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The Canadian Entomologist.

VOL. XXIV.

LONDON, APRIL, 1892.

No. 4.

NOTES ON NORTH AMERICAN TACHINIDÆ, WITH DESCRIPTIONS OF NEW GENERA AND SPECIES.—PAPER V.

BY C. H. TYLER TOWNSEND, LAS CRUCES, NEW MEXICO.

Loewia ruficornis, n. sp., ♂.

Eyes cinnamon brown; frontal vitta brown, much narrowed posteriorly, front at narrowest point about one-half its width at vertex; sides of front, sides of face and facial depression black, thinly silvery-pollinose; cheeks blackish posteriorly, thinly silvery, the pregenal area very broad, brown, extending upward between sides of face and facial depression; antennæ and arista rufous, third antennal joint little more than one and a half times as long as second, with a somewhat darker shade on outer side; proboscis brownish, palpi rather fuscous, tips rufous; occiput black, black-hairy. Thorax and scutellum shining black, black-hairy and bristly. Abdomen shining dark metallic-green; second segment with a median marginal pair of macrochææ, third with six or more marginal, anal with about six marginal; hypopygium rather exerted, concolorous. Legs black, knees slightly rufous, front femora bristly; claws and pulvilli elongate, pulvilli smoky-whitish. Wings slightly grayish, nearly hyaline, costo-basal portion and veins golden; tegulæ rather smoky-golden, translucent; halteres clear yellow.

Length of body, $6\frac{1}{2}$ mm.; of wing, $5\frac{1}{2}$ mm.

Described from one specimen; Constantine, Mich., August 27. This species seems to connect the genera *Loewia* and *Ennyomma*. The species of *Loewia* usually have the eyes contiguous in the male, while in this species they lack considerably of meeting, and the apical cell, though it cannot be said to be open, is rather widely closed in margin, if the expression may be allowed. In *Ennyomma* the apical cell is open.

Loewia nigrifrons, n. sp., ♂.

Differs from *L. globosa* Twms. (Ent. News, III.) as follows: Sides of front and sides of face shining black, not silvery; facial depression slightly silvery; pregenal area light-brownish; proboscis and palpi blackish,

Wings smoky golden, all except internal border; tegulæ golden fuscous, halteres concolorous.

Length of body, 5 mm.; of wing, $4\frac{1}{2}$ mm.

Described from one specimen; So. Illinois (Robertson).

Ennyomma distoides, Twms. Trans. Am. Ent. Soc., XVIII, p. 371.

A ♂ specimen from So. Dakota (Aldrich), August 12. Measures $7\frac{1}{2}$ mm.

Clista americana, n. sp., ♀.

Eyes brown; frontal vitta dark brown, blackish, averaging one-third width of front, front averaging one-third width of head; sides of front, sides face and facial depression black, thinly silvery-pollinose; cheeks posteriorly black, thinly silvery, rest included in the large brown pregenal area, an angle of which runs upward between sides of face and facial depression; sides of face fringed with bristles on inner border, cheeks on lower border; antennæ entirely rufous, third joint about twice as long as second, arista brownish; proboscis and palpi brown or blackish, the proboscis fleshy, not as long as height of head, the palpi curved and thickened at tip; occiput black, black-hairy. Thorax and scutellum shining black, the thorax in front slightly silvery, leaving three black vittæ which become lost near suture. Abdomen shining black, with a hardly greenish reflection, broad, flattened, rounded; first two segments with a lateral and a median marginal pair of weak macrochætæ; third with about eight marginal, and anal about six marginal macrochætæ of normal size. Legs black, claws and pulvilli only a little elongate, pulvilli smoky-yellowish. Wings grayish-hyaline, base and veins yellow; tegulæ brassy-yellow, front scales white on outside, the rest transparent; halteres yellow, tinged with rufous toward base.

Length of body, $6\frac{1}{2}$ mm.; of wing, $5\frac{1}{2}$ mm.

Described from one specimen; So. Illinois (Robertson).

Tryphera americana, n. sp., ♀.

Eyes bare, brownish; front more than one-third width of head, frontal vitta velvety brown; frontal bristles descending to base of third antennal joint, vertical bristles strongest, and with three next pairs directed backward, two orbital bristles; sides of front shining black; facial depression and sides of face black, somewhat silvery, epistoma pale luteous; cheeks shining black, anteriorly somewhat rufous; facial ridges bare; vibrissæ decussate, inserted on oral margin; antennæ rufous, more or less blackish, third joint blackish-brown in some lights, fully two and one half times as long as second, somewhat widened; arista brown, 3-jointed, often some-

what geniculate, second joint slightly elongate; proboscis short, fleshy, dark brown; palpi yellow, a little thickened at tip; occiput shining-black, somewhat bristly. Thorax, scutellum and abdomen wholly shining greenish-black, scutellum with a weak apical decussate pair of bristles, a sub-apical decussate (?) pair of macrochætæ, and two lateral pairs. First abdominal segment with one or more lateral macrochætæ; second with a lateral marginal one, a lateral discal pair, a median discal and a median marginal pair; third with a lateral discal pair, three lateral marginal ones, a median marginal and a median discal pair; anal segment with a discal row and a few marginal macrochætæ. Legs black, claws and pulvilli short. Wings grayish-hyaline, basal portion and costal border yellowish, with small costal spine, third vein bristly at base; apical cell closed in tip of wing, fourth vein curved, hind cross-vein nearer curve; tegulæ pale tawny, halteres brownish.

Length of body, $3\frac{1}{2}$ mm.; of wing, 3 mm.

Described from one specimen; So. Illinois (Robertson).

Tryphera polidoides, n. sp., ♀.

Eyes light brown, thinly hairy; frontal vitta light brown; apparently three orbital bristles amongst other weaker bristles; sides of front shining black; sides of face and facial depression black, thinly silvery, epistoma paler; cheeks and occiput shining black, with slight greenish lustre, hairy, cheeks bordered anteriorly with a narrow brownish prægenal area; antennæ and arista black, first two antennal joints rufous, third joint about three times as long as second, moderately wide; proboscis brownish, palpi yellowish. Thorax, scutellum and abdomen dark metallic green; first segment with a lateral marginal macrochæta; second with a lateral discal and marginal one, or pair, and a median discal and marginal pair; third with a lateral discal and median discal pair, and a quite distinct marginal row; anal with a discal and marginal row. Legs blackish, claws and pulvilli only a little elongate, pulvilli tawny-whitish. Wings slightly grayish, nearly hyaline, veins yellow, third vein spined at base; tegulæ dull whitish, translucent; halteres brownish.

Length of body, $5\frac{1}{2}$ mm.; of wings, $3\frac{2}{3}$ mm.

Described from one specimen; N. Y. (Comstock).

CLISTOMORPHA, n. gen.

Much the general form of *Clista*, but greatly resembling *Hyalomyia* in the form of the head. Belongs in *Phytoinae*. Head in general profile triangular, the fronto-facial profile sinuate in outline, bulging above. Front not prominent, very narrow in ♂, the eyes closely approximated in

front of ocelli but not contiguous, front a little widened at vertex, more so at base of antennæ, face widening at same angle, about one-half width of head at widest which is the lowermost portion; frontal bristles weak, in single row, terminating at base of antennæ, directed forward and inward, decussate, except vertical bristles which are directed backward and hardly stronger than the others; no orbital bristles (δ). Face not receding, rather advancing, nearly perpendicular, epistoma prominent, oral profile long; facial depression about four-fifths width of face, rather triangular in outline, very shallow; facial ridges bare except some very small bristles just above vibrissæ, only a very little constricted a good distance above oral margin where the weak non-decussate vibrissæ are situated, the latter being distinct from the shorter bristles below which make up the uniform row on the cheek borders; sides of face very narrow, bare; cheeks very narrow, bare. Eyes bare, descending far below vibrissæ and about as low as oral margin. Antennæ inserted nearly on a line drawn through middle of eyes, short, about three-fifths length of face, third joint hardly longer than second, elongate-round; arista bare, apparently only 2-jointed, basal joint short, terminal joint thickened at base. Proboscis nearly as long as height of head, rather slender, labella somewhat developed; palpi small, slender, filiform, but slightly thickened at tip. Thorax not so wide as head; scutellum with an apical decussate, and two lateral pairs of macrochætæ. Abdomen rather wider than thorax, much rounded, somewhat flattened, but convex above, first segment not shortened; macrochætæ weak, discal and marginal; hypopygium concealed. Legs not long, not stout, very little bristly, claws and pulvilli of δ only a little elongate. Wings much longer than abdomen, without costal spine, third vein without bristles at base; apical cell closed in border at tip of wing, fourth vein curved, apical cross-vein nearly straight; hind cross-vein nearly straight, about in middle between small cross-vein and bend of fourth. Type *C. hyalomoides*, n. sp.

Clistomorpha hyalomoides, n. sp., δ .

Eyes cinnamon brown; frontal vitta velvet-black, narrowed posteriorly; sides of front, face and cheeks silvery-pollinose; antennæ and arista blackish, second antennal joint more or less brownish; proboscis brown, palpi pale tawny; occiput black, silvery below. Thorax soft black, humeri broadly silvery-cinereous, continued backward on sides of thorax to scutellum, pleuræ silvery; scutellum black. Abdomen black; second segment narrowly at base and with median line, third more broadly at base and broadest on sides and in middle, and anal almost

wholly except tip, silvery cinereous; macrochaetae weak and more or less bristle-like, first segment with a median marginal pair, second with a median discal and marginal pair, third with a median discal pair and a marginal row, anal with a marginal and two discal rows. Legs blackish, femora more or less brown, claws and pulvilli but little elongate. Wings grayish-hyaline, very faintly tawny at base, veins brownish; tegulae smoky yellowish-gray; halteres rufous, knobs flesh-coloured.

Length of body, $5\frac{1}{2}$ mm.; of wing, $4\frac{1}{2}$ mm.

Described from one specimen: N. Y. (Comstock).

Phyto senilis, n. sp., ♂.

Eyes brown; frontal vitta velvet-blackish; sides of front black, more or less silvery-pollinose; face and cheeks blackish, silvery-pollinose; antennae and arista blackish, first two antennal joints rufous, sometimes also base of third; third joint hardly one and one-half times as long as second; proboscis brown, palpi yellow; occiput blackish, black-hairy. Thorax and scutellum shining black, with an opaque more or less distinct median pair of vittae lost at suture. Abdomen black, hairy; first three segments with a marginal row of macrochaetae, anal segment tipped with weaker ones; hypopygium rather exerted. Legs black, femora hairy, tibiae bristly, claws and pulvilli elongate, pulvilli tawny fuscous. Wings grayish-hyaline, basal portions and veins pale tawny; costal border of wing swollen on second costal cell, costa drawn in at termination of auxiliary vein; tegulae whitish, margins yellow; halteres blackish.

Length of body, $6\frac{1}{2}$ mm.; of wing, $5\frac{1}{2}$ mm.

Described from one specimen; N. Y. (Comstock).

Macquartia johnsoni, n. sp., ♂.

Eyes light brown, rather thickly hairy; frontal vitta black, about one-third width of front, narrowing behind as front grows narrower, the front about one-third width of head before; frontal bristles strong, not descending below base of antennae, three posterior pairs directed backward, decussate except second pair divergent, others directed forward and decussate; two orbital bristles; vertex golden; sides of front, face and cheeks silvery-white, not hairy nor bristly; facial ridges bare, vibrissae strong, decussate, inserted on oral margin; antennae blackish, first two joints and base of third rufous, third joint about two and a half times as long as second; arista blackish, pubescent basally; proboscis blackish, labella and palpi rufous yellow; occiput silvery or brassy pollinose, golden above, thickly gray hairy. Thorax brassy-golden pollinose, with two median vittae which

become obsolete about half way between suture and scutellum, and a heavier lateral vitta which is interrupted at suture; scutellum brassy pollinose. Abdomen shining black, bases of second to anal segments broadly silvery pollinose with a brassy tinge, also sides of first segment; first segment with a lateral macrochæta and bristles, and a median marginal pair; second with a lateral one, and a median marginal and discal pair; third with a median discal pair and a marginal row of about eight; anal segment with a discal and marginal row. Legs black, tibiæ rufous, bristly, femora silvery on outside, claws and pulvilli quite elongate, pulvilli yellowish. Wings grayish hyaline, tegulæ whitish, halteres yellowish.

Length of body, $8\frac{1}{2}$ mm.; of wing, 7 mm.

Described from one specimen; Penna. (C. W. Johnson).

Polidea americana, n sp., ♂.

Eyes nearly black, pubescent; frontal vitta black, one-third width of front, front one-third width of head; one orbital bristle on left side, none on right; frontal bristles descending below base of third antennal joint; sides of front shining dark green as far down as lowest frontal bristles; sides of face and facial depression silvery-pollinose; cheeks and occiput shining dark green; antennæ and arista deep black, third antennal joint wide, two and a half times as long as second; proboscis brownish, palpi pale rufous, darker at base. Thorax, scutellum and abdomen dark metallic green; first segment with a lateral marginal macrochæta amongst other bristles; second with a median discal and marginal pair, and a lateral marginal and discal one, or pair; third with a median discal and lateral discal pair, and a marginal row; anal with a discal and marginal row; hypopygium somewhat brownish. Legs black, knees hardly rufous, claws and pulvilli only a little elongate. Wings slightly grayish, nearly hyaline, veins yellow, third vein spined nearly or greater way to small cross-vein; tegulæ nearly white; halteres rufous, knobs black.

♀. Differs as follows:—Frontal width about the same, two orbital bristles (only one on right side in one specimen); third antennal joint not widened. Claws and pulvilli not quite so long; front tarsal joints widened.

Length of body, ♂ 6 mm., ♀ $5\frac{1}{2}$ to $5\frac{2}{3}$ mm.; of wing, ♂ 4 mm., ♀ $4\frac{1}{3}$ to $4\frac{1}{2}$ mm.

Described from one male and two females; Constantine, Mich., August 24. I have also a ♂ from Orono, Maine (Harvey), which I doubtfully refer to this species. It has no orbital bristles, and the apical cell is very narrowly open. It measures $5\frac{1}{3}$ mm.

CLERCK'S ICONES.

BY W. J. HOLLAND, PH.D., D.D.

Under the title "*Icones Insectorum Rariorum cum Nominibus eorum trivialibus, locisque e C. Linnæi Arch: R: et Equ: Aur: Syst: Nat: allegatis,*" Charles Clerck, a member of the Royal Academy of Sciences of Upsala, commenced the publication at Stockholm, in the year 1759, of a series of plates intended to illustrate the species of exotic lepidoptera recently named by his distinguished fellow-countryman, the immortal Linnæus.

About a month ago I received from Mr. Felix Dames, the well-known bibliophile of Berlin, a letter informing me that he had succeeded in securing a remarkably fine copy of this exceedingly rare work, which he held at my disposal. I immediately cabled to him that I would become its purchaser. But six or seven copies of the book are known to be in existence, and not all of these in perfect state. The one I own, which has just come into my hands, and which is the only copy which has ever crossed the Atlantic, is in superb condition, and enjoys the distinction of being, with the exception of the copy in the library of the Royal Academy of Sciences at Stockholm, the only example in which there are the plates, so far as published, of the Third Section of the work which Clerck did not live to complete. He died on July 22nd, 1765.

Hagen, in his *Bibliotheca Entomologica*, states that the work consists of two sections, the first of which, in addition to the title page and dedication, has eight pages of Swedish and Latin text, together with sixteen plates; and the second, in addition to the dedication, contains three pages of text, thirty-eight plates, and an index of three pages. The copy lying before me contains, in addition to the parts described by Hagen, seven plates, numbered from 4 to 10, of which the first two are coloured, and the next to the last (pl. 9) is partly coloured.

The extreme rarity of the book is well known to lepidopterists. Gottlob Wilhelm, in his "*Unterhaltungen,*" *Ins. II.*, page 16, published in 1779, is quoted by Strecker in his "*Butterflies and Moths of North America,*" p. 218, as having described the work in the following terms:—"Fifty-five pages large 4to, a simple register, together with a dedication and preface, compose the whole work, which, at auction, was sold for 600 Swedish dollars." Hagen tells us that the book was distributed by the Queen of Sweden in the form of presentation copies, and that it

was never put upon the market, and hence became scarce. Linnæus, in his *Systema Naturæ* I., ii. p. 535, speaks of it in laudatory terms as "*Clerckii icones insectorum, pulcherrimum opus, quod etiamnunc vidit orbis literatus.*" Prof. Zeller, in the *Stettiner Entomologische Zeitung*, Vol. XIV., p. 199, after describing at length the longing desires he had felt to get a glimpse of the work, and how at last, through the kindness of Alexander von Humboldt and the Librarian of the Royal Library at Berlin, the wish had been gratified, and how it happened at the same time that he was allowed the use of a mutilated copy belonging to Dr. Herrich-Schaeffer, of Regensburg, goes on to state his disappointment with that part of the work which is devoted to the illustration of the European Geometridæ and Pyralidæ. He says:—"*Welches war aber der Eindruck, den das pulcherrimum opus, als ich es nun endlich vor Augen hatte, auf mich machte? Hatte ich auch keine Bilder wie in British Entomology oder wie in der Exploration Scientifique de l'Algerie erwartet, so wusste ich mir doch nicht sogleich Rechenschaft zu geben, wie Linné so jaemmerliche Materieen fuer etwas so Herrliches erklæaren konnte. Das ergab sich denn wohl, dass nicht die Abbildungen Europæischer Nachtfalter sondern die der grossen, bunten Exoten Linnés Augen bestochen und ein so viel sagendes Urtheil hervorgerufen hatten.*" While it is undoubtedly true that the figures of the smaller forms are measurably disappointing, and are not to be for a moment compared with the splendid productions which have come to us in recent years from the press of Europe and America, yet as a whole they compare very favourably with the illustrations given in many of the works of the older authors. They are equal to those given in Drury's illustrations, and are vastly superior to the great majority of the figures given by such an author as Cramer. Zeller calls attention to the fact that there are differences in the two copies which he had under his eye at the time he wrote his critique, due to the work of the colourist. The uncoloured plates in the copy before me explain the manner in which these variations came to take place. The figures prepared by the engraver were simply outlines done in copperplate, and all of the shading, as well as the colouring, was left to the artist who wielded the brush, and who can have had nothing to guide him in his work except the original drawings, or the insects themselves. Under the circumstances it is very plain that minor discrepancies must have inevitably occurred.

The North American insects figured in the work are the following:—

Papilio glaucus, *P. asterias*, figured under the name *P. Ajax*, *Victorina steneles*, *Colæris dido*, *Gyæncia dirce*, figured under the name *Papilio bates*, *Agraulis vanille*, *Danaïs plexippus*, *Deiopeia ornatrix*, *Samia cecropia*, *Pachylia ficus*, *Erebûs odorata*, (*sic*), *Actias luna*, *Nyctalemon lunus*. The latter is common in Jamaica.

The insects figured in the supplementary plates which are found in my copy, and to which there is no reference made by Kirby in his Synonymical Catalogue, are the following:—

PLATE 4.

Fig. 1,	<i>Papilio (Argynnis) niphe.</i>	2 figs.	Upper and lower sides.
" 2,	" (<i>Precis</i>) <i>almana</i> , vera.	2 figs.	" "
" 3,	" (<i>Grapta</i>) <i>c-aureum</i> .	2 figs.	" "
" 4,	" (<i>Junonia</i>) <i>ænone</i> .	2 figs.	" "

PLATE 5.

Fig. 1,	<i>Papilio (Danaïs) plexippus.</i>	2 figs.	Upper and lower sides.
" 2,	" (<i>Danaïs</i>) <i>chrysippus</i> .	2 figs.	" "
" 3,	" (<i>Precis</i>) <i>almana</i> , XXX.	2 figs.	" "
(This is the wet season form known by authors as <i>P. asterie</i> , L.)			
" 4,	<i>Papilio (Neptis) leucotoe (sic)</i> . (<i>Athyma</i>)	4 figs.	Upper and lower sides.

(The two left hand figures represent *Neptis leucothoe*, and the two right hand figures represent *Athyma perius*, which has been confounded by synonymists with the preceding species, which in turn has been unaccountably given by Kirby, who refers to Cramer's figure as a synonym for *N. aceris*, Lep. *Neptis leucothoe*, figured in Cramer, and in the uncdited plate of Clerck, whose figure is a good one, is a Celebesian insect.)

PLATE 6.

(Uncoloured.)

Fig. 1,	<i>Papilio Demoleus.</i>	2 figs.	Upper and lower sides.
" 2,	" <i>Ægistus</i> .	2 figs.	" "
" 3,	" (<i>Delias</i>) <i>pasitea (sic)</i> .	2 figs.	" "
" 4,	" (<i>Terias</i>) <i>hecabe</i> .	3 figs.	" "

(Two forms of this species are given, one with the black marginal border not quite as broad, nor as deeply sinuate inwardly as the other.)

PLATE 7.

(Uncoloured.)

Fig. 1, *Papilio (Melanitis) leda*. 4 figs. Upper and lower sides.

(The two upper figures represent the form in which the falcation of the primaries is most noticeable, and in which the outer margin of the secondaries is freely produced at the extremity of the third submedian. It may be that the figure was drawn from an African specimen, in which case the form *Banksia* is probably intended to be represented. The lower of the two figures represents a smaller form in which the falcation of the primaries is scarcely perceptible, and the secondaries are rounded posteriorly and not produced. I have such specimens of *Leda* in my collection from Perak and from Kumaon.)

Fig. 2, *Papilio (Precis) lemonias*. 2 figs. Upper and lower sides.

" 3, " (*Mycalesis*) *mineus*. 2 figs. " "

" 4, " (*Cynthia*) *alimena*. 2 figs. " "

(This is not *Hypolimnias alimena*, of which a good figure is given on plate 32, but undoubtedly represents *Cynthia deione*. *Alimena*, Clerck, must therefore be added to the synonymy of that species. Fig. 5 unnamed, but easily recognizable as *Junonia atlites*.)

PLATE 8.

(Uncoloured.)

Fig. 1, *Papilio Memnon*. 2 figs. Upper and lower sides.

" 2, " (*Euplaea*) *midamus*. 4 figs. " "

(The two lower figures may represent *E. midamus*, but they have not the exact form of that species, and are too large. There is nothing but an outline. The two upper figures seem to represent *E. Core*.)

PLATE 9.

(Partly Coloured.)

Unnamed, but a fairly good figure of *Attacus atlas*.

PLATE 10.

(Uncoloured.)

Fig. 1, *Papilio Agamemnon*. 2 figs. Upper and lower sides.

(The tailed form of this species.)

Fig. 2, *Papilio*, unnamed.

(The cuts represent the upper and under sides of a specimen of *Papilio Antiphates*, Cram., the tails of which have been cropped off with a scissors. The outline faithfully reproduces the mutilation, so as to render it recognizable by any one familiar with the species.)

Fig. 3, *Papilio panope*. A good outline of the upper and under side of this species.

The only commentary upon the Icones of Clerck which I have been able to find is embodied in the papers of Prof. Zeller, alluded to already in this article, and a paper by Herr Werneburg, published in the Stettiner Entomologische Zeitung for the year 1856, in which the writer undertakes to solve some of the problems as to synonymy, which he regards Prof. Zeller as having left untouched. These all, however, as the comments of Prof. Zeller likewise, relate to the European micro-lepidoptera figured in the work. I may at a later date furnish a paper upon the synonymy of the exotic micro-lepidoptera, in regard to which plainly something remains to be said.

Chancellor's Office, Western University of Pennsylvania.

Feb. 2, 1892, Pittsburgh.

HERMAPHRODITE GYPSY MOTHS.

BY C. H. FERNALD, AMHERST, MASS.

Two specimens of this moth (*Ocneria dispar*, L.) were taken in Medford, Mass., last summer, which are what Ochsenheimer called perfect Hermaphrodites. One is much larger than the other, having an expense of 52 mm., and has the right half of the body, with the wings and antennæ of that side, of the form, colour and markings of the female, while the left side of the body, with its wings and antennæ, are male. The other example has a wing expanse of 39 mm., and is a male on the right side and a female on the left. In both specimens the frenulum is single on the male side, but divided on the female.

As the sexes of this moth differ so strongly in the form and colour of the wings, and in the pectinations of the antennæ, an Hermaphrodite is a remarkable insect to look at, and seems almost to suggest that it is a work of art.

Hermaphroditism in this species is occasionally met with in Europe, several cases being on record in the European journals.

A CLASSIFICATION OF THE NORTH AMERICAN SPIDERS.

BY NATHAN BANKS, WASHINGTON, D. C.

The author has frequently been asked why he did not make a key for the families of spiders. He has answered that a correct key was impossible. But as such questions are getting more numerous, and connected with a desire to know something about spiders, the author has decided to put together what he could as a contribution to the classification of our spiders, principally for the use of those who are unable to obtain the costly works necessary for study.

I shall consider the family the highest group separated by definite characters; not but what certain families possess transition forms, but that the groups higher than the families are not defined by definite characters, but by tendencies. Two groups above the families I shall recognize, the higher the division, the lower the section; the section embracing certain families, the division one or more sections. To these I shall not attempt to make a key, but only designate their general characters and the families which they embrace. In the key for the families I shall be arbitrary; but in the system which follows I shall try to indicate the natural affinities.

The classification of spiders is difficult because of the few characters that can be used. This is not often understood by those who study insects. Let the entomologist cut off from his insect the wings, the antennæ, one pair of palpi, unite the abdominal segments, obliterate all sutures, and how many characters will he have left! Yet even then he will have far more than the student of spiders can find in his subject.

A few words in explanation of the characters used in the key. The body of a spider is very definitely divided into two parts—the anterior, the cephalothorax; the posterior, the abdomen. Upon the anterior part of the cephalothorax are the eyes; the region they occupy is called the eye region. The eyes are arranged in transverse rows; abbreviations referring to them are frequently used, as S. E. side eyes; A. E. anterior eyes; P. E. posterior eyes; M. E. middle eyes; from these are made compounds, A. S. E. anterior side eyes, etc. Dark coloured eyes are diurnal, light coloured eyes are nocturnal. The region between the anterior row of eyes and the anterior or clypeal margin of the cephalothorax is called the clypeus or fillet. A groove on the meson toward the posterior part of the cephalothorax is called the median groove. There are more or less distinct furrows extending from the groove to the sides,

these are the radial furrows ; the region of the cephalothorax between the anterior pair and embracing the eye region is called the head or pars cephalica. The mandibles are the anterior pair of mouth-parts ; they are two-jointed, the second joint being called the fang, and furnished with the opening of the poison gland. The maxillæ form the second pair of mouth-parts ; to the sides of the maxillæ are attached the palpi, which in the adult male have the terminal joint peculiarly modified for sexual purposes. Between the maxillæ and articulated to the sternum is the lip. The sternum is the ventral plate of the cephalothorax, the entire region between the base of the legs. The legs, of four pairs, are numbered from before backward, I., II., etc. The legs are seven-jointed ; the joints are called, beginning at the most basal, coxa, trochanter, femur, patella, tibia, metatarsus, and tarsus ; in a few peculiar groups there is an eight joint, the onychium. At the end of the tarsus, or onychium if present, are two claws, equal in size ; below and between them is frequently a third, smaller and more curved. The claws may be furnished with teeth, and are called dentated. Sometimes under the two larger claws, in place of a third, is a dense brush of hairs called a scopula. The abdomen is joined to the cephalothorax by a slender pedicel. At, or near, its extremity on the under side or venter are the spinning organs called spinnerets ; these are of three pairs, the middle pair smaller and concealed by the other two. The spinnerets are probably always two-jointed, but in some spiders one pair is very prominently so. At the base of the lower pair of spinnerets is sometimes a transverse surface provided with spinning tubes ; this is called the cribellum. Complementary to this in function is a row of stiff hairs or bristles on the posterior metatarsi called the calamistrum. Near the base of the spinnerets is a pair of stigmata, which are sometimes placed much more anteriorly, even nearer the basal than the distal end of the abdomen. When so situated there is formed a transverse ridge or fold on the venter. Near the base of the venter is a pair of transverse slits ; these are the lung-slits. In some spiders there are two pairs. Between them on the median line is the opening of the genital organs ; in the female called the epigynum. Its structure, together with the structure of the male palpal organ, is of utmost importance in the determination of species.

Because of certain peculiarities, I shall treat the cave forms separately in the key. The characters of the families as indicated in the system should be used in connection with the key.

KEY TO THE FAMILIES OF SPIDERS OF THE U. S.

- 1 { Fang moving vertically, usually two pairs of lung slits..... 31
 { Fang moving horizontally, but one pair of lung slits..... 2
- 2 { Cave species..... 3
 { Not cave species..... 5
- 3 { Six eyes, in three groups of two each, body round..... *Dysderidæ*
 { Eyes not so arranged, body more elongate..... 4
- 4 { Two claws to tarsi..... *Clubionidæ*
 { Three claws to tarsi..... *Theridiidæ*
- 5 { Eyes six..... 6
 { Eyes eight..... 9
- 6 { A pair of stigmata just caudad of the lung slits..... *Dysderidæ*
 { No stigmata close to lung slits..... 7
- 7 { The six eyes in three groups of two each..... *Scytodidæ*
 { The six eyes in two groups of three each..... 8
- 8 { Legs very long and slender..... (*Spermophora*) *Pholcidæ*
 { Legs short..... (*Neophanes*) *Dictynidæ*
- 9 { Cephalothorax produced in front of pars cephalica, which is very small,
 maxillæ closely surrounding the lip, mandibles small, cephalo-
 thorax roundish..... 10
 { Not such spiders..... 12
- 10 { S. E. touching..... *Pholcidæ*
 { S. E. separated, P. S. E. and P. M. E. touching..... 11
- 11 { Apex of abdomen surrounded by a circle of bent hairs.... *Urocteidæ*
 { Abdomen without such hairs..... *Filistatidæ*
- 12 { Eyes equal or subequal, often dissimilar *, more or less in two rows
 variously curved, forming a group much wider than long.... 20
 { Eyes unequal, similar, in three or four rows, forming a group almost
 as long or longer than wide..... 13
- 13 { With a calamistrum and cribellum..... (*Hyptiotes*) *Uloboridæ*
 { Without calamistrum or cribellum..... 14
- 14 { Largest eyes in anterior row..... 15
 { Largest eyes not in anterior row..... 16
- 15 { Eyes in three rows..... *Attidæ*
 { Eyes in four rows..... *Lyssomanidæ*
- 16 { Two claws to tarsi, only two eyes in anterior row..... *Ctenidæ*
 { Three claws to tarsi..... 17

* Dissimilar = eyes of two colours, dark and light ; similar = eyes of but one colour.

17	{	Two eyes in anterior row.....	18
	{	Four eyes in anterior row.....	19
18	{	A high clypeus.....	<i>Oxyopidæ</i>
	{	Almost no clypeus.....	<i>Podophthalmidæ</i>
19	{	Eyes of second row immensely larger than those of the third row...	<i>Dinopidæ</i>
	{	Eyes of second row not much larger than those of third row.	<i>Lycosidæ</i>
20	{	With calamistrum and cribellum, three claws to tarsi.....	21
	{	Without calamistrum and cribellum.....	22
21	{	S. E. not as far apart as M. E., clypeus high.....	<i>Dictynidæ</i>
	{	S. E. as far or farther apart than M. E., clypeus low.....	<i>Uloboridæ</i>
22	{	Tarsi with two claws.....	23
	{	Tarsi with three claws.....	27
23	{	Second pair of legs longer than the fourth, all eyes similar, cephalothorax somewhat roundish.....	24
	{	Second pair of legs not longer than the fourth, A. M. E. diurnal, rest nocturnal, cephalothorax more elongate.....	25
24	{	A. M. E. very close to clypeal margin, clypeus low.....	<i>Sparassidæ</i>
	{	A. M. E. some distance from margin, clypeus higher.....	<i>Thomisidæ</i>
25	{	Mandibles very large, trochanters long.....	<i>Prodidomidæ</i>
	{	Mandibles and trochanters normal.....	26
26	{	Maxillæ with a concavity or furrow.....	<i>Drassidæ</i>
	{	Maxillæ convex.....	<i>Clubionidæ</i>
27	{	But one pair of spinnerets.....	<i>Palpimanidæ</i>
	{	Three pairs of spinnerets.....	28
28	{	Clypeus wider than ocular area.....	29
	{	Clypeus narrower than ocular area.....	30
29	{	Lower spinnerets longer than upper, two-jointed.....	<i>Enyoidæ</i>
	{	All spinnerets equally short.....	<i>Theridiidæ</i>
30	{	Superior pair of spinnerets longer than the others, two-jointed, A. M. E. diurnal, S. E. separated, not far from M. E.....	<i>Agalenidæ</i>
	{	All spinnerets short, S. E. often touching, often far from M. E.....	<i>Epeiridæ</i>
31	{	Legs very long and slender.....	<i>Hypochilidæ</i>
	{	Legs stout and shorter.....	32
32	{	Two pairs of lung slits.....	33
	{	But one pair of lung slits.....	<i>Catadysidæ</i>
33	{	Palpi arising from the side of maxillæ.....	<i>Atypidæ</i>
	{	Palpi arising from the tip of the maxillæ.....	<i>Theraphosidæ</i>

A SYSTEM OF SPIDERS.

Division I.—*Gnaphosæ*.

This embraces but one section.

Section I.—This section contains the spiders which have the mandibles moving vertically. With the exception of one doubtful form they have four lung sacs. There is no epigynum in these forms, the male palpal organ is very simple, consisting of a bulb tapering on one side to a tube; the tarsus of the palpus is not at all modified. They are a tropical group and include the largest and most powerful spiders known. They have developed from primitive spiders like *Filistata*.

Family 1, *Atypidæ*.

This includes but one genus, *Atypus*, whose members are quite rare.

Family 2, *Theraphosidæ*.

These are the tarantulas. We have two sub-families.

- | | | | |
|---|---|---|-----------------------|
| 1 | { | Inner distal angle of maxillæ slightly prolonged; palpi somewhat lateral..... | <i>Eriodontinæ</i> . |
| | | Inner distal angle of maxillæ not prolonged; palpi terminal..... | <i>Theraphosinæ</i> . |

The *Theraphosinæ* may be divided into two tribes.

- | | | |
|---|---------------------------|-----------------|
| { | Three claws to tarsi..... | <i>Trionchi</i> |
| | Two claws to tarsi..... | <i>Dionchi</i> |

The *Dionchi* have one genus *Eurypelma*; the true tarantulas. The *Trionchi* may be separated into two groups.

- | | | |
|---|---------------------------------|---------------------|
| { | Median groove longitudinal..... | <i>Mecicobothri</i> |
| | Median groove transverse..... | <i>Epicephali</i> |

Family 3, *Hypochilidæ*.

This is represented by one peculiar genus *Hypochilus*. In the shape of the body and the length of the legs it has great resemblance to a *Pholcus*. It has a calamistrum and cribellum. The only species in the U. S. spins a web similar to some *Therididæ*.

Family 4, *Catadysidæ*.

Represented by one genus *Catadysas*, which has not been seen since described by Hentz. It stands on the dividing line between the typical members of this division and the more typical spiders, in having but two lung-sacs.

Division II.—*Micrognatha*.

With but one section.

Section II.—This includes spiders of the most primitive and comprehensive form; “prophetic types” as the older naturalists would call them. They have a roundish cephalothorax which projects in front of the small pars cephalica. The maxillæ closely surround the lip. The mandibles are small. The legs are usually long and slender, and they make irregular webs.

Family 5, *Filistatidæ*.

These are the lowest spiders. The pars cephalica is no larger than the eye-tubercle of *Phalangida* with which it is homologous. The male palpal organ is the most simple, only a tube at the end of the tarsus. *Filistata* occurs in the southern parts of our country.

Family 6, *Urocteidæ*.

This family is represented by one species of *Thalamia* in the Southern States.

Family 7, *Scytodidæ*.

This distinct group is represented by two genera, somewhat rare in the Southern States.

Family 8, *Pholcidæ*.

Here the legs are long and slender, the tarsus in the typical forms being furnished with an eighth joint. The forms are principally southern. I include in this family *Pholcus*, *Spermophora* and *Spintharus*.

Division III.—*Veræ*.

Here we come to the typical and more common spiders. It embraces three sections.

Section III.—This is about the same as the *Tubitelariæ* of certain writers. The cephalothorax is usually low and elongate. The abdomen also is commonly elongate and low. The legs fitted for running. The eyes are equal in size and plainly in two rows.

Family 9, *Dysderidæ*.

These have but six eyes; just behind the lung-slits is a pair of stigmata. The forms are uncommon.

Family 10, *Prodidomidae*.

We have but one genus and species in the Southern States.

Family 11, *Drassidae*.

This embraces a number of common spiders. The body is low and flat, the legs short and stout, the spinnerets usually projecting behind. They spin no web but lead a wandering life in search of prey, mostly at night. There are two sub-families.

- { A dorsal groove present *Drassinæ*.
- { No dorsal groove present *Micarinae*.

The latter group is represented by *Micaria* which is quite rare.

The *Drassinæ* may be divided into two tribes.

- { Hind row of eyes recurved..... *Gnaphosi*.
- { Hind row of eyes straight or procurved..... *Drassi*.

The former includes *Gnaphosa*, *Poecilochroa* and *Pythonissa*. The latter includes *Echemus*, *Drassus*, *Prosthesima* and *Teminius*.

Family 12, *Clubionidae*.

Closely related to the preceding family, they are usually light coloured, while the *Drassidae* are dark.

The legs are a little longer and more slender, the spinnerets less prominent, and the abdomen more round. It may be divided into three sub-families.

- ¹ { A transverse furrow on the venter..... *Anyphaeninae*
- { No transverse furrow on the venter..... 2
- ² { A stiff, horny shield either on dorsum or around the base of the pedicel *Corinninae*
- { Abdomen wholly soft..... *Clubioninae*

The latter sub-family may be divided into two tribes.

- { Two rows of very strong spines under tibiae I. and II. *Phrurolithi*
- { Tibiæ I. and II. not strongly armed..... *Clubioni*

Family 13, *Agalenidae*.

Not a very extensive family; most numerous in the west. The pars cephalica here is very distinct, and occupies the whole width of the cephalothorax in front. One genus, *Cybaeus*, disagrees with the characters of the family, as the spinnerets are all short; the genus will, however, be readily recognized as belonging to the family because of its general resemblance to other more common forms. Two well marked sub-families can be recognized.

- { A transverse furrow on venter, lower spinnerets widely separated *Hahninae*
 { No ventral furrow, spinnerets as usual..... *Agaleninae*

The latter may be divided into two tribes.

- { Upper spinnerets long, two-jointed..... *Agaleni*
 { All spinnerets short..... *Cybaeni*

Family 14, *Enyoidae*.

The lower spinnerets here are long and two-jointed. Otherwise much like the preceding family. We have one genus, *Habronestes*, in the Southern States.

Family 15, *Palpimanidae*.

Peculiar in having but one pair of spinnerets. One genus, *Lutica* from Utah.

Family 16, *Dictynidae*.

This family is much like *Agalenidae*, but have the accessory spinning organs. They are usually smaller. They spin small irregular webs, hanging from the under side.

Section IV.—This includes a large number of common spiders. They spin webs to catch prey. Most of the forms are very much alike in appearance. The abdomen short and rounded, the cephalothorax short with well developed pars cephalica, and the legs somewhat long, always with three claws. The spinnerets are short, the male and female organs well developed.

Family 17, *Theridiidae*.

This is the largest family of spiders, and many of its members are very small. They spin irregular webs, and hang inverted from the under side. The males frequently possess peculiar sexual modifications of the head. They can be arranged in three sub-families whose limits are not distinct. Their general characters are as follows:—

Theridinae.

The abdomen is large and roundish, the cephalothorax short, the legs long and quite slender; mandibles thinner than femur I.; male palpal organ without tarsal hook.

Erigoninae.

These are smaller species, the abdomen not very much larger than the cephalothorax, and a little elongated. The legs are shorter than in the *Theridinae*, and the male palpal organ has a tarsal hook; the epigynum not projecting, the legs without long spines, head of male often curiously modified.

Lingphinae.

These have longer legs than the preceding, and they are more spiny; the epigynum often projects. They are more usually marked than the *Erigoninae*, and are generally larger.

Family 18, *Epeiridae.*

This includes the common orb-weaving spiders; a few other genera are included—*Pachygnatha*, *Glenognatha*, *Bellinda* and *Mimetus*. They are very similar to the *Theridinae*, but have a low clypeus. Three sub-families may be recognized.

- | | | | |
|---|---|--|-------------------------|
| 1 | { | Body with spine-like projections..... | <i>Gasteracanthinae</i> |
| | | Body without such projections, at most with two basal humps..... | 2 |
| 2 | { | Male mandibles large, body elongate..... | <i>Tetragnathinae</i> |
| | | Mandibles small, body shorter.. | <i>E. irinae</i> |

These sub-families, like those of the *Theridiidae*, also intergrade.

Family 19, *Uloboridae.*

Related to the *Epeiridae* by their habit of building orb-webs, but their structure quite distinct. We have but two genera, *Uloborus* and *Hyptiotes*.

Section V.—This includes the *Laterigradae* of authors. The body is flattened, the first two pairs of legs long, the abdomen short and roundish.

Family 20, *Thomisidae.*

These are frequently found upon flowers and fences waiting the approach of some insect. There are a great number of cases of protective resemblance in the group. They walk most easily sideways, and many throw off their legs very readily.

- | | | |
|---|---|----------------------|
| { | Two front pairs of legs much larger and longer than the others, no scopula..... | <i>Thomisinae</i> |
| | Two front pairs of legs not larger than the others, a scopula present. | <i>Philodrominae</i> |

Family 21, *Sparassidae.*

These resemble the *Philodrominae* of the preceding family. They occur in the south and southwestern parts of the U. S.

Division IV.—*Oculatæ*.

Here the eyes are strongly unequal in size ; the pars cephalica very large, the eyes in three or four rows. They are the most active and highly developed spiders. They spin no web but hunt their prey.

Section VI.—This includes the *Citigradæ* of most authors.

Family 22, *Ctenidæ*.

These have much affinity with the *Sparassidæ*. There is but one genus in the Southern States.

Family 23, *Lycosidæ*.

These are the "wolf-spiders" which run among leaves and grass and over rocks. Their legs are moderately long and quite stout, with many hairs and spines. The mandibles are large and strong.

{ Ocular area slightly broader than high*Dolomedinae*
 { Ocular area as high or higher than broad*Lycosinae*

Family 24, *Dinopidæ*.

One genus quite peculiar in the South.

Family 25, *Podophthalmidæ*.

One peculiar genus in the Southern States.

Family 26, *Oxyopidæ*.

Three genera, mostly southern and western forms. Somewhat intermediate between the *Lycosidæ* and the *Attidæ*.

Section VII.—The *Saltigradæ* of authors, the "jumping-spiders". Their body compact, the legs short and stout, the size medium. The *Hymenoptera* of spiders.

Family 27, *Attidæ*.

This contains nearly all the forms of the section. Three sub-families may be recognized.

¹ { Ant-like spiders, slender legs.....*Synemosinae*
 { Not ant-like, legs more stout 2
² { Eye region longer than thoracic region.....*Ballinae*
 { Eye region shorter than thoracic region.....*Attinae*

The latter may be separated in two tribes.

{ Cephalothorax low, depressed*Marptusi*
 { Cephalothorax high, raised*Philippi*

Family 28, *Lyssomanidæ*.

One genus in the Southern States.

CANADIAN HYMENOPTERA.—No. 1.

BY W. HAGUE HARRINGTON, OTTAWA.

Under this heading, I propose to give from time to time descriptions of new species in my collection, and such notes on other species as may seem of value to students of our fauna.

NOTOPYGUS AMERICANA, n. sp. — Female, length 10 mm.; head, antennæ, thorax, coxæ and first segment of abdomen, black; remainder of abdomen and legs red; antennæ as long as head and thorax, filiform, joints short and subequal; thorax elongate, shining; metathorax, rounded and obliquely truncate; wings, slightly infumated, with black nervures; abdomen shining, as long as thorax, triangularly clavate, truncate at apex, with the ovipositor curved upward; sheaths black.

Described from one ♀ captured on 16th June, 1891. This fine species is the first of the genus to be recorded from Canada, and may be readily recognized by the conspicuous, erect ovipositor.

PRIONOPODA CANADENSIS, n. sp.—Female, length 9 mm.; head above antennæ, thorax, coxæ and trochanters, posterior tibiæ and tarsi, base and apex of abdomen, black; face below antennæ, the cheeks, anterior and middle legs, posterior femora and base of tibiæ, abdominal segments two, three and base of four, and venter, red; head very large, wider than the thorax, cheeks much swollen; antennæ very long, brownish above, pale beneath; third joint globose, smaller than second, fourth nearly as long as five and six; thorax short and robust; metathorax rounded; scutellum rather prominent, rounded; wing without areolet; posterior legs long, femora slightly clavate, coxæ large, globose; claws strongly pectinate; abdomen fusiform, somewhat compressed at apex.

Described from one ♀ captured on 20th June, 1891. This is a very handsome species, owing to its coloration and highly polished appearance (no punctures are visible under a strong hand lens). It should perhaps form the type of a new genus, as it differs greatly in structure of thorax, etc., and in wing venation from *P. scutellata*, Ashm.

ISCHYROCNEMIS OTTAWAENSIS, n. sp.—Female, length 7 mm.; black with the legs, scutellum, mouth parts and orbits of eyes honey-yellow; head slightly swollen so that the face is feebly carinate; antennæ long, pubescent, with longer erect hairs at apices of joints; thorax shining;

metathorax rounded, faintly areolated; scutellum elevated, smooth, red on the disc; legs not very stout, posterior femora but slightly swollen; wings large, hyaline, stigma pale-yellow, areolet rhomboidal; abdomen polished; apex of segments one and two narrowly margined with red; ovipositor exerted, red, sheaths black.

Described from one ♀ captured some years ago, and differs abundantly from *I. carolina*, Ashm.

MESOLEPTUS NIGRICORNIS, Prov. (Add. Faun. Hym. 99), must be removed to the genus *Ctenopelma*. The type which is in my collection has the claws so distinctly pectinate that I do not see how this character was overlooked. I have a second ♀ taken shortly after the first one was described.

PIMPLA ELLOPIÆ, n. sp.—Female, length 10 mm.; black with red abdomen; face coarsely punctured, with feeble smooth ridge below antennæ, which are long and slender; thorax shining, punctures shallow; legs black, anterior femora and tibiæ with pale line, anterior and middle tarsi rufous, base of posterior tibiæ and the tarsi piceous; abdomen red shining; punctures fine; ovipositor half as long as abdomen.

Male, length 8 mm.; posterior femora red, and abdomen slightly darker and not so polished as in the ♀.

Described from one ♀ and one ♂ received from Mr. Fletcher, who bred them from pupæ of *Ellopia somniaria* from Victoria, B. C. (See report of Experimental Farms, 1890, page 177.)

OUR WINTER BEETLES.

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

Though the winters of Iowa are quite severe, there are, nevertheless, always a few days when the weather is moderate enough to admit of the entomologist getting out for a few hours work at his favourite pursuit. When the sun comes out and the snow disappears in sheltered spots, a little investigation will yield much that is of interest, and throw considerable light on the habits of many of our insects.

Among the Carabidæ to be found in February may be mentioned

Tachys lævus, *Pterostichus patruelis*, *Platynus lutulentus* and *Stenolophus conjunctus*; all except the first quite common under stones and chips—the *Pterostichus* and *Platynus* preferring moist places, while the others like to rest under objects which lie on turf. Some water beetles (*Hydroporus modestus* and *Laccophilus fasciatus*) I have taken in water beneath the ice. What explanation can be advanced to account for their remaining active in such a cold medium when their terrestrial relatives are torpid?

Scydmaenus fossiger and *basalis* may be taken under stones and chips which are resting lightly on turf, in company with *Ctenistes piceus*, *Decarthron abnorme*, and one or two other Pselaphidæ. Staphylinidæ are the most numerous of all, both in species and individuals, and all of the following species may be taken at any time during the winter:—*Pæderus* sp., *Sunius binotatus*, *S. longiusculus*, *Falagria venustula*, *Tachyporus brunneus*, *Stilicus angularis*, *Diachus schaumii*, *Olophrum rotundicolle* and two or three species of *Stenus*, all under stones or chips, some being found also in moss. *Scaphidium quadriguttatum* I also find in moss during cold weather, and in fact have not met with it at any other time. Our Iowa specimens are the variety called *piceum*.

Of Phalacridæ I always find numerous *Olibrus nitidus* and *O. consimilis*, of Corylophidæ *Sericoderus flavidus*, and of Erotylidæ *Languria mozardi*, all under loose stones and chips, in company with *Corticaria pumila*. The remaining families appear to be represented more sparingly if we consider the great number of species that some of them contain.

Cerambycidæ have been rarely reported as winter insects, so I was surprised one New Year's Day, six years ago, to come across one of them alive, resting under a stone. Judging from memory alone (for the specimen has gone out of my possession) it was probably *Leptostylus aculiferus*. Of Chrysomelidæ I take occasionally *Chrysomela suturalis*, and also have *Mantura floridana* down on my list for the year 1886. The only Scarabæid I take is *Aphodius inquinatus*, not a *bona fide* native of our country, though evidently come to stay. The Tenebrionidæ, so characteristic of hot and dry climates are represented only by a *Paratenetus* which, however, is often seen in considerable numbers. A species of *Apion* and *Sphenophorus parvulus*, which are of occasional occurrence, finish the list.

Many species no doubt pass the winter in the perfect state, but being either buried deep in the ground or imbedded in the substance of trees escape our notice, and as few entomologists are sufficiently enthusiastic to make large and deep excavations with so little prospect of return I fear our knowledge of such as are included in the former category will long remain incomplete. My own exertions at the wood pile have yielded only bark beetles (and larvæ) during the winter, though some evidently spend this season more or less deeply imbedded in sound or decaying wood. (See note by Mr. Blanchard, CAN. ENT. VII., p. 97.)

Any comparison of such an incomplete list of our winter insects with the forms known from the inhospitable climate of the far north would be vain; but I would remark the preponderance of Staphylinidæ, as suggestive, when taken in conjunction with the nature of the species of the other families here noted, of at least an apparent similarity.

CHIONOBAS UHLERI.

BY T. D. A. COCKERELL, INSTITUTE OF JAMAICA.

Mr. W. H. Edwards, in his most interesting account of *Chionobas uhleri*, (Butt. N. A., Pl. XII., Vol. 3) remarks that he can find no evidence that it is found in the south of Colorado. It may, therefore, be as well to record that I found it near Swift Creek, in Custer County; and Mr. H. W. Nash informed me that it occurred at Rosita, in the same county. These localities are just north of 38° N. Lat.

With regard to the variation in the ocelli of this and other Satyridæ, it becomes rather difficult to give statistics without the use of some regular formula. Mr. Edwards gives the *number* of ocelli observed in different individuals, but we are left in doubt as to *which* particular ones were present, and which absent.

A convenient method of indicating the exact nature of these variations is to have a series of figures corresponding to the interspaces, numbering from above downwards. If a butterfly had fully developed pupilled ocelli in all the interspaces, the formula would read P. (for primary) 1234567, S. (for secondary) 1234567. When an ocellus was wanting, 0 might be

substituted, and for an ocellus which had no pupil, we might put a small figure below the line, thus . . . Two or more ocelli joined would be bracketed together, so (12), and a continuous band would consequently be represented by all bracketed together, thus (1234567). Up. s. and und. s. might be used to indicate the upper and under sides respectively; and in the case of asymmetrical specimens (which are rather frequent in some species) the left and right sides would require separate formulæ.

To give examples, the figures of *C. uhleri* on Mr. Edwards's plate would have the following formulæ:—

Fig. 1, up. s. P.	00 ₃ 0000	S. 0000000.
Fig. 2, und. s. P.	00 ₃ 0000	S. 0000000.
Fig. 3, up. s. P.	0 ₂ 34 ₅ 0	S. 0234560.
Fig. 4, und. s. P.	0034560	S. 0234560.
Fig. 5, up. s. P.	00 ₃ 0 ₅ 0	S. 00 ₃ 0 ₅ 0.
Fig. 6, up. s. P.	00340 ₆ 0	S. 0 ₃ 00 ₆ 0.

This looks complicated, but the method is really simple and easy to understand, and as short as any which exactly defines the character of the variation.

HOW TO TAKE THE OIL OR GREASE OUT OF SPECIMENS OF NATURAL HISTORY.

BY PH. FISHER.

When a specimen has become oily (Lepidoptera, Coleoptera, Orthoptera, etc.) use a bottle with a neck wide enough to let the specimen slip through easily, pin and all. Put in this bottle enough common naphtha to fully cover the insect, and introduce it into the fluid. Leave it in the bottle from 10-12 hours. Then take it out, and lay it on some blotting paper, where it will soon dry. If not yet clean, introduce in fresh naphtha once more. This treatment will not injure the insects in the least; they will come out brand new. Before publishing this, I have tried it on the most delicate Lepidoptera and Coleoptera, with the best results. If the body only is oily, break it off gently, and treat in same way.

CORRESPONDENCE.

PROF. J. B. SMITH'S LIST OF LEPIDOPTERA.

Dear Sir: There be criticisms and criticisms; those intended as friendly and those intended as destructive in character, and sometimes one is as unwittingly unjust as the other may be intentionally so. Mr. Dyar's notice of the List of Lepidoptera, in the February number of the CAN. ENT., calls forth this moralizing expression. Mr. Dyar is evidently a friendly critic, and I feel obliged for his kind words; but some of the "inaccuracies and omissions" are misleading. The List went to the printer in June, the Bombycids were printed in August, and Mr. Hudson's descriptions of *Dasychira* and *Cerura* did not appear until September or October.

Sarothripa reveyana, S. V., is not an omission. Speyer showed years ago that the American forms were distinct from the European, and he named the Americans *S. lintneriana*. I might have cited *reveyana* in error as a synonym of *lintneriana*; but can hardly be charged with an omission.

Gastropacha alescensis, Pack., is unknown to me, except in the casual reference by Stretch. It is not given in Dr. Packard's monograph of the *Bombycid*, nor does it appear in Mr. Grote's lists. I have not examined all of Dr. Packard's writings; but in the list of "The Entomological Writings of Dr. Alpheus Spring Packard," by Samuel Henshaw, Bulletin 16 of the Division of Entomology, U. S. Department of Agriculture, there is no mention of any *G. alescensis* in the "Systematic Index of the New Names Proposed." It is quite fair to assume that no such species was ever described, until Mr. Dyar points out the place of original description.

The compiler of a list cannot reasonably be held to a special knowledge of all groups, and if he gives the condition of affairs as it stands in literature at the time, he has made no error. As literature stood when I wrote, *Arctia sciurus* had been referred to *Euchates collaris*, and I could not know that Mr. Edwards had reached a different conclusion—even now Mr. Dyar does not state positively that *sciurus* is *not* a variety of *collaris*. Unpublished synonymy does not form a good basis for a charge

of inaccuracy. As to *Edema albicosta*, Hbn., I find on my cards after the reference to the original description:—"1825, Treit. Schmett. Eur. V., 2, 167=*albifrons* with an erroneous locality." Packard omits the name altogether, while Mr. Grote lists it as distinct. As to *Cerura*, Mr. Dyar is entirely correct. I copied the species as given in his table; but unfortunately in preparing the MSS. for the printer I failed to number *scitiscrpta*. The name was therefore put in italics and I failed to notice the error in reading proof. *Hemileuca neumoeni* and *Eutheca mora* are genuine cases of omission.

I have replied to Mr. Dyar's criticisms because they were kindly and therefore very much more apt to convey weight; also to show that it is not safe to assume that criticisms are always well founded even when not replied to.

J. B. SMITH.

MANUAL OF THE MICROLEPIDOPTERA OF N. AMERICA.

Prof. C. H. Fernald, of Amherst, Mass., is at work on a manual of the Microlepidoptera of North America, a work for which his studies of the last twenty years have admirably fitted him. He has made two trips to Europe for the purpose of studying the types of our Micros in the European museums, and has studied all the prominent collections in this country. His magnificent library and collections of these moths afford him the best possible facilities for carrying out this work, which will prove a task which anyone else could hardly undertake. The immensity of this work is appalling when we consider the extent of territory embraced, the great number of species, and particularly the fact that we have so few good collectors of Micros in this country.

Prof. Fernald is particularly desirous that collectors should give especial attention to the collection of Microlepidoptera for the next few years.

OBITUARY.

It is with the deepest sorrow that we have to announce the death, on 15th March, of Mr. F. B. Caulfield, of Montreal, who has been for many years an active member of our Society. His loss will be keenly felt by the members of the Montreal branch, of which he has always been one of the chief supports. We tender our sincerest sympathy to his sorrowing family.

Mailed April 2nd.