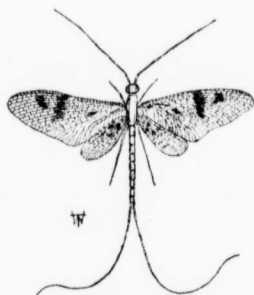


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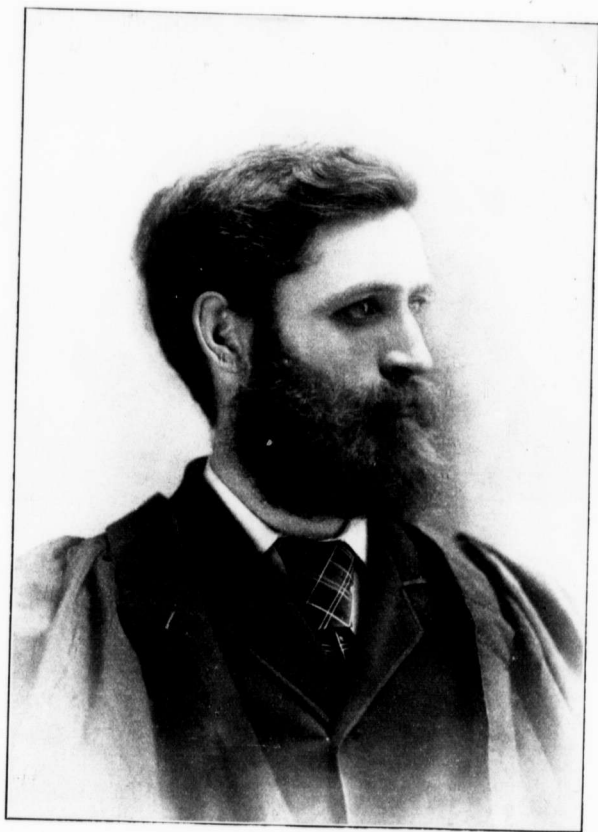
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WILLIAM E. SAUNDERS.
SECRETARY OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO FROM 1887.

The Canadian Entomologist.

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No. 1

WILLIAM E. SAUNDERS.

In this issue of our magazine we have pleasure in presenting to our readers a portrait of the Secretary of the Entomological Society of Ontario for the last fifteen years, MR. W. E. SAUNDERS, who is well known as a prominent member of the fraternity of Canadian naturalists. Mr. Saunders's home is in London, where he was born and where most of his life has been spent. His father, Dr. William Saunders, Director of the Experimental Farms of the Dominion, has always been devoted to the study of the natural sciences, and hence the son's attention was in early years directed to similar pursuits, interest in them being maintained by the making of collections in the different departments. Geology, Botany, Entomology and Ornithology all in turn provided object-lessons for study, training the mind to habits of close observation and filling the leisure of later years with delightful employment.

After a few years of miscellaneous collecting, Mr. Saunders turned his attention more exclusively to Ornithology, and as soon as the use of a gun was permitted he commenced a scientifically-arranged collection of our native birds, showing male and female in summer and winter plumage, with any variations from the types; also the nest and eggs of each species. Year by year the collection is added to, until now it numbers over 1,000 specimens. Mr. Saunders's birds are his intimate friends, and whether in his own house or on the public platform, his "Bird Talks," illustrated with specimens, show to his audience that he speaks of what he has learnt by personal experience in the fields and woods. His enthusiasm for this study is such that he counts it no hardship to walk miles into the country in time to hear some favourite songster greet the dawn. He has also been known to spend a night in the woods in the depths of winter, just to see what he missed by spending his nights in bed!

About two years ago Mr. Saunders accompanied his father on an official visit to Sable Island, a place he had long wished to go to in order

to see the only known breeding place of the "Ipswich" sparrow. The impressions of this trip were given to the public in an article in one of our local papers, which has since been adapted for some of our scientific magazines. Mr. Saunders was able also to enrich his collection by several specimens of the rare sparrow, as well as some other beautiful birds which have their habitat on that interesting island.

Although Mr. Saunders is kept fully employed in looking after his business interests, he finds a change of work sufficient to afford him the rest he needs; hence, he has employed his leisure time in many pursuits, and while Ornithology may be called his principal "hobby," he has gone rather extensively into gardening and horticulture generally—extensively, considering the size of his lot on Central Ave., but the amount of fruit and flowers there produced is a surprise and pleasure to all his summer visitors. His well-known love for these pursuits and his knowledge of horticulture generally has occasioned his recent election to the chairmanship of the committee who have in charge the care of the street trees in London.

Mr. Saunders received his education principally in London, though two or three years were spent in boys' colleges elsewhere. As it was considered best for him to enter the drug business so long conducted by his father, he was sent for two years to the Philadelphia College of Pharmacy, where he graduated with the highest honours. Soon after his return to London he was taken into partnership with his father, but on the latter being appointed Director of the Experimental Farms of the Dominion, Mr. Saunders retired from the retail business and entered into the wholesale exclusively.

On the establishment of the Western University he was appointed to the chair of Chemistry, which he held until the claims of his own business forced him to relinquish the position.

We regret to learn that the Entomological Society of Belgium has recently lost its venerable President, DR. PIERRE-JULES TOSQUINET, retired Inspector General of the Health Department of the Army, Officer of the Order of Leopold, and honoured with the Civil Cross of the First Class and also the Military Cross. He died at Saint Gilles, October 28th, 1902, in the 78th year of his age.

CLASSIFICATION OF THE FOSSORIAL, PREDACEOUS AND
PARASITIC WASPS, OR THE SUPERFAMILY
VESPOIDEA.

BY WILLIAM H. ASHMEAD, A. M., ASSISTANT CURATOR, DIVISION OF INSECTS,
U. S. NATIONAL MUSEUM.

(Paper No. 11.—Continued from Vol. XXXIV., p. 291.)

FAMILY XXXIV.—Sapygidæ.

The wasps belonging to this family, on account of the emarginate eyes in the females, and the abdomen being usually marked with yellow or white, closely resembles those in the families *Myzinidæ* and *Scoliidæ*, but may be easily distinguished by the great difference in the legs, the middle coxæ being approximate, the outer face of the tibiæ being smooth, unarmed, *without* tubercles or spines, while the tarsi are without strong spines or bristles, and unfitted for digging.

The antennæ, too, are different; they are inserted much farther apart, being nearer to the eye margin than to each other. The pronotum is broader, abruptly truncate anteriorly, with the front angles more acute, while the venation, at least in the front wings, is wholly different from the venation in the *Myzinidæ* and the *Scoliidæ*, the stigma being distinct, never small, the marginal cell larger, lanceolate, the basal nervure slightly arcuate, with the cells different. The males are easily known by the *unarmed* hypopygium.

In habits the species agree with those in the *Trigonalidæ*, being parasitic in the nests of wasps and bees.

Table of Genera.

1. Head normal, *without* smooth, blister-like swellings along the inner margin of the eyes and on the vertex; ocelli large, distinct. . . . 2.
Head *with* smooth, blister-like swellings along the inner margin of the eyes and on the vertex; ocelli small, indistinct.
Antennæ at apex similar in both sexes, the last joint in the male not enclosed by the penultimate. . . . (1) *Eusapyga*, Cresson.
(Type *E. rubripes*, Cr.)
2. Antennæ dissimilar in the sexes, not filiform; mandibles with unequal teeth. 3.
Antennæ similar in both sexes, filiform, tapering off at apex; mandibles broad, 3-dentate, the teeth blunt, equal; maxillary palpi 6-jointed, labial palpi 4-jointed. (2) *Polochrum*, Spinola.
(Type *P. repanda*, Spinola.)

3. Third joint of the antennæ *not* longer than the fourth; second cubital cell narrowed above; antennæ in female clavate, in male subfiliform, the last joint more or less enclosed by the penultimate; mandibles 3-dentate, the teeth acute, the outer tooth a little the longest..... (3) *Sapyga*, Latreille.
(Type *Apis clavicornis*, Fabr.)

- Third joint of the antennæ longer than the fourth; second cubital cell not much narrowed above; antennæ in female subfiliform..... (4) *Sapygina*, Costa.
(Type *Sapyga decemguttata*, Jurine.)

FAMILY XXXV.—Myzinidæ.

This family is usually classified with the *Scoliidæ*. According to my views, it is quite distinct, although closely allied, and is easily separated by the difference in the shape of the eyes in the females, and by the totally different armature of the male genitalia.

The eyes in a female Myzinid are always *entire*, never emarginate within, as in the *Scoliidæ*. The males have the eyes emarginate or sinuate within, much as in the *Scoliidæ*, but are easily distinguished by difference in venation and by the armature of the genitalia, the tip of the abdomen always ending in a single upward curved aculeus.

In the *Scoliidæ* the abdomen in the males terminates in three straight spines.

The family is without doubt *parasitic*, but nothing seems to be known of the habits of the many species already described.

Many of our species are common in midsummer and early fall; they are conspicuous and easily observed, and some of our younger entomologists should make an effort toward unravelling their life-histories.

The genus *Mensis*, Du Buysson, I do not know; it may be Sapygid, but I am unable to place it from the description.

The species in our catalogues, under the genus *Myzine*, do not belong to it, but should be removed to the genus *Plesia*, Jurine.

Table of Genera.

1. Females: eyes entire, *not* emarginate within..... 2.
Males: eyes more or less emarginate within..... 11.
2. Wings fully developed, normal..... 3.
Wings much abbreviated, the apex pointed, incised or bilobed..... 9.

3. Front wings with *three* cubital cells, rarely with *two* cubital cells . . . 4.
 Front wings with two cubital cells.
 Second cubital cell receiving both recurrent
 nervures Poecilotiphia, Cameron.
 (Type *P. albomaculata*, Cam.)
4. Marginal cell not at all or only slightly separated from the costa ;
three cubital cells, the second and third each receiving a recurrent
 nervure 8.
 Marginal cell widely separated from the costa, nearly to the stigma,
 and directed forward into the disc of the wing, so as to occupy the
 place usually occupied by the third cubital cell.
Two cubital cells 5.
Three cubital cells 6.
5. Thorax elongate, the pronotum long ; hind tarsi twice longer than
 their tibiae ; cubitus in hind wings originating *before* the transverse
 median Hemimeria, Saussure.
 (Type *Myzine Savignyi*, Guér.)
6. Second cubital cell neither small nor petiolate 7.
 Second cubital cell very small, longly petiolate ; hind tarsi not twice
 longer than their tibiae *Myzine*, Latreille.
 = *Tachus*, Jurine.
 = *Meria*, Illiger.
 (Type *Tiphia tripunctata*, Rossi.)
7. Second cubital cell large, longer than wide, trapezoidal, receiving the
 recurrent nervure far beyond the middle ; hind tarsi about twice as
 long as their tibiae ; cubitus in hind wings originating behind the
 transverse median nervure ; mandibles long, sickel-shaped,
 edentate *Plesia*, Jurine.
 (Type *Tiphia namea*, Fabr.)
- Second cubital cell not so large, receiving the recurrent nervure at the
 middle ; mandibles stout, curved, edentate . . *Dimorphoptera*, Smith.
 (Type *D. scoliiformis*, Smith.)
8. Cubitus in hind wings originating *beyond* the transverse median
 nervure ; hind tibiae elongate, triangulate ; last joint of hind tarsi
 not smaller than the fourth . . . *Micromeria* (Westwood) Saunders.
 (Type *Meria*, Llugii, Westwood.)

- Cubitus in hind wings originating (?) *before* the transverse median nervure; hind tibiae globose; last joint of hind tarsi very minute..... Parameria, Guérin.
(Type *P. femorata*, Guér.)
9. Wings glabrous, *not* hairy..... 10.
Wings hairy, strongly fimbriate.
Apical lobes of front wings unequal; stigma and veins absent..... Komarovia, Radoszkowski.
(Type *K. victoriosa*, Radoszk.)
10. Apex of wings bilobed, the marginal cell wanting; *one* cubital and *two* discoidal cells; mandibles at apex bifid; hind tibial spur moderate, straight and acute..... Pseudomeria, Saunders.
(Type *P. graeca*, Saund.)
Apex of wings pointed; *one* or *two* discoidal cells; mandibles at apex simple, edentate; hind tibial spur very long, slender, acute (Africa)..... Pseudotiphia, Ashm., g. nov.
(Type *Tiphia brevipennis*, Lucas.)
11. Front wings with *three* cubital cells..... 12.
Front wings with *two* cubital cells.
Second cubital cell receiving both recurrent nervures..... Poecilotiphia, Cameron.
12. Marginal cell at apex *not* at all or only slightly separated from the costa; second cubital cell large, irregularly quadrangular, trapezoidal or pentagonal, longer than the third..... 13.
Marginal cell at apex widely separated from the costa; second cubital cell small, longly petiolate..... Myzine, Latreille.
13. Marginal cell *shorter*, rounded or truncate at apex; second cubital cell long, in outline triangular..... 14.
Marginal cell long, its apex oblique and with a slight curve inwards *near* the costa; *three* cubital cells, the second cell large, the second and third each receiving a recurrent nervure, or the second recurrent is interstitial with the second transverse cubitus; cubitus in hind wings originating *before* the transverse median nervure..... Plesia, Jurine.
14. Apex of marginal cell narrowly rounded; second cubital cell receiving the first recurrent nervure *at* or a little before the middle, the second recurrent nervure received by the third cubital cell *before* the middle..... Micromeria, Saunders.

Apex of marginal cell briefly truncate; second and third cubital cells each receiving a recurrent nervure at or a little beyond the middle; cubitus in hind wings originating a little before the transverse median nervure. Mesa, Saussure.
(Type *M. diapherogamia*, Sauss.)

FAMILY XXXVI.—Scoliidae.

This family is very closely allied to the *Myzinidae*, but may be easily separated by having the eyes in the females distinctly *emarginate* within. The males also have *emarginate* eyes, but are more easily distinguishable by abdominal peculiarities, the tip ending in *three* straight spines, but never in a single upward curved aculeus as in the *Myzinidae*.

The species are parasitic upon the larvæ of beetles belonging to the family *Scarabaeidae*, and probably also upon other ground-inhabiting beetle larvæ.

Two subfamilies may be recognized:

- Front wings with only *one* recurrent nervure; if with two, the second recurrent is incompletely formed, and bends backwards so as to unite with the first, the second cubital cell receiving only one recurrent nervure. Subfamily I.—Scolinae.
- Front wings with two complete recurrent nervures, both of which are received by the second cubital cell. Subfamily II.—Elidinae.

SUBFAMILY I.—Scolinae.

In this subfamily the front wings have only a single complete recurrent nervure, which is received by the second cubital cell. The group is evidently an offshoot from the *Elidinae*, which have two complete recurrent nervures.

Table of Genera.

1. Front wings with *four* discoidal cells, the third usually triangular, often petiolate. 2.
- Front wings with *three* discoidal cells.
 - Two* closed cubital cells. *Discolia*, Saussure.
(Type *Scolia apicicornis*, Guér.)
 - Three* closed cubital cells. *Scolia*, Fabricius.
= *Triscolia*, Sauss.
= *Triliacos*, Sauss. (partim.)
(Type *S. flavifrons*, Fabr.)
2. *Two* cubital cells. *Diliacos*, Sauss. et Sich.
(Type *Compsomeris violacea*, Lepels.)

- Three cubital cells Liacos, Guérin.
 = Triliacos, Sauss. et Sich (partim.)
 (Type *L. dimidiata*, Guérin.)

SUBFAMILY II.—*Elidinae*.

This subfamily is separated from the *Scoliinae* by having two recurrent nervures, and both being received by the second cubital cell. It is the older type of the two subfamilies, and is clearly shown by the more numerous cells in the front wings.

The present conception of the genus *Elis* appears to be wrong. *Elis*, as established by Fabricius, was a most composite group, and some of the species originally placed in it by Fabricius did not even belong to the same family.

Fabricius, when he established *Elis*, placed under it seven species, viz.: (1) *E. sexcincta*, (2) *E. interrupta*, (3) *E. seniles*, (4) *E. 7-cincta*, (5) *E. cylindrica*, (6) *E. volvulus* and (7) *E. cochleata*. Subsequently, some of these were placed in other genera, and the first species, *Elis sexcincta*, became the type of the genus *Myzine*, Latr. After going carefully over the literature, I find that the only species left to which the Fabrician name *Elis* may be applied is *Elis (Scolia) 7-cincta*. This must now be considered the type of the genus; it will throw out the generic names, *Colpa*, Lep.; *Compsomeris*, Lep., and *Dielis*, Sauss., and what we have been calling *Elis* becomes *Trielis*, Saussure.

Table of Genera.

1. Front wings with three or four cubital cells 2.
 Front wings with two cubital cells.
 Three discoidal cells *Elis*, Fabricius.
 = *Compsomeris*, Lep.
 = *Colpa*, Lepel.
 = *Dielis*, Sauss.
 (Type *Scolia 7-cincta*, Fabr.)
2. Front wings with three closed cubital cells.
 Three discoidal cells *Trielis*, Saussure.
 = *Elis*, Sauss. et Auc.
 (Type *Elis consanguinea*, Sauss.)
 Four discoidal cells *Trisciloa*, Gribode.
 (Type *T. Saussurei*, Grib.)
 Front wings with four closed cubital cells . . . *Tetrascolia*, Ashm., g. nov.
 (Type *Compsomeris Urvillii*, Guér.)

NEW NOCTUIDS FOR 1903.—No. I.

BY JOHN B. SMITH, SC. D., RUTGERS COLLEGE, N. J.

Feralia Columbiana, n. sp.—Ground colour a bright emerald green, the maculation black and white. Head with a black interantennal spot. Collar with a black patch at its centre and at the base of each primary: tipped with whitish. Behind the collar there is a black edging to the disc and the loose basal tuftings are black marked. The edges of the patagia are black along the disc and at the base of the wings. The thorax itself is small and quadrate, the maculation just described forming a black square in its centre. The abdomen is deep smoky brown, yellowish or whitish at tip. Primaries with all the lines black, prominent, yet fragmentary. Basal line single, accompanied by a few white scales, becoming diffuse at the inner margin. T. a. line single, followed by a white line, outcurved as a whole and irregularly bent or curved outwardly in the interspaces. It may or may not be connected with the basal line by a black bar below the median vein. T. p. line very irregularly dentate, broad, a little diffuse outwardly, preceded by a white line, the tooth on vein 4 carrying the line nearest to the outer margin. The median shade line is irregular, broken, almost upright, coming between the ordinary spots and tending to become obsolete below the middle of the wing. If complete the tendency is to a black powdering through the outer half of the median space. There is no s. t. line. The space between t. p. line and outer margin is even to a series of large black, interspatial terminal spots which are preceded by white scales. Beyond these spots the fringes are cut with blackish, the intermediate spaces whitish. Orbicular round or oval, more or less completely outlined in white and black. Reniform large, upright, a little constricted in the middle, an inner, diffuse white line to the incomplete black defining line. Claviform indicated by black scales and more or less white filled. The secondaries may be entirely blackish with white fringes, or there may be a whitish margin and base of indefinite extent. Beneath with a geminate extra-median line on all wings; secondaries with a large black discal spot. The primaries have the terminal space green, but within that everything is more or less black powdered to the base. A large black patch on the costa between the outer line and the terminal space. The breast is a mass of smoky blackish long fine hair. The legs are banded and ringed with black, white and green.

Expands 40 mm. = 1.60 inches.

Habitat: New Westminster, British Columbia, 1896 (Fletcher); Northwest Territory (Ottolengui).

Two males in good condition, very much alike, yet different. The specimen from Dr. Fletcher came some years ago and was associated with *Momophana Comstocki*, because of the tendency to powder or darken the outer portion of the median space. It was realized that the wing form was somewhat different; but this was not without the range of possible variation, and I had an example from Oregon that I yet believe to be *Comstocki*. The receipt of a fine example from Dr. Ottolengui makes clear a close relationship to *Feralia jocosa*, than which it is a much larger and more intensely coloured form. It is quite likely that the secondaries may vary to almost whitish with more or less blackish powderings.

Carneades cinereopallidus, n. sp.—Ground colour a peculiar, very pale ashen gray, more or less powdered with bluish dark gray scales; a little washed locally with luteous. Head concolorous. Collar with a blackish line across the middle, below which is a whitish line or shade which may involve the entire lower half. Tip edged with white scales, then luteous to the black line. Thorax with disc and patagia more or less whitish, the edges of the latter sometimes edged with black: more evidently so in the females. Primaries whitish powdered over the costal region; a luteous shading through the cell and in the s. t. space. A black, geminate basal line is obscurely marked; most obvious on and below the median vein. Median lines practically lost: the t. a. marked by the claviform and a slight difference in shade between basal and median spaces; t. p. a narrow paler line which is somewhat rigidly oblique. S. t. line narrow, whitish, preceded by black scales which may form rather vague sagittate spots. It is obviously dented by whitish rays on veins 3 and 4, which do not, however, quite reach the outer margin. Whitish rays on veins 6 and 7 do not, or only slightly, dent the line. A series of smoky, obscure, terminal lunules. A very pale yellow line at base of fringes. Claviform narrowly outlined by black scales, concolorous, usually with a paler shading above and beyond it. Orbicular oblique, oblong, varying in width, open to the costa, sometimes outlined by black scales, of the palest ground colour or a little whitish. Reniform rather narrow, kidney-shaped, pale yellowish, sometimes contrasting; not outlined except by the rather sharp colour contrast. Secondaries white, with a very narrow smoky edging in the male, a broader, variable outer

shading in the female. Fringes white. Beneath, white with a smoky disc on primaries, costal region powdered on secondaries, a smoky terminal line on all wings.

Expands 28-33 mm. = 1.12-1.32 inches.

Habitat: Stockton, Utah, in October. Four examples, two of each sex, and none of them good, are at hand from Mr. George Franck.

The species belongs with the *4-dentata* series; but is not especially well marked and recalls the *personata* form of *pitychrous*. It is best placed near *4-dentata*, and I am not sure that some specimens so marked will not prove referable to this new form.

The antennæ of the male have the lateral processes well marked and the bristle tufting long.

Carneades tronellus, n. sp.—Ground colour white with a yellowish tinge, ranging from faint lemon to creamy or even very pale luteous; the deeper shades in the females. Head and thorax concolorous, vestiture rather thin, long, patagia not marked. Primaries, in the males almost immaculate, the only obvious mark being a somewhat diffuse blackish spot at the end of the cell, representing the reniform. On close examination, scattered darker scales or slight shadings indicate the maculation which is obvious in the female. In the latter sex the primaries are more or less powdery and all the normal maculation is traceable, albeit in a fragmentary fashion, nor all of it in any one specimen. Basal line marked by black scales on costa and median vein. T. a. line geminate, the inner line is usually marked on the costa only, broken into imperfect interspatial lunules, as a whole a little outcurved. T. p. line geminate, inner line narrow, broken, feebly crenulated, blackish, outer line a vague shading: the course as a whole well curved over the cell and a little incurved below. A dusky costal patch in the s. t. space contrasts a little with the somewhat paler apex. Terminal space a little dusky and thus indicating a somewhat irregular terminal line. Secondaries white in both sexes, in the female with a faint trace of narrow extra-median line. Beneath white, primaries with a yellowish tint, practically immaculate in both sexes.

Expands 32-37 mm. = 1.28-1.50 inches.

Habitat: Stockton, Utah, in October. Three ♂ and three ♀, all more or less rubbed or otherwise imperfect, from Mr. George Franck.

The species is allied to *citricolor*, Grt., but is much lighter in colour and in the ♂ not nearly so well marked. On the other hand, in the

female the maculation is much better written. So great a difference between the sexes is not usual in this series, and I believe that more material will bring maculate males and more nearly immaculate females.

Mamestra orida, n. sp.—Ground colour ashen gray, powdered with black. Head inferiorly protuberant, a little roughened, yellowish in colour. Vague blackish lines across the front and vertex. Collar inferiorly a little paler; a more or less obvious black transverse line. Thorax powdery, patagia with obscure submarginal lines. Primaries powdery, the maculation obscure, except that the reniform and the s. t. line are always conspicuous. Basal line geminate, smoky, well marked; connected with base by a short black line in the submedian interspace. T. a. line marked by geminate blackish dots on costa and then lost. T. p. line also marked by costal spots and in some specimens by venular black dots, never complete. S. t. line whitish, irregular, with small outward teeth on veins 3 and 4, emphasized by the darker terminal space and a dusky preceding shade. A series of black terminal interspatial lunules. Fringes white at base, interlined with smoky, cut with paler on the veins, edges a little notch. Veins marked by blackish scales. Claviform broad, varying in length, outlined by blackish scales, concolorous. Orbicular rather small, oval, somewhat elongate, outlined in smoky brown, annulate with yellowish, smoky centered. Reniform large, kidney-shaped somewhat dilated inferiorly, and there obscured by a blackish, diffuse shading. Secondaries white, with a broad black outer margin, the fringes white. Beneath white, more or less powdery over the costal region. All wings with a broad, black submarginal band, and within this a series of black venular dots. Primaries with a discal lunule, secondaries with a discal dot. Tarsi annulate with black and white.

Expands 30-33 mm. = 1.20 to 1.32 inches.

Habitat: Stockton, Utah, in October.

Two ♂ and seven ♀ from Mr. George Franck, who has others which do not materially differ from the series under observation. The antennæ of the male have the joints a little marked, and are obviously ciliated. The genitalia are quite unique, and do not closely resemble those of any of the species figured by me in the revision.

It belongs to the group *defessa*, and may be most nearly associated with *chartaria*, differing obviously in the black-margined secondaries. The maculation of the under side is quite characteristic, and in all this species should be readily recognizable.

The protuberant, roughened front is somewhat unusual in this genus, but is not so marked as to require a separate generic term.

Caradrina drasteroides, n. sp.—Ground colour a creamy gray, with the yellowish tinge well marked. Head and thorax immaculate. Primaries powdered with black scales, which gives the gray tinge an emphasis; most of the s. t. and terminal spaces distinctly and evenly gray. The ordinary lines are not well marked. Basal line marked on costa only or not at all. T. a. line barely traceable by the absence of black scales; outwardly bent on the median vein, inwardly angled on the submedian. T. p. line better defined, geminate, only a little outcurved; inner line blackish or brown, sometimes emphasized on the veins; the outer line marked only by the darker s. t. space which relieves the pale shade following the inner dusky line. The median shade line is smoky or deeper luteous, well removed outwardly, and outwardly diffuse to the t. p. line. S. t. line whitish, almost even, a little better defined on the costa by a slight darkening in the s. t. space; well defined inwardly, somewhat diffuse outwardly. A series of minute black terminal dots, which may be wanting. Orbicular and claviform wanting. Reniform oblique, without definite outlines, dusky, obscured by the median shade, which crosses and completely involves it. Secondaries snowy white, with or without a small dark discal spot and a more or less obvious powdering of black scales at the base of the fringes. Beneath, primaries creamy white, the yellow most obvious along the costa, with a more or less obvious extra-median dusky line, and with or without a discal spot. Secondaries white, more or less creamy and powdery along the costa; a partial outer line and sometimes a small discal dot.

Expands 27-31 mm. = 1.08-1.24 inches.

Habitat: Southern California; Arizona. Two male examples; one in good, the other in fair condition.

The smaller specimen is from Arizona, and comes from the collection of Dr. Ottolengui. The larger specimen is from Southern California, and has been in my collection nearly or quite ten years awaiting a mate. The reference to *Caradrina* is not quite satisfactory, because of the wing form. This resembles more that of *Drasteria*, and there I expected at first to place it, but the species is obviously a typical trifold.

The vestiture is scaly, just a little roughened, forming no tufts of any kind. The palpi hardly exceed the front. The antennæ are very shortly ciliated.

Siavana rigida, n. sp.—Ground colour a somewhat yellowish brick red, through which a luteous base appears locally. Head and collar a deeper, more rusty red-brown. Thorax and abdomen otherwise immaculate, concolorous. Primaries without strong contrasts. The costa is a deeper red-brown, and in the costal area there is a light gray powdering. T. a. line single, very slender, slightly irregular, a little outcurved, bright red-brown, tending to disappear altogether. T. p. line slender, crenulate, single, with or without minute black venular dots; as a whole, nearly parallel with the outer margin. S. t. line a series of vague gray venular dots, which may be altogether wanting. The colour deepens a little, and becomes somewhat smoky at the outer margin, where a narrow yellow line marks the base of the fringes. Median shade line crimson red, rigidly oblique from the costa near the inception of t. p. line, touching the lower outer angle of the reniform and reaching the inner margin just within the t. p. line. This line tends to disappear and may be entirely absent, and there may or may not be a prominent black patch on the inner margin, filling the space between the t. p. line and median shade line. Orbicular a small blackish dot. Reniform moderate in size, rather narrow, slightly oblique, somewhat constricted centrally, narrowly brown ringed, the filling luteous, but not contrasting. Secondaries a little paler at base than primaries, but darkening outwardly to the same shade. The median shade of primaries is obviously continued across the secondaries, and the t. p. line is vaguely traceable. There is also a slightly-waved, narrow, yellowish line at the base of the fringes. Beneath there is a crimson powdering, which becomes paler along the inner margin of the secondaries. A vague, common outer line.

Expands 45 mm. = 1.80 inches.

Habitat: Huachuca Mts., Arizona. One male and one female from Dr. Barnes.

The species resembles the eastern *repanda* (*Harveya auripennis*, Grt.) in general appearance and in colour. In the ♂ the antennæ in the new species are decidedly more slender and the ciliation of the joints, though longer, is more sparse. So in *rigida* the apex is marked and the outer margin is a little excavated below it; in *repanda* the apex is obtuse and the outer margin is rounded. In the older species the median shade line is smoky, somewhat diffuse, and a little sinuate, almost parallel with the t. p. line; in the new species this line is rigid and crimson. Altogether, the differences, though not striking, seem to authorize the new species.

ARCTIC SIRICOIDEA AND TENTHREDINOIDEA.

BY W. HAGUE HARRINGTON, F. R. S. C., OTTAWA.

The knowledge of our Arctic insect fauna is of so fragmentary a character that any contribution thereto is of special interest and value to Canadian entomologists. I am indebted to Dr. Hans Kiaer, of the Museum of Tromsø, Norway, for a copy of an exceedingly valuable catalogue entitled "Die Arktischen Tenthrediniden,"* an examination of which emphasizes this fact. His introduction points out that in Canada little is known of the forms occurring north of St. Martin's Falls, Lat. 51°, whereas in Norway species are recorded from as far north as Lat. 70°. Of 228 species enumerated (including 12 of Siricoidea) Arctic Scandinavia furnishes 132, Nova Zemlya 18, Spitzbergen 6, Iceland 3, Greenland 2, Hudson's Bay region 59, Alaska 8, and Arctic Siberia 11. There is but one species common to Europe and America, and only 11 species in all occur in any two of the above regions, showing that the circumpolar fauna is not so cosmopolitan as is frequently supposed, although undoubtedly some forms now listed as distinct species may prove to be synonyms. *Rhogastera viridis*, Linn., is the sole link between the old and new worlds. *Sirex bizonatus*, Steph., and *S. caudatus*, Cress., are found in Hudson's Bay territory and in Alaska; *Cimbex femorata*, Zett., *Trichosoma lucorum*, Linn., and *Nematus miliaris*, Panz., in Arctic Scandinavia and Siberia; *N. arcticus*, Holmgr., and *N. frigidus*, Boh., in Nova Zemlya and Spitzbergen; *N. conductus*, Ruthe, and *Emphytus pallidipes*, Spin., in Arctic Norway and Iceland, and *N. obscuripes*, Holmgr., in Arctic Norway and Nova Zemlya. The percentage of Nematids to other forms is very large in the boreal and arctic faunas, and, apparently, increasingly so northward concurrently with changes in the flora. From the Hudson's Bay region this group is as yet not nearly

* FAUNA ARCTICA. Eine Zusammenstellung der arktischen Tierformen, mit besonderer Berücksichtigung des Spitzbergen-Gebietes auf Grund der Ergebnisse der Deutschen Expedition in das Nordlicher Eismeer im Jahre, 1898. Band II., Lieferung 3, 1902.

so well represented as is that of the Tenthredinids, clearly showing that the smaller and inconspicuous forms characteristic of the north have escaped the attention of the few collectors there, and that extensive additions could be made to the list of species, did not the inaccessibility of the region at present prevent systematic collecting.

A notable addition has been made to the knowledge of American species, since the preparation of Kier's catalogue, in the "Papers from the Harriman Alaska Expedition" (Proc. Wash. Acad. Sciences). No. XXVIII. (158 pages, 3 plates) is a monograph by Ashmead of all the Hymenoptera, describing 201 new species and enumerating 335 species now known from Alaska. No. VII., by Prof. Kincaid, deals specially with the Tenthredinoidea. This large and successful expedition to Alaska was in 1899, and Prof. Kincaid, as entomologist, made, during the months of June and July, very extensive collections. Among these were 56 species of sawflies, of which 32 were new species described in his paper. The list of Alaskan species was thus raised in one brief season from 7 species to 61 species, and the fauna was shown to be comparatively rich. Many of the species found on the Alaskan coast will undoubtedly extend eastward into Canada, through the Yukon. The Tenthredinids are represented by 22 species, of which 6 are new, and the Nematids by 27, of which no less than 21 are new, an indication of how little was previously known, and of how much remains to be learned. Some of the species have a very extensive range, as, for instance, *Pæcilostomidea maculata*, Nort., the well-known strawberry sawfly; *Dolerus scriceus*, Say; *D. aprilis*, Nort.; *Cimbex americana*, Leach, and *Trichiosoma triangulum*, Cr., all of which occur throughout Canada and over large areas in the United States. It is stated that an especially rich series of Nematids may be expected in the Alaskan region "owing to the immense abundance, both in species and individuals, of various kinds of willows." This will hold good in a great measure all across northern Canada, and insects which feed upon birch, spruce and other widely-distributed northern plants can also have an extended range. This is shown by the occurrence in Alaska of *Pachynematus ocreatus*, Harrgtn., described from Ottawa, and bred from a larva on spruce. One of the few species previously known from Alaska, *Tenthredo melanosoma*, Harrgtn., seems to be abundant, as seven specimens were collected, and I have also received two males and two females from Mr. W. Simpson, of Ottawa, who collected them, in 1894, at Burroughs Bay.

THE LIFE-HISTORY OF *CROCIGRAPHA NORMANI*, GRT.

BY ARTHUR GIBSON, CENTRAL EXPERIMENTAL FARM, OTTAWA.

On the 6th May, 1901, a cluster of 30 eggs of *Crocigrapha Normani*, Grt., was found by the writer. Six of these had been destroyed and the contents eaten, probably by some hemipterous insect. The eggs were laid in rows close together, touching each other, on the upper side of a leaf of *Caulophyllum thalictroides*, Michx., and formed almost a complete square, an average of six eggs being in each row. They looked as if they had just been laid. Young maple, ash and birch trees were growing near by.

Egg.—Almost semispheroidal; 0.7 mm. wide, 0.6 mm. high, about 31 ribs rising from almost near the base, which is flattened and pitted, making it appear roughened. The whole egg has a shiny appearance, particularly so towards and at the tip of each rib. The ribs are acutely angled, and the whole surface, except the base, is distinctly marked with wavy, transverse ribs. When found, the eggs were white. On the 7th May they were all ringed near the apex with reddish brown, and there was also a blotch of this colour near the apex. The eggs hatched on the 11th May.

Stage I.—Length, at first, 3.25 mm. Head 0.4 mm. wide, pale brown, slightly bilobed, with a shallow furrow down the front; mouth-parts reddish; hairs on face pale. Body cylindrical, pale yellow; after feeding, the food contents give a greenish appearance; skin smooth, shiny. The cervical shield is concolorous with head, and bears two rows of transverse tubercles, 4 large ones in front and 4 smaller ones behind. Tubercles on body shiny black, large, single-haired; tubercles i and iii in a line, ii and iv almost in a line, but iv nearer to iii than ii is to i. Spiracles very minute, faintly black, and in a line with tubercle iv, and about the same distance from tubercle iii as from iv; setæ short and black. A faint dark green dorsal vessel is apparent. All the feet are concolorous, slightly darkened at tips. The first two pairs of abdominal feet on segments 7 and 8 are aborted, only being about half formed.

The young larvæ are "loopers," and spin a considerable quantity of silk; when disturbed on a leaf, they rise up on their prolegs and assume a sphinx-like attitude. Apple, beech, willow, elm, basswood, wild gooseberry, ash, plantain, birch and wild cherry were offered, and while they fed on nearly every one of these plants, elm and beech were the favourite food.

On the 15th May most of the larvæ were swollen and ready for the first moult; on the 16th and 17th they cast their skins.

Stage II.—Length, 5.5 mm. Head 0.7 mm. wide, brownish yellow; on each cheek there are two large dark brown round spots. In some specimens these two spots are almost black, and the whole face is sparsely mottled with small spots of the same colour; ocelli dark; mouth-parts reddish; antennæ faintly reddish. There is now a great difference between the larvæ in this stage and in last stage. A distinct white dorsal stripe is now present, also a lateral stripe of the same colour, and a wide stigmatal band, which is double on some segments. The whole dorsal surface of the larvæ, just after moulting and for a day or so, is dark green, but afterwards becomes less dark in colour, the skin below spiracles being still paler. In some specimens the skin between the lateral stripe and the stigmatal band is quite dark, almost black. The cervical shield is concolorous with body. The feet are all pale green, the first pair of abdominal prolegs aborted. The thoracic feet bear black plates exteriorly.

On the 19th May several were swollen, and by the morning of the 20th four had moulted. The remaining specimens had all moulted by the 21st.

Stage III.—Length, 10 mm. The general appearance of the larvæ in this stage is much the same as just after last moult. Head 1.0 to 1.1 mm. wide, slightly bilobed, the two spots, one on each cheek, in all but a few specimens are now joined together, and appear as one large conspicuous mark shaped like a dumb-bell. The face is shiny and of the same brownish yellow as before; the brownish blotches, as in last stage, are also present over the whole face; ocelli black; mandibles reddish. Body of a rather geometrid appearance, colour above spiracles dark grayish green, below spiracles lighter green. The dorsal and lateral stripes are faintly bluish. The tubercles are black and very small. The stigmatal band now appears as a double stripe, joined together at the junction of each segment, and resembles a chain of links. The space between the double stigmatal stripe and the lateral stripe is darker than the dorsal area, and in some specimens this space is almost black, giving the appearance of a wide, black, lateral band. The spiracles are pale, ringed with black. Cervical shield concolorous with body. Thoracic feet and prolegs concolorous with venter, bearing short pale hairs. Claspers of abdominal and anal feet reddish. The first two pairs

of abdominal feet are fully formed in this stage, and are used by the larvæ when walking. Thoracic feet blackish at tips; abdominal feet shaded with black towards base. The larvæ do not change during this stage, and remain the same colour as just after moulting. They still have the habit of assuming the sphinx-like attitude.

On the 23rd May some specimens were swollen, and by the 25th all but four had moulted. These passed the third moult soon afterwards.

Stage IV.—Length, 17 mm. Head 1.5 to 1.6 mm. wide, very slightly bilobed. The larvæ in this stage do not show any difference from the last stage. The markings are exactly the same, no change whatever could be detected. The dorsal area is perhaps a little darker than in Stage III.

On the 27th May four specimens were swollen, and these had moulted by the morning of the 28th. The remaining larvæ moulted during the next two days.

Stage V.—Length, 21 mm. Head 2.0 to 2.2 mm. wide. In this stage also the larvæ do not show any material difference from Stage III. The whole dorsal surface is rather darker, and, in consequence, the black band on the sides does not appear so conspicuous. The whole skin above the spiracles is a dull-grayish green, finely mottled with black. The lateral stripe is fainter than before. The centre of the spiracle is pale orange in this stage, but ringed, as before, with black.

On the 31st May two larvæ passed the fifth moult, and the remaining specimens within the next few days.

Stage VI.—Length, 27 mm. The larvæ in this stage are very different from the last three stages. Head 3.1 to 3.4 mm. wide, brownish, very slightly bilobed, shiny; almost the whole upper surface of each cheek consists of one large, black, elongated spot. Between the two large spots the face is darker brown than the lower front of head, and is reticulated with the same colour. On the lower front and sides there are also some darker brown blotches; ocelli black; setæ pale and slender; at base of each hair there is a small dark brown spot. The head in the last three stages becomes darker with each moult. Body cylindrical; dorsal and lateral stripes, as well as the black band between lateral stripe and spiracles, are very faint now, the dorsal stripe being the most perceptible. The whole skin above the spiracles is now one mass of beautiful, small, wavy, black dashes, spots and blotches, the skin itself being of a dull yellowish gray, a pale reddish brown, or a dull grayish

green, the shade varying in almost each larva. Superficially, however, the colour is much the same, and does not vary to a striking extent. On all the specimens there is a distinct purplish or reddish sheen between the segments. The venter in all the specimens is paler than the dorsum. Cervical shield darker than body. Tubercles small, black, normal; setæ pale and slender. Tubercle iv behind the spiracle. Spiracles black, with a pale centre. Feet concolorous with venter; thoracic feet shiny; claspers of prolegs blackish.

Length of mature larva at rest, 35 mm.; extended, 42 mm.; width at widest part, 5.75 mm.

On the 13th June four larvæ buried, on the 14th two, on the 16th two, and the remaining specimens soon afterwards. Pupation takes place within an earthen cell.

Pupa.—Average length, 17 mm.; width, 5.5 mm.; colour almost a warm sepia brown, polished; thorax, wing-cases, etc., finely wrinkled with transverse lines; abdomen polished, the segments pitted anteriorly. Cremaster stout, darker than abdomen, rugose, excavated beneath, with two slender straight spines, about 0.7 mm. in length, at the tip. These spines are pointed downwards, and are distinctly curved at the end.

The first moth emerged (in a cool cellar) on the 17th Feb., 1902, and four other specimens emerged on the 12th May, which is the natural time for the imago to appear (Ottawa, April 29, May 4, 7, 10, 21, 23, 25, 29, Fletcher, Young, Gibson; Toronto, Ont., May 9, 17, Gibson; Trenton, Ont., May 24, Fletcher; Chats Rapids, Que., May 24, Gibson).

On the 25th May, 1901, two larvæ of this species were found on the common Beaked Hazelnut (*Corylus rostrata*, Ait.) on the Experimental Farm, and had only emerged from the egg a few days. These were reared to maturity (the larvæ being fed solely on this plant), and the caterpillars answered well to those described above, the only apparent difference being that in Stage I the cervical shield was partly margined with black.

THE OCCURRENCE OF THE PHORID GENUS *AENIGMATIAS* IN AMERICA.

BY D. W. COQUILLET, WASHINGTON, D. C.

The occurrence in Arizona of a representative of a very anomalous wingless genus of Phoridae, of which but a single specimen was heretofore known, and that found beneath a stone in such a widely-separated locality as Denmark, is a problem in geographical distribution very difficult of solution. During the entomological excursion of Messrs. E.

A. Schwarz and H. S. Barber to portions of New Mexico and Arizona in the summer of 1901, while collecting at the base of a hill at Flagstaff, Arizona, Mr. Barber obtained in his sweeping net a single specimen of the cockroach-like genus *Aenigmatias*. This specimen agrees closely with Dr. Meinert's original description and figures of his *Aenigmatias blattoides**, except that it has only six instead of seven body-segments, not counting the genitalia. Thinking that perhaps an error had been made by the engraver, and that the description had been made conformable to the engraved figure, I addressed a letter on the subject to Dr. Meinert, who, under date of November 18, 1902, writes me that, in company with his assistant, Mr. Boving, he again examined the unique specimen and found that his published figures and descriptions are correct, and that the specimen really has seven distinct body-segments. In the genus *Phora* the male has normally six abdominal segments, while in the females of the various species the number ranges from four to six, according to the species. Dr. Meinert does not state the sex of his specimen, but the figures apparently indicate a male, although Prof. Mik has expressed the opinion that they probably represent the female, and that the winged *Platyphora Lubbocki*, Verrall, may be the male of the same species. The Arizona specimen also appears to be a male, and in addition to the fewer number of segments in the abdomen, possesses several minor differences, which indicate that it is specifically distinct from the Danish species.

Of its habits nothing is known beyond the fact that it occurred on low vegetation in a locality where no ant-nests could be found, although search was made for them. No stones nor rocks occurred in the immediate vicinity, the nearest approach being the small pieces of lava scattered about, but these were too small to conceal an ant-nest.

The new form may be characterized as follows :

Aenigmatias Schwarzii, new species.

Dark yellow, the posterior part of the body-segments brown, most extended on the apical part of the abdomen, where it covers the genitalia and the greater portion of the last two segments ; upper side of body opaque, distinctly whitish pruinose, and with a short, sparse, yellowish-white pubescence, a row of short black bristles along the hind margin of each abdominal segment and a few shorter ones scattered over the last two segments ; first thoracic segment (which comprises the prothorax and

*Entomologiske Meddelelser II., page 213, plate IV., figs. 1 to 6.

mesothorax) slightly over twice as long as the second, the latter almost twice as long as the first abdominal segment and subequal to the second; about two-thirds as long as the third, the fourth segment deeply emarginate in the middle, at which point it is slightly shorter than the first abdominal segment; greatest vertical diameter of abdomen scarcely more than that of the thorax, venter convex (and without the blackish protuberance shown in Dr. Meinert's figure 2); head sparsely clothed with a short yellowish-white pubescence, a row of black postocular bristles extends from upper end of each eye to the oral margin, apices of palpi beset with a dense cluster of black bristles; legs beset with short, black, bristly hairs, femora very robust; length, 1.5 mm.

Collected July 5, 1901, at Flagstaff, Arizona, by Mr. H. S. Barber, at whose request the species is dedicated to Mr. E. A. Schwarz, whose careful investigations have brought to light so many rare and interesting forms in all orders of insects. Type No. 6703, U. S. National Museum.

NOTES ON THE COCCIDÆ.

BY MRS. C. H. FERNALD, AMHERST, MASS.

In an article on the genus *Lecanium*, published in the *CANADIAN ENTOMOLOGIST*, Vol. 34, p. 177 (1902), I stated that I inferred that Costa proposed generic names for the Coccidæ in his *Prospetto di una nuova descrizione metodica del genera Coccus L.*, a work I had not seen at that time, as no copy could be found in the libraries of this country or in London. Mr. Fernald has, however, recently secured a copy of this exceedingly rare work, published in 1828, from Naples, Italy.

Costa in his *Prospetto* published in 1828 proposed and described three genera. These were *Calymmata*, *Diaspis* and *Diaprosteci*. As this last is only a vernacular name, it need not be considered, although the author gave *Coccus adonidum*, L., as an illustration. *Calymmata* was divided into Monaspidæ and Polyaspidæ. Under this genus the author mentioned several species as illustrations. The genus *Diaspis* was described, but as no species were mentioned or referred to, it is without a type so far as the *Prospetto* is concerned. There is therefore nothing in this work to affect the classification of the Coccidæ.

In his *Nuove Osservazioni intorno alle Cocciniglie*, published in 1835, Costa used *Calypticus hesperidum* in some places and *Calymmatus hesperidum* in others, while he used *Dactylopius* instead of *Diaprosteci* of the *Prospetto*. In the *Fauna del Regno di Napoli*, he divided the Coccidæ into three genera, *Calypticus*, *Dactylopius* and *Diaspis*, each of which was described and with well-known and fairly well described species under them.

CASSIDA VIRIDIS, LINNEUS.

In the October number of the CANADIAN ENTOMOLOGIST, I told of the appearance at Levis of a tortoise-beetle new to this Province.

A question as to the identity of this insect having been raised, I asked Professor E. A. Popenoe, of Kansas State Agricultural College (to whom I was sending specimens), for his opinion upon it. I also sent specimens to the Coleopterist of the British Museum, with a like request. Both gentlemen very kindly answered me.

Mr. Popenoe wrote: "In Redtenbacher's Fauna Austriaca, the only general European work on the species within my reach, there is a very good analytical table and fairly full descriptions of the species within the limits of the work, and I find your specimens to agree with his description of *Cassida equestris*, Fab., of which he places *C. viridis*, L., as a synonym. I am satisfied that your determination is correct. Redt. says the margin of the abdomen is yellow, and it is so in one of your specimens, though not distinctly so in the other."

Mr. Chas. O. Waterhouse replied: "I have carefully examined the *Cassida* you sent me, and I am sure it is our common thistle species, *Cassida viridis*, L."

I am glad to find that my reading and my early recollections of the English insect did not mislead me.

In *Illustrations of the Linnean Genera of Insects*, by W. Wood, Vol. I., there is a coloured representation of *C. viridis*, and in the Rev. J. G. Wood's *Insects at Home*, Fig. xxiii., the insect is shown in its different stages.

C. viridis, like the fly, *Pegomyia bicolor*, and the moth, *Metzneria lappella*, was probably brought out in supplies of fodder for cattle sent to this country.—THOMAS W. FYLES, Levis, P. Que.

BOOK NOTICE.

A NATURAL HISTORY OF THE BRITISH LEPIDOPTERA, VOL. III.—By J. W. Tutt, F. E. S. Demy 8 vo, 558 + xii. pp. Price, £1 net. Swan, Sonnenschein & Co., Paternoster Square, London, E. C.

The third volume of Tutt's *British Lepidoptera* has appeared, and is fully up to the standard of the first two volumes. The superfamily *Lachneides* is completed, the superfamilies *Dimorphides* (*Endromides*), *Attacides* and a part of the superfamily *Sphingides* are finished.

The references to literature, ancient and modern, seem to leave nothing more to be desired in this respect ; in fact, the amount of labour performed and research that has been made seems almost appalling, and we wonder whether the author has the strength and endurance to carry such an undertaking through to completion.

This work may well be taken as a model by one who is less experienced, provided he does not follow it too closely and thus destroy his own originality of thought and plan.

Under each superfamily is given a very complete history of the classifications of the different authors. These are carefully discussed, and when the author differs from others, he does not hesitate to express his convictions.

Many of our old familiar names have disappeared, and are to be found only among the tail-feathers of synonymy. This is, however, strictly in accordance with the law of priority, and if any of us feel unreconciled to this, we may well ask ourselves whether we are to keep up with the trend of modern scientific thought or fall by the way.

Under each species is given the synonymy and references to literature, so full and complete that we can hardly imagine anything of importance to have been overlooked. Then follows the original description in the language in which it was published, and this is followed by the author's description of the imago. There is then given a full account of sexual dimorphism and gynandromorphism, more than five pages being devoted to gynandromorphous examples of *Amorpha populi*, L. Variation is also taken up very fully with all the forms described and named, and this requires seven pages for *A. populi* alone. A complete account is given of the time, place and manner in which the eggs are laid, followed by a full description of the egg, the larva in each "stadium," and variations of the larva, pupation and cocoon, pupa, food-plants, parasites, habitats, time and place of appearance and distribution.

While this work must prove indispensable to the entomologist who desires full information on the Lepidoptera of the British Isles, it will be exceedingly valuable to students of the Lepidoptera in the United States and elsewhere, because of the exhaustive study of the literature of the genera and higher groups, and the careful and conscientious manner in which the author applies the laws of nomenclature.—C. H. FERNALD.