen.....
*Genus **Baeocharis** Mayr.

Wings developed.

Head covered with large shallow impressions, over these thickly and finely punctured .....*Genus **Phaenodiscus** Foerster.

Head not much punctured, usually with only a few scattered impressions near the eyes.

Head lengthened below eyes, trapezoidal when seen from before..... Genus **Psilophrys** Mayr.

Head not lengthened below eyes, round or oval when seen from before.....Genus **Encyrtus** Dalman.

Subfamily APHELININAE.

Fore wings with a hairless line, extending from stigma transversely towards base of wing; antennæ apparently 6-jointed.

Fore wings dusky on basal half and furnished with cilia towards tip.....
*Genus **Plastocharis** Foerster.

Fore wings not dusky and not with especially long cilia.

Three antennal joints before club of equal length..... *Genus **Mesidia** Foerster.

Three antennal joints before club of unequal length.

Ovipositor exserted to more than one-third the length of abdomen.....
Genus **Centrodora** Foerster.

Ovipositor not at all or but slightly exserted ...Genus **Aphelinus** Westwood.

Fore wings with no hairless line; antennæ plainly 8-jointed.

Antennal club only 2-jointed; hind border of hind wings with very long cilia.....
*Genus **Encarsia** Foerster.

Antennal club 3-jointed; hind border of hind wings with no very long cilia.....
Genus **Coccophagus** Westwood.

(To be continued.)

Society News.

Brooklyn Entomological Society. January 5, 1885. — Twenty persons present, the president in the chair. The officers of the preceding year read their reports, which were accepted, and the following officers were elected for the ensuing year. President: Rev. Geo. D. Hulst; Vice-Pres.: Chas. W. Leng; Corr. Secy.: John B. Smith; Rec. Secy.: A. C. Weeks; Treasurer: C. H. Roberts; Curator: Chas. W. Leng; Librarian: Geo. D. Hulst. Members of the Executive Committee: Geo. D. Hulst, B. Neumoegen, J. B. Smith, E. L. Graef, C. W. Leng, Geo. Gade. Publication Committee: J. B. Smith, Hy. Edwards, Geo. D. Hulst, G. W. J. Angell, E. L. Graef. Messrs. J. Hess, C. Pfeil, and W. Schenck were dropped from the rolls of the Society for non-payment of dues. The proposition of the "Prairie Farmer" for an exchange of publications was accepted.

Mr. Smith explained briefly how, where, when and what to sift, and described the outfit required. Messrs. Graef, Hulst, Mayer, Cramer and Pearsall discussed the question of how *Limacodes* are best brought to maturity. Mr. Pearsall reports good success in forcing them to maturity by keeping in a warm moist temperature—a number of species are daily emerging from pupa formed the past fall. Informal discussion closed the meeting.

Entomological Society of Washington, Jan. 6, 1886. Prof. H. Osborn was elected a member of the Society. The election of officers for 1886 took place. Prof. C. V. Riley was elected president, but declined to serve as he had already served two terms. A second ballot resulted as follows: President: L. O. Howard; 1st Vice-Pres.: Dr. J. G. Morris; 2nd Vice-Pres.: Dr. Geo. Marx; Rec. Secy.: E. A. Schwarz; Corr. Secy.: J. B. Smith; Treasurer: B. P. Mann. Executive Committee: Dr. C. V. Riley, O. Lugger and Theo. Pergande.

Prof. Osborn read a paper on certain Hemiptera which were unusually abundant in Iowa in the fall of 1885 giving with each species the food-plant or place of occurrence. Among the species mentioned are the following: *Carynocoris distinctus, Alydus eurinus, Neides spinosus, Anthocoris insidiosus, Phylus angulatus, Blissus leucopterus, Calocoris rapidus, Lygus lineolaris, Phymata erosa, Acholla multispinosa, Cicada tibicen, Ceresa bubalus, Publilia concava, Brochymena arborea* and *B. annulata.*

Mr. Lugger read a paper on the life-habits of *Mesites subcylindricus* and *Platypus flavicornis*, as observed by him on the beach of the Chesapeake Bay, Eastern Shore of Maryland. The former species was found to live in great numbers in old roots of *Pinus australis* which are covered twice each day by the high tide. The beetles infest the roots in large numbers and honeycomb them with large and irregular burrows. Holes of exit for the perfect beetles are very few. The *Platypus* was observed abundantly flying one morning just before sunrise and not at any other time of the day, nor would the beetles be found on or in the Yellow Pines, the only trees growing in that locality.

Dr. Riley exhibited drawings of larva and pupa of *Exorista vittata* and *Epipocas punctatus* and explained the differences between the corresponding adolescent stages in these two insects.

A letter from Mr. C. L. Johnson was read, stating that he had observed a Lepidopterous larva feeding on a species of Aphid, and had bred the insect to maturity. Mr. Lugger stated that the larva was that of *Fenesica tarquinius*, and he had also made the same observation several years in succession: though he had never actually seen them feeding on the Aphids, they were always found among them.

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The North American species of Toxophora.

By D. W. Coquillett.

The genus *Toxophora* may be easily distinguished from any other genus belonging to the family Bombylidæ by the following characters: Wings with only three posterior cells; abdomen never club-shaped, covered with an appressed tomentum and destitute of long pile; body and head when viewed from the side curves nearly in the form of a half-circle: first joint of antennæ longer than the third.

The following table comprises all of the species of *Toxophora* known to occur in North America.

1.— Wings with three submarginal cells, the second vein being connected with the anterior branch of the third by a cross-vein..... 2
Wings with only two submarginal cells; cross-vein at apex of discal cell not angular, and destitute of a stump of a vein..... leucopyga.

2.— Cross-vein at apex of discal cell angular and bearing a stump of a vein..... 3
Cross-vein at apex of discal cell not angular, destitute of a stump of a vein..... 4

3.— Wings hyaline, costal half only slightly yellowish..... pellucida.
Wings smoky brown, costal half darker brown..... amphitea.

4.— Abdomen with a black stripe each side of the middle..... virgata.
Abdomen with a row of black spots each side of the middle..... maxima.

T. americana Guer. (Icon. Regn. Anim., Insectes, t. 95, f. 1) has never been described; moreover, the figure shows four posterior cells, which would exclude this species from the genus *Toxophora*.

T. leucopyga Wied. Auss. Zw. I, 361, 2; Macq. Dipt. Ex. II, 1, 117, t. XIII, f. 1; *fulva* Gray, Griffith's An. Kingd. XV, Ins. 2, 779, t. 126, f. 5; O.-S. Western Diptera 267; Cat. Dipt. 238. Ga., Car., Tex. Length 10—12 mm. (O.-S.)

Unknown to me. Judging from the descriptions there can be no doubt of the correctness of this synonomy, which was suspected by Osten Sacken.

T. pellucida n. sp. Wholly black. First joint of antennæ white tomentose, inner side of second joint silvery pollinose in the male. A cluster of appressed whitish pile on each side of the front above the antennæ. Occiput pale yellowish pilose. Thorax pale yellowish pilose, the center fulvous tomentose, the bristles black; pleura white tomentose. Abdomen white tomentose, at the base more yellowish; a row of black spots each side of the middle, situated on the anterior edges of the segments, those on the first segment extending the entire length of the segment, those on the second segment coalescing with each other; also a row of black spots on each side of the abdomen, situated in the middle of segments, somethimes wanting except on the second and third segments. Venter white tomentose. Femora whitish tomentose, on the tibiæ more yellowish. Knob of halteres whitish. Wings hyaline, costal, first and second basal cells somewhat yellowish; three submarginal cells; small cross-vein at middle of discal cell; cross-vein at apex of discal cell angular and bearing a stump of a vein which projects into the second posterior cell. Length 6—10 mm. Cal. 7 ♂, 7 ♀.

T. maxima n. sp. Wholly black. First joint of antennæ white tomentose. Front, except the apex, with densely appressed yellow pile. Occiput yellow pilose. Thorax yellow pilose and tomentose, the bristles black; pleuræ yellow pilose. Abdomen bright yellow tomentose, a row of black spots on each side of the middle, situated on anterior edges of the segments, those on the second segment coalescing with each other. Venter sparse whitish tomentose, more dense on hind edges of the segments. Femora and tibiæ pale yellow tomentose. Knob of halteres yellowish. Wings hyaline, costal, first and second basal cells slightly yellowish; three submarginal cells; small cross-vein at last third of discal cell; cross-vein at apex of discal cell not angular, destitute of a stump of a vein. Length 16 mm. Cal. 1 ♀.

T. virgata O.-S. Western Diptera 266. Length 7—10 mm. 2 ♂, 1 ♂. Cal., Tex., Ga.

T. amphitea Walker. Cat. B. M. II, 298; O.-S. Western Dipt. 267. Length 12 mm. (according to Osten-Sacken 5 mm.). 1 ♀, Fla., Middle and So. States.

Proceedings of the Entomological Club of the A. A. A. S.

(Continued from page 209 *ante.*)

The Secretary then read the following paper:

LARVAL LONGEVITY OF CERTAIN COLEOPHORÆ.

By Mary E. Murtfeldt, Kirkwood, Mo.

With regard to the life habits of its species no group of the *Tineidæ* is more interesting than the *Coleophoræ*.

The larvæ are all case bearers, the cases being very dense, of a woody or testaceous appearance and from silk with a large admixture of excrementitious matter. They vary much in form and, where the larvæ are confined to a single food-plant, the shape of the case may be regarded as an important characteristic of the species.

Only the head and thoracic segments of the larvæ are ever exposed and these alone show color ornamentations.

The legs are well developed and the insect is capable of quite rapid locomotion notwithstanding the unwieldiness of the enclosed hind-body which is usually sustained at an angle of forty-five degrees and sometimes almost vertically.

I have found the *Coleophoræ* rather difficult to rear and this is especially the case with the single brooded species that can be collected only in autumn. These must be preserved not only over winter, but through the still more trying months of spring and summer often late into September and October. During all this time the entomologist must continually guard these objects of his care from excessive heat, mould and mites.

All *Coleophora* larvæ are averse to dampness and yet a certain amount of moisture about the time of their final tranformations seems to be necessary to their complete development.

For four or five successive years I have collected and cared for the larvæ of a certain species which may be found in September and October on the seeds of *Chenopodium album*. The cases of this species are at first conical and are carried in an almost erect position, but at maturity become somewhat fusiform and considerably curved at the anterior end. The average length is 0.20 inch, the texture peculiarly firm with an irregular roughened and mottled surface which closely imitates the dull black, whitish green and pale brown of the ripening seed cases of the *Chenopodium*.

The head and narrow cervical shield are polished pale-brown indistinctly mottled with a darker shade of the same color. Thoracic segments beautifully ornamented with curved and wavy lines of crimson on a pearl-white ground and the long and slender legs are similarly marked. When removed from the case the hind body is found to be of a pale-green or greenish-white color, depressed cylindrical form and with a very soft and easily ruptured integument. The prolegs are of the normal number but reduced to simple circlets of minute hooks. Supra-anal plate dark fuscous, horny and edged with short stiff hairs.

On the dorsum of the seventh segment, in many of the larvæ examined, were a pair of dark spots each one with two points projecting toward the medio-dorsal line. The nature of these marks or organs I have not yet ascertained.

Growth is usually complete by the middle of October and the larvæ then either desert their food plant entirely or attach themselves to the main stalk. Here they remain ten or eleven months and sometimes even longer in a state of semi-dormancy. That they are not completely dormant is evident by the fact that if forcibly loosened from their places, or disturbed by the pressure of any other body against their cases, or if the

surface to which they are attached becomes damp, they will with apparent ease lift up their cases and remove to a more favorable location. In the rearing jar the cases will nearly all be found attached to the muslin cover which the larvæ have previously thickened with a very fine web. The cases are attached by a secretion which seems to be a mixture of cement and silk. I have also found the cases partly buried in the pith of a split-stalk of the food plant with which I had provided them. If nothing occurs to disturb them or to endanger their health they do not usually move from their original position. So far as my observation goes these larvæ do not "feed up" in the spring or summer, though tempted with both fresh and dried food, and yet I have often found them, not only alive but plump and active and able to crawl up the smooth sides of the rearing jar after more than a year's abstinence. Their only preparation for transformation consists in strengthening the anchorage of their cases and in turning around within them to enable the moth to emerge from the posterior or free end.

It is at this crisis that they are most likely to succumb to unfavorable outward conditions. Their peculiar vitality seems to be exhausted and does not suffice for the change to pupæ, hence my inability after repeated experiments, to report success in rearing the perfect insect.

C. lineapulvella Cham., is an equally tantalizing species. I have never found this feeding but have taken the cases in the autumn from the bark of trees and shrubs and only once succeeded in rearing the imago.

I believe this larval longevity to be characteristic only of the seed-feeding species, as I have never observed it in those found on leaves or buds, the latter being usually double brooded.

(P.S.-Since the above notes were offered to the Entomological Club I have the satisfaction of reporting the emergence of two imagines of the species on seeds of *Chenopodium.*

These appeared about the last of September. A few days ago (Oct. 15) on cutting open some of the remaining cases I found one larva still unchanged but apparently healthy.

The species seems closely allied to if not identical with *C. lineapulvella* Ch., though the cases from which I bred the more typical form of the latter were quite different in several respects. The species just reared varies chiefly in the darker ground color of the primaries, which instead of being white is deep buff and in the more profuse dusting of brown scales on the apical third. A more critical examination may disclose other less obvious distinctions. It would certainly add to the testimony against the value of larval characteristics should the two (supposed) species prove identical.)

Prof. Riley says, many species remain for a long time in the larva state. There is a *Thyridopteryx* which can hardly be distinguished from *ephaemeriformis* that lives a full year in the larva state instead of completing its transformations in a few months as *ephaemeriformis* does.

Prof. Lintner remarked that it was surprising how far small larvæ sometimes travelled during their life. *Aspaedisca splenderiferella* on apple, was often so abundant that almost every leaf on a tree showed either a larva or traces of its work. He found the pupa on the leaves, the branches, and on the trunks, even close to the roots. The imago emerged during the latter part of July. He wondered that the larva should travel so far before pupating.

Mr. Smith then proposed as a subject of discussion

"HOW SHALL WE CREATE, AND FOSTER AN INTEREST IN THE STUDY OF ENTOMOLOGY!"

He said he had, during the past year or more, been carefully considering this question, without reaching a satisfactory conclusion. It seems strange that in so large a country, with a fauna offering so many new and interesting forms, there should be so few with a lively interest in Entomology. The youth of this country seem to have no interest in that line, and the question is, could not some interest be created? And, further, how, when created, can this interest be fostered? He has received many letters from collectors of this tenor: How can I determine my insects? What books shall I get? and similar questions. He had not always found it easy to give a satisfactory answer. Many of the gentlemen present were teachers, or in official positions: Can they offer any suggestions?

Prof. Osborn said, one of the first difficulties in the way of interesting students is, that we cannot offer them any profit from the study. They must study something that will enable them to get a living, and Entomology is not one of the branches that offers many advantages in that direction. He teaches Entomology, and creates a temporary interest, which, owing to other serious duties of life, generally dies out, sooner or later.

Prof. Riley said, the matter is an important one, and deserving our careful attention. The question of books, is a serious one, often asked and not satisfactorily answered. There are so many, treating of different groups or part of groups, that it requires a considerable library to study; and this kind of work does not reach the popular mind, and is not what we need. Still we have no reason to complain of the progress of Entomology: compare the state of the science twenty years ago with its present condition, and it offers little to despair of. In the late edition of the

Naturalist's Directory there are more with Entomology in some of its branches after their names, than ever before.

Mr. Smith says that in the May No. of "Ent. Am." he had given a statement of what the Naturalist's Directory showed in this direction, and proved how little the word "*Ent.*" after a name signified in many instances.

Prof. Peabody said that in 1869 this matter came up before him and he has tried to work out its solution for many years. He had projected a popular manual; but the longer he worked, the further off seemed the end. There were two serious difficulties in the way. The first is, that the subject is so large that it is difficult for one man to cover the ground and keep the work within moderate bounds; and the second, that our knowledge of many orders was still too incomplete for such a work which should be simple and comprehensive.

Prof. Underwood thinks we do not necessarily need such a comprehensive work. The most successful manuals in botany, and such as created most interest, where those that treated only a limited group, and a limited fauna. A most useful treatise would be one embracing the insects of the N. E. United States, as there the largest number of those who would be interested in such a work would be found.

Mr. S. W. Allis said, that one drawback is the want of knowledge how a collection should be kept. He has known a number of young men who started enthusiastically, and gathered a large lot of material: suddenly the museum pests appeared and cleaned them out; effectually dampening their ardor. His idea would be to encourage students to collect in special groups. The collections would be smaller, more readily kept, and there would be more apt to be good material amongst them.

Prof. Riley thinks we could never render such a work as has been proposed, popular. We do not want to make collectors, we want students, who will take an interest in the work. There is great difficulty also in getting any order outside of *Coleoptera* and *Lepidoptera* in a popular and yet accurate form, because so little is known of them. After all, in his opinion, Entomologists, like poets, are born, and not made, and unless they have the proper stuff in them, they cannot be made good workers. Referring again to the question of books; he alway recommends: first, Harris Injurious Insects, a classic that will give acquaintance with many common species, as well as a simple classification; second, Kirby and Spence; third, Westwood. He has had in mind an introductory work, to which Westwood would be somewhat the model. He would treat, perhaps, 100 families, taking a type of each, and giving a complete treatise on it, so that the student could gain a knowledge of what classification

meant. Such a work could not have synopses, because that would not be popular.

Prof. Peabody would not recommend Kirby & Spence nor Westwood, for American students. He thinks that a student who could overcome those works, and still retain an interest, would be a born Entomologist, who required no stimulant to interest him.

Prof. Lintner would not recommend Kirby & Spence, nor Westwood. He recommends Harris and Packard. He thinks children are born naturalists, and that synopses, especially if illustrated would be very useful.

Prof. Westcott says he recommends Harris, Packard, and Le Baron's 4th Report, which is excellent so far as it goes; and there were several other reports that would be very useful.

Prof. Riley said there is a difficulty in recommending public documents, because they are not readily obtainable in the ordinary course of trade.

Prof. Osborn thinks personal contact among Entomologists the best way to create and sustain interest in the study.

Further discussion brought forth no new suggestions, though many minor difficulties in the way of producing a popular and yet valuable work were discussed.

On motion of Prof. Underwood the club then adjourned, to meet again under the rules, at the next meeting of the A. A. A. S.

JOHN B. SMITH, Secretary.

The systematic position of the genus Triprocris *Grt.*

By H. B. Möschler, Kronförstchen near Bautzen.

I published in Stettiner Entomologische Zeitung, 1885, p. 203 etc., a treatise on Mr. Smith's Notes on the systematic position of some North American Lepidoptera and assented to this author's view, that none of the genera, placed in the family *Zygænidae* by several North American authors, belong to it; but there were a few genera unknown to Mr. Smith and myself and *Triprocris* is among them. Since that time, Mr. Neumögen was kind enough to send me a fine specimen of *Triprocris Smithsonianus* Clem., collected in Texas, and I will give my view on the systematic position of this species, stated by an exact examination of my example.

In size this species is similar to the species of the genus *Ino* Leach, and the body, especially the antennæ, shows a metallic hue like those species.

Antennæ with bases approached, much shorter than the body, rather deeply pectinated in the ♂. Palpi very minute, scaled, drooping, terminal joint acute. Tongue very short. Eyes large, rather prominent, naked. Head free, rather small, scaled, with ocelli. Thorax longer than wide, scaled. Abdomen rather cylindrical, finely scaled, shortly and indefinitely tufted at the sides, much exceeding the hind wings.

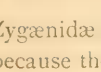
Legs slender, finely scaled, hind tibiæ with two apical spurs. Fore wings longer than the body, narrow, rounded at the tip. Hind wings narrow, rounded at the tip.

Neuration of the fore wings. Discoidal cell $\frac{2}{3}$ of the length of the wing, obtuse at the end, divided; subcostal vein four-branched, two nervules before the end of the cell, two behind it, near to each other. Two discoidal veins. Median vein four-branched with nervules nearly equidistant. Two internal veins.

Neuration of the hind wings. Discoidal cell rather longer than half the wing. Costal vein wanting, subcostal vein two-branched at the end of the cell, one discoidal vein, median vein three-branched, the nervules nearly equidistant. Three internal veins.

In my paper a specimen is mentioned as unknown to me and belonging presumptively to *Triprocris*.

At present, I am sure, that it belongs to this genus, in spite of a little difference of the neuration of the hind wings; but I am doubtful whether it is the female of *Tr. Smithsonianus* or another species. A comparison of my figures will illustrate the difference. (Upper figure *Smithsonianus*, lower figure sp?)



With regard to the systematic position of the genus *Triprocris*, there is no doubt that it belongs neither to the family of Zygænidæ nor to the Syntomidae. It cannot belong to the first family because the costal vein of hind wings is wanting, and as it has two internal veins of the fore wings this genus cannot be placed with the Syntomidæ. It can only belong to the family Pyromorphidæ H. Sch., with the genera *Pyromorpha* H. Sch. and *Harrisina* Pack.; for the genera belonging to this family, are distinguished by two internal veins of the fore wings and want of the costal vein of the hind wings.

I was thus able to examine all the genera of North American Zygænidæ, except *Pseudalypia* Edw., *Horama* Edw., *Edwardsia* Nmgn., and *Penthetria* Hy. Edw., and I must again confirm that Mr. Smith's view that neither of them belong to the Zygænidæ is perfectly right.

The breastbone of the larva of Cecidomyia homologous to the labium.

By Dr. H. A. Hagen.

The gall of *Cec.* (*Caryae*) *tubicola* Sacken, is solid at the darker tip: the two basal thirds possess an elongated cavity, filled but not densely with some irregular webbing, the threads being very fine. The comparatively very small larva has an amber-yellow breastbone; its free part resembles a small tooth of a shark, which joins somewhat abruptly a longer and broader basal ovoid part. Near this part are situated saussage-like vessels; two of them connected with the larger part of the breastbone, just before the free pointed apical part. These vessels have a dull ashy-gray appearance, similar to spinning vessels, are 0,003 mill. thick, with a thinner end attached nearly together on the ventral side. The ventral side of the free part of the breastbone is concave at its base, where it is included in the body, and even on the not included part some fine striæ are to be seen. If this is, as I believe it to be, an organ for spinning, the breastbone is homologous with the labium. I should remark that *C. tubicola* is till now the only species, known to me, to spin; but probably there exist many more.

Society News.

Brooklyn Entomological Society. February 2, 1885. — Twenty persons present, the president in the chair. Mr. Hulst gave some general notes on the classification of the Geometridæ, based on the studies thus far made by him, and urged the collection of larvæ and the breeding of the species, as the only way to obtain a thorough knowledge of the geometrid fauna of any locality. Mr. Weeks gave some of his experiences with the larvæ of this family, noting that the larva of *Endropia marginaria* hibernated without making special efforts to secure comfortable or warm quarters for the winter.

A discussion on methods of collecting and raising larvæ in which severa members took part, closed the evening.

Entomological Society of Washington. February 11, 1886. Mr. Howard read a note from Prof. Riley in relation to the food habits of the larva of *Fenesica tarquinius*, in which he stated that he had for some time had in his notes, the records of observations by Mr. Pergande, who had found the larva actually feeding on the following species of Aphididæ: *Pemphigus fraxinifolii*, *Schizoneura tesseleata*, and *Pemphigus imbricator*. The last named species is the species referred to by Mr. Johnson and Mr. Lugger at the last meeting.

Mr. Howard read a paper on the Chalcid genus *Podagrion*, peculiar, because it unites the characters of several families, and is parasitic on *Mantis* eggs. He particularly described the method of oviposition through the hard covering of the egg masses. Mr. Lugger states that at one period of its development the embryo of *Mantis* shows 4 pairs of legs. Mr. Howard also mentioned that a

specimen of *Lasioderma serricorne* has been found alive in Pyrethrum powder which was still strong enough to kill cockroaches.

Mr. Lugger exhibited a pattern of a new aquarium which is very convenient for rearing and observing all sorts of aquatic larvæ &c. It can be hung on the wall like a picture, and readily connected with the water pipe, so that a steady flow of water of any desired strength can be maintained.

Mr. Smith read a translation and abstract of a recent paper on the odor giving structures of the males of Lepidoptera, commenting favorably on the same, and citing instances confirmatory of the views advanced, i.e. that they were secondary sexual characters, the odor proving agreeable to the ♀. Mr. Schwarz said that among the many forms of secondary sexual characters in the Coleoptera, some would likely found analogous in function to those in the Lepidoptera. He referred more particularly to the tufts of hair on the mentum of *Trogosita*, and those on the ventral segments of the ♂ in *Dermestes*. Differences in the vestiture of the sexes are known to occur: e.g. *Hoplia* where the ♂ has scales, and the ♀ only hairs; but in this case it is hardly possible that we have to do with odoriferous organs.

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ERRATA.

P. 6, line 5, for bifaris, read biforis.
P. 7, " 17, for carmata, read carinata.
P. 8, " 17, for rusticalis, read verticalis.
P. 24, " 16, for *Phytoconidæ*, read *Phytocoridæ*.
P. 25, " 30, for **Penlatomidæ**, read **Pentatomidæ**.
P. 27, " 7, for *Abyrodidæ*, read *Aleyrodidæ*.
P. 52, " 22, for The, read This.
P. 60, " 29, for given, read giving.
P. 74, " 5, for perverous, read perversus.
P. 98, " 13, for some ago, read some time ago.
P. 103, " 9, from bottom, for enclosed, read inclined.
P. 117, " 7, between is, and strikingly, insert a.
P. 117, " 22, for *Onodontota*, read *Odontota*.
P. 119, " 7, for through, read though.
P. 143, " 22, for *Poldesmus*, read *Polydesmus*.
P. 155, " 11, from bottom, for legs, read wings.
P. 160, " 34, for *orizava*, read *orizaba*.
P. 172, " 12, for *Phœogmes*, read *Phœogenes*.
P. 188, " 15, from bottom, dele to, before "each".
P. 209, " 6, for J. A. Cook, read A. J. Cook.

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