

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- Coloured covers/
Couverture de couleur
- Covers damaged/
Couverture endommagée
- Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée
- Cover title missing/
Le titre de couverture manque
- Coloured maps/
Cartes géographiques en couleur
- Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)
- Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur
- Bound with other material/
Relié avec d'autres documents
- Tight binding may cause shadows or distortion along interior margin/
La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/
Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.
- Additional comments:/
Commentaires supplémentaires:

- Coloured pages/
Pages de couleur
- Pages damaged/
Pages endommagées
- Pages restored and/or laminated/
Pages restaurées et/ou pelliculées
- Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées
- Pages detached/
Pages détachées
- Showthrough/
Transparence
- Quality of print varies/
Qualité inégale de l'impression
- Continuous pagination/
Pagination continue
- Includes index(es)/
Comprend un (des) index
- Title on header taken from: /
Le titre de l'en-tête provient:
- Title page of issue/
Page de titre de la livraison
- Caption of issue/
Titre de départ de la livraison
- Masthead/
Générique (périodiques) de la livraison

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	14X	18X	22X	26X	30X
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12X	16X	20X	24X	28X	32X

The Canadian Entomologist.

VOL. XXIII.

LONDON, APRIL, 1891.

No. 4.

MEETINGS OF THE MONTREAL BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

Jan. 13, 1891.—The 159th meeting of the Branch was held at 74 McTavish street, Mr. H. H. Lyman, President, in the chair. Mr. J. F. Hausen read a "Description of a New Species of the Coleopterous Genus *Pterostichus*," which he has named *Pterostichus conspicuipes*, on account of its bright yellow legs. The type was taken at Lachine. Mr. Hausen also read a note "On the Occurrence of *Gracilia minuta*, Fab., at Montreal."

Feb. 10, 1891.—The 160th meeting of the Branch was held at 74 McTavish street, Mr. H. H. Lyman, President, in the chair. There was a good attendance of members, and Mr. James Fletcher, Dominion Entomologist and Vice-President of the parent society, was also present.

Mr. Lyman read "A Preliminary Paper on the Genus *Chionobas*," in which the different species and reputed species inhabiting this continent and the north of Europe were compared, and attention drawn to the wide difference of opinion among entomologists as to the distinctness of the various forms. The paper was illustrated by a large number of specimens from the collections of Messrs. Lyman, Fletcher and Winn, the following forms being represented:—*Gigas*, *Californica*, *Nevadensis*?, *Macounii*, *Chryxus*, *Aello*, *Varuna*, *Uhleri*, *Tarpeia*, *Bore vera*, *Taygete*, *Jutta*, *Oeno*, *Semidea*, *Brucei*, *Crambis*, *Subhyalina*?, from Hudson's Straits; *Semidea var.?*, from Colorado; and *Semidea var.?*, from Laggan.

A discussion followed, after which Mr. Caulfield read a paper entitled "Notes on the Gryllidæ—Field Crickets," illustrated by specimens. Mr. Hausen read a "Preliminary Notice of Three New Species of *Pterostichus*—Systematic Notes." The species are to be called *Pulvinatus*, *Stenopus* and *Strictus*. The types were taken in the vicinity of Montreal. This paper is to be published in the Canadian Record of Science, with a plate and synoptic table of species. After spending some time examining some

specimens of very interesting species of Lepidoptera, exhibited by Messrs. Fletcher and Lyman, the meeting adjourned.

March 11, 1891.—The 161st meeting of the Branch was held at 74 McTavish St., Mr. H. H. Lyman, President, in the chair. There was a fair attendance of members, and the Rev. T. W. Fyles, of South Quebec, was also present. Mr. Winn read an interesting paper entitled "Notes on Some Methods of Collecting Insects," giving his experience in this connection and in the breeding of larvæ. Mr. Lyman read a "Report on a Collection of Lepidoptera from the North of Lake Huron," made by Dr. Robert Bell, F. R. S. C., Assistant Director of the Geological Survey. The collection contained fifty-four species, and the report will be published in the Annual Report of the Geological Survey. Mr. Hausen exhibited the proofs of his forthcoming plate in the Canadian Record of Science, and a number of interesting specimens were exhibited by the members.

A. F. WINN, Secretary.

TEN NEW SPECIES OF ORTHOPTERA FROM NEBRASKA— NOTES ON HABITS, WING VARIATION, ETC.

BY LAWRENCE BRUNER, LINCOLN, NEBRASKA.

(Continued from page 59.)

Orchelimum gracile, n sp.—A slenderer and somewhat smaller insect than either *O. vulgare* or *O. concinnum*, from both of which it differs in the form of its pronotum and of the ovipositor. The tubercle of the vertex is short, broad, and has the apex rounded. The tegmina and wings are of moderate length, very delicate in texture, and in the male furnished with an inconspicuous musical apparatus very similar in proportions to that of *agile* and *longipennis*. Legs slender, the posterior femora not quite reaching the tips of the closed tegmina. Terminal segment of the male abdomen quite broad; the anal cerci stout and acuminate, with the internal tooth minute; subgenital plate broad and long, reaching beyond the tips of the cerci. The ovipositor unusually long, broad, nearly straight and fine pointed.

In colour it is pale transparent-green with a broad reddish-brown band upon the head and pronotum, continuous from the tip of the vertex to the posterior transverse indentation of the pronotum, somewhat paler in the middle; upon the latter, rather broadly bordered by yellowish-white throughout. Face and mouth parts together with the genital arma-

ture of the male ochreous; ovipositor light reddish brown. Tarsi and sometimes also the tibiæ a trifle infuscated.

Length of body, ♂, 16 mm., ♀, 17.5 mm.; of antennæ, ♂ and ♀, about 50 mm.; of pronotum, ♂, 3.8 mm., ♀, 4 mm.; of tegmina, ♂, 19 mm., ♀, 20 mm.; of hind femora, ♂, 14 mm., ♀, 15 mm.; of ovipositor, 11-12 mm.

This particular species is quite common in the vicinity of West Point, Nebraska, about the margins of ponds and along the edges of streams where it frequents rank growing grasses and sedges. I have also taken it several times at the electric lights in the city of Lincoln, while it was observed to be very common in the sand hill region of Wheeler, Garfield and Holt counties. It has never been found by me outside of the State, nor has it been sent to me from beyond our boundary.

Its song is very low and more rapid than that of *O. glaberrimum* and *O. vulgare*.

The uncommonly long ovipositor of this insect would indicate a slight variation from the normal egg-laying habits of the other members of the genus; but just what this variation is has not been ascertained.

Orchelimum gladiator, n sp.—This second species of meadow grasshopper of the genus *Orchelimum* which is now characterized, appears to be quite distinct from all other described North American forms. Its chief distinguishing character is its very broad, nearly straight ovipositor of more than the ordinary length. In its general structure it resembles the more robust species like *O. glaberrimum* and *O. concinnum*. It differs from these, however, in having shorter legs and antennæ. The posterior femora are rather slender; the cone of the vertex is short and obtuse, with the extreme tip shallowly sulcate; the eyes are rather large but not prominent, the hind wings are little if any longer than the tegmina, which do not quite reach the tip of the ovipositor.

Colour, pale transparent grass-green throughout, save the usual markings upon the occiput and disk of the pronotum which are dark brown, on the latter composed of two well defined narrow, slightly diverging lines. The dorsal portion is also tinged with brown. Antennæ rufous; feet and extreme tip of the ovipositor tinged with rufous.

Length of body, ♀, 18 mm.; of antennæ, 35 mm.; of pronotum, 4.75 mm.; of tegmina and wings, 19 mm.; of posterior femora, 15.5 mm.; of ovipositor, 10 mm.; greatest width of ovipositor, 1.82 mm.

Described from two female specimens taken upon the flowers of one

of the golden rods (*Solidago rigida*) at West Point, Nebraska, during the latter part of the month of September, 1886. Male not known to me.

The species is evidently quite local in its distribution; and perhaps also quite rare. A better knowledge of the habits of our North American Orthoptera may also aid in finding them.

There is a single female specimen of a closely allied, though distinct species, in my collection, which was taken in the District of Columbia. This latter form is also undescribed, and can be known temporarily as *Orchelimum minor*, from its rather small size and short wings. It is slenderer and in every way smaller than *O. gladiator*. In colour it is rather less green than usual, and has the brown markings very decided. Its ovipositor which resembles that of *gladiator* is also brown instead of green.

I have still other undescribed *Orchelimums* in my cabinet, but must postpone their description for a future paper. If others who have specimens of these insects in their collections which do not appear to have been described, and they do not care to work them over themselves, it would be deemed a favour if they were sent to the writer, who would then endeavour to prepare a paper on the two genera which would include all of the known as well as any new forms that might still remain undescribed.

In addition to several described species of *Conocephalus*, we have here in Nebraska a heavier bodied and shorter winged form than the *C. ensiger* Harris, which appears to be new.

Conocephalus nebrascensis, n sp.—Most closely related to *C. ensiger*. Cone of the vertex entirely black beneath; ovipositor long and lance-like.

Cone of the vertex rather slender, its sides parallel from a little in advance of the eyes to its middle, from which point it tapers to the rounded apex; the basal tooth quite prominent. Eyes large and prominent, usually dark coloured. Pronotum large and broad, the shoulders well defined, the posterior extremity broadly rounded, the deflected lobes or "side laps" spreading below; the entire surface rather shallowly punctate, glabrous. Tegmina coriaceous, with large coarse tympanum in the male—very similar to that of *C. crepitans* and *C. robustus* Scudd. Posterior femora moderately slender, short, and with both the inner and outer lower carinae provided with spines. Anal cerci stout, with strong internal hooks; sub-genital plate quite large and broad; the projecting "digits" widely separated and small. Ovipositor long and slender,

lanceolate, a little curved upwards and extending about one-fourth of an inch beyond the closed tegmina.

General colour bright grass-green, with yellowish lines along the lateral carinae of the pronotum. Posterior tibiae together with all the feet more or less infuscated. Antennae testaceous or rufous.

Length of body, ♂, 28 mm., ♀, 32 mm.; of cone, ♂ and ♀, 3.5 mm.; of pronotum, ♂ and ♀, 8 mm.; of tegmina, ♂, 36 mm., ♀ 40 mm.; of hind femora, ♂, 20 mm., ♀, 23 mm.; of ovipositor, 30 mm.

Habitat.—Found throughout the eastern part of the State, where it occurs most frequently in the natural groves growing along our principal streams. I have also seen specimens of it that were taken in Iowa and Illinois, and have specimens from both of these last named States in my collection.

Amblycorypha Scudderae, n sp.—Very similar to, but smaller than the *A. oblongifolia*.

Pale to dark green. Disk of the pronotum flat, gradually expanding posteriorly; the lateral angles or shoulders quite sharp; the lateral lobes with their posterior lower edge broadly rounded. Tegmina quite heavy and opaque, rather rough and of a dull green colour—especially so in the female specimens; the costal area full and evenly rounded. Posterior femora moderately stout, slightly surpassing (♀) or not quite reaching (♂) the tips of the tegmina, their inner margin furnished with 7 or 8 short spines. “Shrilling” field of the tegmina large and flat, as in *oblongifolia*, a little broader than the posterior extremity of the pronotum. Ovipositor evenly curved, the apical third strongly toothed.

Length of body, ♂, 22 mm., ♀, 22 mm.; of pronotum, ♂, 6 mm., ♀, 6.65 mm.; of tegmina, ♂, 33 mm., ♀, 32 mm.; width of tegmina, ♂, 10 mm., ♀, 10.5 mm.; length of hind femora, ♂, 28 mm., ♀, 29 mm.; of ovipositor, 11 mm.

One of our commonest katydids throughout the eastern or wooded portion of Nebraska. It is especially numerous among the groves of oaks and other hard wood trees.

Like *oblongifolia*, this katydid produces the peculiar chick-chick noise which is so characteristic a sound in our groves at night during the months of August and September. *Scudderae* is to be distinguished from that species by its smaller size, the more evenly rounded or arcuate edges of the tegmina, the comparatively shorter hind legs, and the more strongly serrated point of the female ovipositor.

SOME INDIANA ACRIDIDÆ.

BY W. S. BLATCHLEY, TERRE HAUTE, INDIANA.

But little attention has heretofore been given to the *Acrididæ* inhabiting Indiana by the working scientists of the State. No record of any published paper relating to them can be found, and it is believed, we suppose, that because Indiana lies next to Illinois, where Dr. Cyrus H. Thomas did much of his work, that most if not all of the species of the family found in this State are included in the two lists of the Orthoptera of Illinois prepared by him.

That such belief is an erroneous one, is shown by the fact, that in the single county of Vigo, which lies adjacent to the eastern border of Illinois, and midway between the north and south boundaries of this State, seven species have been taken by the writer which are not given in either of Thomas's lists, three of which have not heretofore been recorded nearer Indiana than New England, or the Gulf States, and the remaining four no nearer than Kansas.

Believing that a list of those taken in the county would prove of value as a basis for a more complete list of those inhabiting the State, the one below has been prepared. The nomenclature is that agreed upon by the most prominent authorities of the present time, and is for the most part derived from the works of Scudder and Saussure. In order that it may not confuse beginners who may use the list for reference, I give the synonymy of the descriptions of the different species as gathered from the literature to which I have had access. Brief notes relating to the comparative abundance, places of resort, and variations where noted, of each species are also given.

My especial thanks are due to Prof. Lawrence Bruner, of Lincoln, Nebraska, and to Mr. S. H. Scudder, of Cambridge, Massachusetts, for the verification of doubtful species and for information regarding the heretofore known range of the rarer ones.

The following works have been consulted in the study of the species listed, and to them reference is made in the synonymy given:—

Harris, Dr. T. W.—Treatise on Some Insects Injurious to Vegetation. 3rd edition. 1862.

Riley, Packard and Thomas.—Reports of the U. S. Entomological Commission, 1877, 1878, 1883.

Riley, C. V.—Report of U. S. Entomologist in U. S. Agricultural Report for 1883.

- Saussure, Henri D.—*Prodromus CEdipodiorum Insectorum*, etc. Geneva, 1884.
- Scudder, S. H.—“Catalogue of the Orthoptera of N. A.,” 1867. Proceedings of the Boston Society of Nat. History, XVII., XIX. and XX., 1875, 1877, 1879.
- Thomas, Cyrus H.—“Insects Injurious to Vegetation in Illinois,” in the Transactions of the Illinois State Agricultural Society, V., 1865; “Synopsis of the Acrididæ of N. A.,” 1873; “List of the Orthoptera of Illinois,” in Bulletin I. of the Illinois Museum of Natural History, 1876; “The Acrididæ of Illinois,” in the Ninth Report of the State Entomologist of Illinois, 1880.

ACRIDIDÆ.

ACRIDINÆ.

TRUXALINI.

1. TRUXALIS BREVICORNIS, Linn.

Pyrgomorpha brevicornis, Thos., Syn. Acrid, N. A., 1873, 67.

Truxalis brevicornis, Id., Ninth Rep. St. Ent. Ill., 1880, 97.

Opsomala punctipennis, Id., Trans. Ill. St. Agl. Soc., V., 1865, 447.

Pyrgomorpha punctipennis, Id., Syn. Acrid. N. A., 1873, 68.

About a dozen specimens of this rare species were taken from tall coarse grass, near the border of a pond, on Oct. 11, 1890. Its range is southern, and Vigo county is, as far as known, the most northern point at which it has been collected. The female varies in colour from a bright pea green to a uniform rusty brown. The males, which are much smaller, have the back green and the rest of the body brown.

2. CHRYSOCHRAON VIRIDIS, Scudd. Short-winged Green Grasshopper.

Chrysochraon viridis, Thos., Syn. Acrid. N. A., 1873, 76.

Chloealtis viridis, Id., Ninth Rep. St. Ent. Ill., 1880, 99.

Opsomala brevipennis, Id., Trans. Ill. Agl. Soc., V., 1865, 451.

This species is quite frequent in the coarse grass which grows in open wet places, and is also at times to be found along the borders of woods. It is coloured much like the preceding, and the variations are the same.

3. CHRYSOCHRAON CONSPERSA, Harris. The Sprinkled Grasshopper.

Locusta conspersa, Harris, Ins. Inj., 1862, 184.

Chrysochraon conspersum, Thos., Syn. Acrid. N. A., 1873, 76.

Chloealtis conspersa, Id., Ninth Rep. St. Ent. Ill., 1880, 99.

Locusta abortiva, Harris, Ins. Inj., 1862, 184.

Rare. A single pair in copulation were taken Oct. 11, 1890, and two or three others two weeks later, one of which, a female, had the elytra extending slightly beyond the tip of the abdomen.

4. SYRBULA ADMIRABILIS, Uhler. The Handsome Grasshopper.

Stenobothrus admirabilis, Thos., Syn. Acrid. N. A., 1873, 84.

Syrbula admirabilis, Id., Ninth Rep. St. Ent., Ill., 1880, 100.

The females of this fine species are not uncommon in upland meadows, and along fence rows. The males are, however, seldom seen, probably on account of their smaller size and duller colour.

5. CHLOEÄLTIS CURTIPENNIS, Harris. The Short-winged Brown Grasshopper.

Locusta (Chloeältis) curtipennis, Harris, Ins. Inj., 1862, 184, pl. III., fig. 1.

Stenobothrus curtipennis, Thos., Syn. Acrid. N. A., 1873, 91.

Id., Ninth Rep. St. Ent., Ill., 1880, 104.

Scarce. It frequents meadows and damp, swampy places which are covered with a rich growth of grass.

OEDIPODINI.

6. CHORTOPHAGA VIRIDIFASCIATA, De Geer. The Green-striped Grasshopper.

Locusta viridifasciata, Harris, Ins. Inj., 1862, 182, pl. III., fig. 2.

Thos., Trans. Ill. St. Agl. Soc., V., 1865, 451.

Tragocephala viridifasciata, Id., Syn. Acrid. N. A., 1873, 103.

Id., Ninth Rep. St. Ent., Ill., 1880, 105,
figs. 13, 17.

Scudder, Proceed. Bost. Soc. Nat.
Hist., XVII., 1875, 481.

The full-grown individuals of this species are more common in May and June than those of any other grasshopper, as its larvæ hibernate, whereas most other species pass the winter in the egg state. It frequents dry, open woods and roadsides, where the half-grown young can be seen jumping vigorously about on any warm sunny day in winter.

- 6 (a). CHORTOPHAGA VIRIDIFASCIATA INFUSCATA, Harris. The Dusky Grasshopper.

Locusta infuscata, Harris, Ins. Inj., 1862, 181.

- Tragocephala infuscata*, Thos., Syn. Acrid. N. A., 1873, 102.
Tragocephala viridifasciata infuscata, Id., Ninth Rep. St. Ent., Ill.,
 1880, 106.
 Scudd., Proceed. Bost. Soc.
 Nat. Hist., XVII, 1875,
 481.

This dark variety of the green-striped grasshopper is quite frequent in April and May, but rare after June 1, when *viridifasciata* seems to take its place. It is probably a mere seasonal form of that species.

7. ENCOPTOLOPHUS SORDIDUS, Burm. The Clouded Grasshopper.
Cedipoda sordida, Thos., Syn. Acrid. N. A., 1873, 116.
Tragocephala sordida, Id., Ninth Rep. St. Ent., Ill., 1880, 107.
Encoptolophus sordidus, Scudd., Proceed. Bost. Soc. Nat. Hist.,
 XVII., 1875, 479.
Locusta nebulosa, Harris, Ins. Inj., 1862, 181.

Rather common in upland meadows and pastures as late as Nov. 22, but is never found about wet places. The males, although small in size, stridulate just as they arise from the ground with a loud crackling noise similar to that made by burning stubble. It flies but a short distance before alighting.

8. ARPHIA SULPHUREUS, Fab. The Yellow-winged Grasshopper.
Locusta sulphurea, Harris, Ins. Inj., 1862, 177, pl. I., fig. 6.
Tomonotus sulphureus, Thomas, Syn. Acrid., N. A., 1873, 105.
 Id., Ninth Rep. St. Ent., Ill., 1880, 107.

Although very common in some parts of Indiana, this is a scarce grasshopper in Vigo Co., where the next species seems to take its place. It frequents dry open woods and roadsides.

9. ARPHIA XANTHOPTERA, Burm.
Tomonotus xanthopterus, Thos., Syn. Acrid., 1873, 105.
Tomonotus sulphureus xanthopterus, Id., Ninth Rep. St. Ent. Ill.,
 1880, 108.

A common species in dry, sandy fields, prairies and borders of meadows. When flushed it flies for a long distance in a zigzag way, the male making a loud rattling noise with every onward motion. Dr. Thomas in his later writings classed *xanthoptera* as a variety of *sulphureus*, but I have carefully compared a large number of specimens of each, and can find no intermediate forms.

9 (a). *ARPHIA XANTHOPTERA CARINATA*, Scudd.

Tomonotus carinatus, Thos., Syn. Acrid., N. A., 1873, 106.

Tomonotus sulphureus carinatus, Id., Ninth Rep. St. Ent. Ill., 1880,
108.

Six or eight specimens of a grasshopper, which, from the descriptions cited above, I take to be the one described by Scudder as *Ædipoda carinata*, were taken. It is, as Dr. Thomas says, very closely allied to *xanthoptera*, but is always darker, the colour approaching a black; the inner wings are deep reddish yellow, and the median carina of the pronotum higher than in that species. Moreover, the stridulation of the male is different, as it can be heard for rods away, the loud chr-r-r-r being sounded just as it leaves the ground, and not while on the wing, as is that of *xanthoptera*. These differences, however, are so minor that I follow Thomas in placing it as a variety of that species.

10. *SPHARAGEMON BALTEATUM*, Scudd.

Spharagemon balteatum, Scudder, Proceed. Bost. Soc. Nat. Hist.,
XVII., 1875, 469.

A rare species found in dry, open, upland woods. Four specimens were taken Oct. 12, two in copulation. It is not included in either of Dr. Thomas's Illinois lists, and although it ranges from Maine to Texas, has not before been recorded closer than New Jersey on the east and Kansas on the west.

11. *DISSOSTEIRA CAROLINA*, Linn. The Black-winged Grasshopper.

Locusta carolina, Harris, Ins. Inj., 1862, 176, pl. III., fig. 3.

Ædipoda carolina, Thomas, Syn. Acrid. N. A., 1873, 117.

Id., Ninth Rep. St. Ent., Ill., 1880, 111.

This common species is readily known by its broad, black, yellow-bordered hind wings, and by its habit of flying rather than hopping when disturbed; many persons taking it for a butterfly when it is on the wing. It is more often found along roadsides and railways than in meadows and pastures.

12. *HIPPISCUS RUGOSUS*, Scudd. The Clumsy Grasshopper.

Ædipoda rugosa, Thos., Syn. Acrid. N. A., 1873, 132.

Hippiscus, corallipes rugosa, Id., Ninth Rep. St. Ent., Ill., 1880,

115.

This large, thick-bodied species is rather common in autumn, its favorite resorts being timothy stubble or open, upland pastures. When

disturbed it flies but a short distance, and without noise, except the flutter of its wings. When on the ground it is very clumsy, on account of its large size, and is easily caught with the hands.

12 (a). *HIPPISCUS RUGOSUS PARADOXA*, Thos.

Ædipoda paradoxa, Thos., Syn. Acrid. N. A., 1873, 132.

Four very large specimens, having the base of wings a bright coral red instead of yellow, were taken. The dark spots on the elytra also varied slightly from those of the typical *rugosus*, but other than this I could detect no differences, and I hence refer them to the above-named variety.

13. *HIPPISCUS PHÆNICOPTERA*, German. The Coral Winged Grasshopper.

Ædipoda phænicoptera, Thos., Syn. Acrid. N. A., 1873, 135.

Hippiscus phænicopterus, Id., Ninth Rep. St. Ent., Ill., 1880, 117, figs. 14, 18.

Locusta corallina, Harris, Ins. Inj., 1862, 176.

An uncommon species, frequenting open woods and meadows from May to September, but rarely found in late autumn. It resembles *H. rugosus* in form and size, but is more active and stridulates much louder than that species. The larvæ evidently hibernate as the imagoes are found so early in the season.

ACRIDINI.

14. *SCHISTOCERCA AMERICANA*, Drury. The American Grasshopper.

Acridum americanum, Thos., Trans. Ill. St. Agl. Soc., V., 1865, 448.

Id., Syn. Acrid. N. A., 1873, 172.

Id., Ninth Rep. St. Ent., Ill., 1880, 129, fig. 10.

This large and handsome grasshopper was quite common, even as late as Nov. 22, along fence-rows, borders of thickets and in low, open oak woods, but was seldom seen in open meadows or pastures. More often than any other species it is found on fences, and when flushed it rises quickly and with a whirring noise, made by its wings in flight. It moves rapidly a long distance, and very frequently alights in a bush or low tree instead of on the ground.

15. *ACRIDIDIUM ALUTACEUM*, Harris. The Leather-colored Grasshopper.

Acridium alutaceum, Harris, Ins. Inj., 1862, 173.

Thos., Syn. Acrid. N. A., 1873, 171.

A rare species, having been noted on but one occasion, along the sandy embankment of a railway, when, perhaps, a dozen specimens were taken on Oct. 11. The males were very brightly coloured, having evidently just moulted for the last time. Like the preceding species, it flies more often than it hops, moving with the same rapid flight, but not so far as *S. Americana*.

A single specimen of this species was taken in Monroe Co., Ind., in 1886, and at the time was referred to *A. emarginatum*, Uhler, with the description of which, as given by Thomas, it closely agrees. It is not recorded from Illinois, nor from any locality nearer than Kansas, as far as I can ascertain.

16. *PEZOTETTIX ROTUNDIPENNIS*, Scudd. The Round-winged Grasshopper.

Pezotettix rotundipennis, Scudd., Proceed. Bost. Soc. Nat. Hist., XIX., 1877, 86.

This species was named for me by Dr. Scudder, as I did not have the description cited above at the time it was taken. It has been known heretofore only from Florida. In Vigo County it is rather scarce, and frequents the borders of blue grass pastures and roadsides. The female appears much more common than the males, only two or three of the latter having been seen. It has been taken as late as Nov. 22, when two females were found on the lower plank of a fence enjoying the sunshine. A single pair were noted in copulation Oct. 11, 1890.

17. *PEZOTETTIX SCUDDERI*, Uhler. Scudder's Grasshopper.

Pezotettix scudderi, Thos., Syn. Acrid. N. A., 1873, 152.
Id., Ninth Rep. St. Ent., Ill., 1880, 121.

In October and November this species is very common in open woods and pastures, especially near the borders of them, where upon the lower part of the fences it delights to collect during the short autumn afternoons.

18. *PEZOTETTIX VIRIDIPES* (?) Walsh, Mss.

A single specimen taken from the roadside on Oct. 11, 1890, was referred to Dr. Scudder for identification. He returned it with the above name marked doubtfully, stating that it "differed from the typical specimen in the nearly complete obliteration of the median carina of the prozona." I have seen no description of it.

19. PEZOTETTIX GRACILIS, Bruner.

Pezotettix minutipennis, Thos., Bull. Ill. Mus. Nat. Hist., I., 1876, 66.

Id., Ninth Rep. St. Ent. Ill., 1880, 119.

Pezotettix manca (?) (Smith), Thos., Syn. Acrid. N. A., 1873, 149.

This species was identified as *P. minutipennis*, Thos., and sent to Mr. Bruner for verification. He referred it to *P. gracilis*, Bruner, of which I have no description, but Scudder. Proceed. Bost. Soc. Nat. Hist., XX., 1879, 77, says that *minutipennis* is a synonym of *gracilis*. It differs but slightly from the description of *P. manca*, Smith, as given by Thomas in his Synopsis, and in my opinion the latter is also a synonym.

About a dozen specimens were taken from low open woods. The sexes were found paired Oct. 11 and Nov. 1.

20. PEZOTETTIX VIOLA, Thos.

Pezotettix viola, Thos., Bull. Ill. Mus. Nat. Hist., I., 1876, 68.

Id., Ninth Rep. St. Ent. Ill., 1880, 120.

Caloptenus nigrescens, Scudd., Proceed. Bost. Soc. Nat. Hist., XIX.,
1877, 27.

Among some grasshoppers sent to Mr. Bruner were two which I had identified as *P. viola*, Thos. He returned their name as *P. occidentalis*, Bruner. Specimens were afterwards sent to Mr. Scudder, who referred them to *P. nigrescens*, Scudd., and wrote that he had *P. occidentalis*, and that it was certainly distinct from *P. nigrescens*, but that he had never yet determined *P. viola*. At the same time he forwarded his description of *P. nigrescens*, cited above, which after careful comparison I believe to be synonymous with *P. viola*, the latter having the precedence. Having never seen a description of *P. occidentalis* I cannot say as to whether *P. viola* is a synonym of it or not.

The species is not a common one, only a half a dozen specimens having been taken. It is found in company with *P. scudderi* in open woods. *P. viola*, according to Thomas, occurs in central and southern Ill. *P. nigrescens* was described from Georgia.

21. MELANOPLUS MINOR, Scudd.

Caloptenus minor, Scudd., Proceed. Bost. Soc. Nat. Hist., XVII.,
1875, 478.

This is a Western species not having been taken before east of Central Illinois. But two specimens were taken. They were found in company with the next species along the borders of a woodland pasture on October 11.

(To be continued.)

PREPARATORY STAGES OF DATANA PERSPICUA, G. & R.,
AND CERURA BOREALIS, BOISD.

BY HARRISON G. DYAR, NEW YORK.

DATANA PERSPICUA.—*Egg*: In general shape subpyriform; flattened at base and top, depressed centrally at vertex, the usual black spot small and indistinct, situated at the bottom of the punctiform depression; the whole surface punctured. Colour white, the lid-like top of a somewhat brighter white. Width .9 mm., height .8 mm. The egg is of the type of *D. major*, but resembles the type of *D. ministra* in coloration by possessing a discolorous lid-like top. This is the part of the shell eaten by the young larva in hatching. Laid in masses of varying numbers on the under side of the leaves of the food plant.

First stage: When first hatched the head is black, .5 mm. wide; the body yellowish with a reddish dorsal and subdorsal line, not reaching the extremities; cervical shield, feet and anal plate black. As the stage advances the body becomes reddish with four lateral yellow stripes on each side and three ventral, as in allies, which remain throughout the larval stages. They are nearly as wide as the intervening lateral spaces, a little confluent posteriorly and are coloured yellow. Black hairs arise from small black tubercles and from the elevated anal feet. Length near completion of this stage about 5 mm.

Second stage: Head higher than wide, slightly punctured, black; width 1.1 mm. Body parts coloured as before. The hair is short, blackish and arises from minute tubercles that are much smaller than in the previous stage.

Third stage: Head shiny black, punctured, the clypeus smooth; width 1.6-1.8 mm. Cervical shield, anal plate and thoracic feet black. Body dark red, the stripes broader than the intervening spaces, bright yellow; abdominal feet red, the anal pair black. A few short hairs; spiracles small, black.

Fourth stage: Head as before, or in other examples, bright wine-red, the lower part of the clypeus, eyes and mouth parts, black; width 2.7 mm. Body as before, the stripes partly confluent posteriorly, hardly so anteriorly; spiracles black, larger than before. Or the cervical shield and anal plate may be wine red, the stripes broad, lemon yellow, moderately confluent at both ends; thoracic and anal feet and the abdominal feet outwardly very slightly black. Hair 5 mm. long, whitish, besides other more abundant fine short hair.

Fifth stage: Head rounded, depressed at the sutures of the clypeus, punctured, shining, usually black; width 4.1 mm.; cervical shield, anal plate and legs black, except occasionally the shield, plate and nearly all of the head is wine-red, or rather blood-red. All kinds of intergrading examples occur. The body is usually black, rarely red, the stripes broad, bright lemon-yellow, somewhat confluent posteriorly. Hair whitish, rather abundant but not long, with other more numerous short, brownish hairs. Bases of abdominal feet a little reddish. In two examples the stripes were much narrower than usual, especially posteriorly, and were much broken, the upper ones consisting of series of little yellow dots. Both had black heads, and they were not alike, as one was much nearer the normal form than the other.

Pupa: Formed in a subterraneous cell, cylindrical; the abdominal segments gently rounded; sutures deep, capable of motion; cases moderately prominent, especially those covering the palpi; two cremasters, very short, each bearing two spines, the outer the shorter, all in a transverse line; cases finely creased; body densely punctured; colour mahogany-red; cremasters blackish. Length 24 mm; width 7 mm. The species is single brooded, though occasionally a few individuals may emerge the same year in confinement, possibly indicating two broods in the southern part of its habitat.

Food plants: Sumach (*Rhus glabra* and *R. typhina*).

Larvæ from Duchess and Ulster counties, N. Y. Abundant; the commonest species of *Datana* in the electric lamps at Poughkeepsie. This larva is well protected by its coloration, which resembles the usual colours (bright red and yellow) of dying Sumach leaves, and it is usually on the lower parts of the bush where such coloured leaves occur that the larvæ amass themselves, especially when young.

CERUKA BOREALIS, Boisd.—*Egg*: Less than hemispherical—obtusely conoidal, the base flat; minutely shagreened; colour black; a little lustrous, but not shiny. Laid singly on either surface of the leaf.

* * * * *

Second stage: Head red-brown, not shiny, the upper half darker; mouth parts blackish; width 1.1 mm. A pair of subdorsal horns on the prothoracic segment, short and spinose; stemapods 5 mm. long, only slightly spined; a transverse row of minute spines on each segment. Body purplish brown over the dorsum nearly to the spiracles, this colour cov-

ering the thoracic segments entirely and ventrally on the seventh to the tenth abdominal segments. The rest of the body is green. The back centrally is a little paler than elsewhere, especially on the metathoracic and first abdominal segments, except in a dorsal line. Spiracles minute, black ringed. Stemapods dark red-brown, twice annulated with whitish and tipped with the same colour. Thoracic feet black; abdominal feet green.

Third stage: Head non-lustrous dark wine-red, paler on the lower part, minutely but thickly mottled with little paler spots; ocelli black; antennæ pale; width 1.6 mm. Cervical horns tuberculated, each with a hair; tails spinose. Thoracic segments, dorsal half of body nearly to spiracles and the last three abdominal segments (joints 12 and 13) ventrally, brownish vinous, as are also the "tails," but for the two broad whitish annulations. The rest of the body is green; the thoracic feet pale testaceous. Piliferous tubercles as before. As the stage advances the brown colour on the dorsum fades out on the posterior thoracic and first abdominal segments (joints 3-5), leaving a triangular patch on the two anterior thoracic segments (joints 2 and 3), which is narrowly connected with the rest of the dorsal colour by a line on the metathoracic segment (joint 4), that rapidly widens on the first abdominal segment (joint 5).

Fourth stage: Head brownish wine-red, the upper two-thirds thickly covered with little round reddish dots, but leaving a narrow line of the ground colour on each side of, and parallel to, the central suture; paler or yellowish at the sides posteriorly; ocelli blackish; antennæ white, brownish toward the tips; width 2.5 mm. Cervical shield red-brown, speckled like the head with little dots but less thickly; the horns on either side of it thick, round, tuberculated; stemapods 9 mm. long, curled up a little at the ends, spinose and coloured red-brown, twice annulated with sordid white. The extensile threads are pinkish at base with a white ring, the terminal part black. Body a little elevated dorsally on the posterior part of the mesothoracic segment (joint 3) but without any process on the metathoracic segment. It is pale green with a broad ferruginous-brown dorsal band which is triangular on the first two thoracic segments, covering the horns, narrows to a line on the metathoracic segment and widening continuously again just reaches the spiracle on the fourth abdominal segment (joint 8), after which it narrows, reaching a minimum in the suture between the seventh and eighth abdominal segments (though still quite wide), widens a little and slightly contracts to cover the anal plate. The band contains some minute

piliferous tubercles and is faintly bordered with yellow. Spiracles pale ochre; venter paler, whitish, with a purple medio-ventral line on the eighth to the tenth abdominal segments. Feet concolorous with the body. As the stage advances some small brown spots appear on the sides.

Fifth stage: Head rounded, flat in front, the clypeus a little depressed, with two vertical ridges below; colour purplish brown, the little yellowish spots arranged as before; clypeus and mouth reddish, jaws black outwardly; antennæ reddish, their bases yellow; ocelli black; the lateral posterior part of the head pale yellow; width 3.6 mm. A few hairs. Body shaped as in the previous stage, the cervical horns present but small, smooth, punctured at the ends, projecting laterally in line with the cervical shield. Tails tuberculated, each tubercle with a fine spine; 11 mm. long; extensile threads black with a white ring, yellowish at base. Body pale whitish-yellow, becoming pale lemon-yellow, the dorsal band ferruginous-brown, shaped as before. On the cervical shield it is marked like the head and bisected by a narrow pale dorsal line; it covers the upper part of the cervical horns, passes below the spiracle on the fourth abdominal segment, narrows to a minimum on the eighth abdominal segment (where it is thrice as wide as on the metathoracic segment) and ends elliptically, covering the anal plate. It is edged with blackish brown and contains a diffuse dorsal and three oblique lateral bands of the same colour, posterior to the latter of which are faint yellowish mottlings. In the lateral angle of the band is also a blackish-brown shade. Tails concolorous, twice annulated with pale yellow. On the lateral region are a few minute hairs and some faint brown spots. Spiracles ochre in a very narrow brown border, and obscurely surrounded by brown clouds. A series of subventral blackish-brown spots and a medio-ventral line posteriorly. Thoracic feet brownish testaceous; abdominal feet pale yellow. The erect spines at the anus are black. Length of larva, exclusive of the stemapods, 22 mm. As the stage advances the dorsal band becomes paler, the cervical shield pinkish, and the markings are more distinct.

Cocoon: Like those of the other species of *Cerura*, but rather flatter for its size. Length 38 mm.; width 11 mm.; height above the surface of the wood 6 mm.

Pupa: Cylindrical, flattened a little on the ventral side, the ends rounded, not tapering; cases prominent, those covering the antennæ

large; a slight depression behind thorax dorsally; no cremaster; colour red-brown; cases finely wrinkled; dull; body smooth, slightly shiny. Length 17 mm.; width 5 mm. Duration of this stage, through the winter.

Food plant: Wild Cherry (*Prunus serotina*).

Larvæ from Dutchess Co., N. Y.

Widths of head for the several stages, calculated from the width at the last stage, ratio .68, are:—.77 mm., 1.13 mm., 1.66 mm., 2.45 mm., 3.6 mm. Observed:—1.1 mm., 1.6 mm., 2.5 mm., 3.6 mm.

The species of *Cerura* may be separated as follows:—

Primaries crossed at basal third by a dark gray band.

Primaries white.

Six black spots in an ellipse on disk. *borealis*, Bd.

Indistinct dental lines on disk.

Transverse band broad. *aquilonaris*, Lintn.

Transverse band narrow, sometimes broken. . . *albicoma*, Strk.

Primaries pale cinereous.

Three dentate lines on disk. *occidentalis*, Lintn.

A row of dots on disk. var. *cinereoides*, Dyar.

Primaries dark cinereous. *cinerea*, Walk.

Primaries crossed by many dentate black lines.

Secondaries white.

Lines continuous. *scitiscrupta*, Walk.

Lines interrupted. var. *candida*, Lintn.

Secondaries black. *multiscrupta*, Riley.

Of these the larvæ of four are known and can be separated by the following table:—

No dorsal process on metathoracic segment.

Edges of dorsal band even.

Dorsal elevation on mesothoracic segment simple. . . . *bore-*
[*alis*, Bd.]

Dorsal elevation double. *occidentalis*, Lintn.

Edges of dorsal band irregular.

Band spotted with yellow. *cinerea*, Walk.

Band spotted with crimson and yellow. . . . var. *cinereoides*,
[Dyar.]

A distinct dorsal process on the metathoracic segment. . . . *multi-*
[*scrupta*, Riley.]

Walker* records "*C. bifida*, var. ?" from Hudson's Bay, and Butler† doubtfully refers a specimen from Mendocino Co., Cal., to *Cerura bicuspis*, Borkh., but it seems probable that these specimens belong to some of the American species, and at any rate these references are not positive enough to warrant the inclusion of the names in the list.

Cerura scolopendrina is known to me only by Boisduval's description, which is vague, and I have not included it in the table.

Cinereoides is a form of *cinerea*, as I have pointed out, and I consider *candida* as a variety of *scitiscrupta* chiefly on the authority of Mr. Graef and of Dr. Strecker. Mr. Graef has shown me that there is no difference in pattern between the two, while Dr. Strecker assures me that they were "raised from the same lot of eggs."

THE MOOSE FLY—A NEW HÆMATOBIA.

BY WM. A. SNOW, UNIVERSITY OF KANSAS, LAWRENCE.

Entomologists will be interested to learn of the occurrence of a near relative of the Horn Fly, *Hæmatobia serrata*, in the middle of the great cranberry swamps of Northern Minnesota. These vast low areas extend for hundreds of square miles in the vicinity of the Lake of Woods. They are the favored home of the American moose, and the hope of obtaining some specimens of this animal for the museum of the University of Kansas led Professor L. L. Dyche of that institution to traverse these dangerous marshes. Professor Dyche has recently returned after remaining for over three months in the very centre of the swamps, camping upon the occasional sand ridges which cross the region; and to him I am indebted for specimens of a new *Hæmatobia*.

The flies were noticed first upon skinning the first moose, when a number of them were discovered in the animal's rectum, into which they had crawled for two or three inches in order to deposit their eggs in the excreta. The dejecta upon the ground were also found to contain hundreds of the eggs. Altogether nineteen moose were killed and in almost every case these flies were observed about them, remaining upon

*Cat. British Mus., Vol. IV., p. 985.

†Ann. and Mag. Nat. Hist., Vol. VIII., p. 317.

their carcasses as long as they lay unskinned, which was often twenty-four to thirty hours. For some time after the death of the animal, the *Hematobia* could be seen only with difficulty, concealed as they were by the mosquitoes which were incredibly numerous, lingering in clouds upon the dead moose as long as any of its juices could be extracted. The flies seemed to prefer the regions of the head, rump and legs where the hair is shortest. It is highly improbable that they find a resting place upon the horns of the moose. The male moose go thrashing about in the underbrush with tempestuous energy. They use their horns during a great part of the year to scrape away the bark from trees; and they have a way of winding them in among the bushes when a rival is near, as a challenge. The females, as is well known, have no horns. The present species is very probably indigenous, infesting as it does an animal not in domestication; and inhabiting such secluded inland portions of this continent. The moose obtained by this expedition were all killed far within the swamp, fifteen to twenty miles from firm land; and it is only in such places that this now rapidly disappearing animal can be found. This region is rarely visited by white men, and the few Indians that venture there wait until the surface of the fens is frozen over. It is not altogether unlikely that this fly infests the caribou also. It was hardly possible to observe its actions on the living moose; but we know that it lays its eggs in the excrement, and in all probability it resembles *H. serrata* in other habits as well.

Professor Dyche heard no complaints from owners of stock on the borders of the swamp of the ordinary Horn Fly, or of any similar fly. The cattle are, however, tormented with mosquitoes, and smudges are kept constantly burning to which they may run for relief.

Hematobia alcis, n. sp. Male.—Length 4–6 mm. Front narrow, with concave sides; central portion black with yellowish pollinose orbital stripes; sides of front further marked by a row of long, sparse, black hairs. Antennæ blackish-brown; second joint sub-globular; third joint slightly longer than broad, with square corners, and slightly concave on the inner side. Arista black, base enlarged. Pectinations long; sometimes one or two hairs on inferior side. Face and cheeks black, sparsely clothed with black hairs. Palpi long, porrect, gently spatulate, light yellow, with black hairs. Proboscis brownish-black. Dorsum of thorax greyish pollinose with yellowish tinge. Two very distinct black median stripes and an interrupted lateral stripe on either side. Thorax and

scutellum with long black bristles. Scutellum concolorous. Abdomen yellowish-grey pollinose, with black hair; a brownish-black median stripe, interrupted at the incisures; a pair of dusky spots on second and third segments, and sometimes also on the fourth. Legs simple, blackish-brown, except the yellow basal and immediate distal ends of femora and basal ends of tibiae. Wings hyaline, somewhat dusky; base orange yellow.

Female.—Front wide and with straight sides. Hind femora light brown, except a subapical dusky band about one-third the length of the femur in width.

Nine males and ten females. The specimens are alcoholic, but in excellent preservation. They are now in the museum of the University of Kansas.

The following differences between *H. alcis* and *H. serrata* may be noted:—The former is larger. It has thin black pile on the cheeks, while in the latter the pile is golden and quite thick. The palpi of *H. alcis* are light-yellow in both sexes with no trace of black, except in the scattered black hairs. The stripes on the dorsum of the thorax are much more distinct. The legs differ considerably, being darker in colour; in the male they are blackish-brown, except the yellow basal and immediate distal ends of the femora, and basal ends of the tibiae; the female has light brown hind femora varied by dusky bands near the distal ends. A more important difference, however, is the lack of the serrations which characterize the hind tarsi of the male *H. serrata*. Base of wings in the present species more broadly and brightly yellow.

Rondani defined the subgenus *Lyperosia*, to which *H. serrata* is referred, from two characters, namely: hairs of arista all superior, and anterior cross-vein opposite the termination of the first longitudinal vein. An examination of my specimens of *H. alcis* has discovered two with one or two hairs on the underside of the arista; and I may say, on the authority of Dr. S. W. Williston, that the relation of the small cross-vein to the end of the first vein in this and allied groups is very inconstant.

I have compared the present species with the descriptions of European species of *Hæmatobia* (except that of *H. irritans* which I did not have), and find that *H. ferox* approached it in some respects, but, brief as is the description, several important differences were noted.

CORRESPONDENCE.

REVISION OF THE GENUS AGROTIS.

Dear Sir,—A few words are called for by Mr. Grote's "remarks" in the March number of the CAN. ENT. The parts critical, of course, require no reply, and are really unexpectedly cordial; nor do the parts explanatory. Mr. Grote asks why I write *heretis*, *badinodes* and *insula*, instead of *herilis*, *badinodis* and *insulsa*. In each instance it is occasioned by an original misreading and mistranscription of the name, which had become so fixed that, often as I had seen and written the names, still persisted and prevented my seeing the error. I am obliged to Mr. Grote for pointing out these cases. Mr. Grote says: "With regard to the classification of the group it is conducted upon the basis first suggested by myself, *i. e.*, the forms with unarmed fore-tibiæ are separated, and other divisions are based upon genitalia and sexual characters." He refers to the CAN. ENT., XV., p. 51, March, 1883. In 1857 Lederer had already used *all* the characters suggested by Mr. Grote, and the latter has made absolutely *no* original suggestions for dividing the genus. Nor has Mr. Grote, anywhere in the Noctuidæ, used or suggested *new* characters. He has written as though I had found the basis for such work as I have done, in his writings. I wish distinctly to state that this is *not* the case. Herrich-Schaeffer, von Heinemann, Lederer, and others, all used the same characters that Mr. Grote has used. I claimed no originality for these bases of subdivision, and no credit is due to Mr. Grote therefor. In the systematic study of the sexual characters in this genus and in the American Noctuidæ I do claim originality. Lederer did not get the clasper in any case, and used only the external form of the harpes. Mr. Grote does not give any evidence, anywhere in his writings, that he went even as far as Lederer in this direction. Mr. Grote knows the writings to which I have referred, as his earlier papers sufficiently prove. In reference to my citations of determinations made by him in collections, these are always to specimens bearing a label in Mr. Grote's own handwriting, and where a type is referred to, it means a specimen so labelled by Mr. Grote himself. I refer now to Mr. Grote's paper in the Proc. Am. Phil. Soc., June, 1883, p. 176, for the following:—"I conclude this paper by briefly referring to the fact that I have determined my species in many collections. I enumerate those of Mr. Thaxter, Mr. Neumœgen, Mr. Hy. Edwards, Mr. Tepper, and in the Albany collections. A large number of my types are in Mr.

Neumøgen's grand collection, and I have figured a good number of the species. There can thus be but few cases of doubt as to what I have described." All of these collections I have studied, and my references are to identifications made in them. I do not blame Mr. Grote for making errors, and had he not assumed so infallible a standard for himself in his criticism of others, would not have so often pointed them out. I am said also to have followed Mr. Grote's synonymy or "adopted" it. Altogether 59 species have synonyms. Of these 23 are originally stated by myself, Mr. Strecker gives one, Mr. Butler is responsible in whole or in part for six, two of them are mere citations of preoccupied names, and of the older species the synonymy is "adopted" by Mr. Grote from Walker in several instances. This is not scientific literature by any means, and I regret being responsible for it, but I cannot allow Mr. Grote's statement "that I have at least laid down the foundation for its proper study" to go unchallenged. Mr. Grote's work in the North American Noctuidæ has been a necessary one, and has been largely drudgery. No one can better appreciate than I the labor involved in identifying material, naming and describing it. That he made synonyms was simply natural and unavoidable, and is in no wise to his discredit. I expect to make them myself, and have done so already. Our noctuids are far from completely known, and in the Agrotæ alone will reach nearly 500 species. I know of more than 20 already that are different from any described in the monograph. Mr. Grote's earlier papers were, as a rule, careful and easy to work with, and so up to the period of Dr. Harvey's work. That Mr. Grote really described Dr. Harvey's species has been often told me; but it is interesting to have the statement from headquarters. Mr. Grote's work in the later period failed to equal the earlier papers, so far as value to the student is concerned, from the fact that he assumed in general that his readers knew the Noctuidæ just as well as he did himself. A brief indication, perfectly characteristic in Mr. Grote's view, was absolutely incomprehensible to one not so well grounded. Mr. Grote's work is essentially descriptive, rarely systematic, never monographic. His generalizations are often well put, interesting and valuable; but withal I have not found anywhere any "foundations" for monographic work that did not already exist in literature. Mr. Grote's correction of my reference to *insulsa* is just. I somehow overlooked the comparison to *repentis*. A specimen in Dr. Bethune's collection named by Walker, and agreeing with his description, is a species of *Hadena*, allied to *acvastatrix* in maculation, but much darker and richer brown in colour, and is Mr. Grote's *H. ducta*. Walker's determinations are not reliable, and I do not say Mr. Grote is wrong.

JOHN B. SMITH.

NOTES.

WHOLESALE DESTRUCTION OF COLIAS PHILODICE.

In August, 1886, while visiting in Louisiana, Mo., I made frequent excursions to damp places along a neighboring brook in search of butterflies. It was the droughty season, and there were but a few stagnant pools, damp gravel beds, and moist clay slopes at which insects could slake their thirst. At one of the last named places I noticed a great bunch of Coliads (mostly *Colias philodice* with an occasional *Eurytheme*), and a few specimens of *Pieris rapæ*, which my advance started and put to flight. As a few individuals did not take to wing, but seemed unable to rise though they fluttered violently, my curiosity was aroused and a closer investigation showed the bank and gravel bed below to be strewn with mutilated specimens of *Philodice*, scores of individuals, detached wings in some cases, in others the head and thorax remained intact. Upon taking the struggling butterflies by the wings I found they were held firmly to the ground, their abdomens being drawn into the burrows of Tiger-beetle larvæ. They were being actually eaten alive by these voracious grubs. I found that the robbers after eating the softer parts of the butterflies cast the wings and harder parts away from their holes. Upon my retiring a few yards the thirsty butterflies returned and settled down to sip the moisture again. Those that alighted over the burrows were quickly seized by their cunning enemies, and the poor creatures could only flutter, unnoticed in their death struggles by their unsuspecting companions. I found the clay slope to contain great numbers of these holes or burrows, and the top of each hole displayed a dark head with a pair of ugly jaws, murderous assassins in hiding, thirsting for innocent blood!

R. R. ROWLEY, Curryville, Mo.

ERRATA.—C. E., Vol. XXIII., p. 34, line 8 from bottom, and p. 36, line 4, for "Lec." read "Sec."; p. 34, last line, for *Prioma* read *Prionia*; p. 35, line 6, for "Lilia" read "Tilia"; p. 35, last line, for "Basidomycetons" read "Basidomycetous"; p. 36, line 15, for "Lilia" read "Tilia."

R. THAXTER.

* * * The Editor craves the indulgence of his correspondents, as he has met with a severe domestic affliction in the loss of his daughter, AGNES EMILY BETHUNE, who died on the 2nd of March in the twenty-second year of her age.

Mailed April 7th.