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A HAND-BOOK TO THE ORDER LEPIDOPTERA.

BY
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EDITOR'S PREFACE.

WITH this volume Mr. Kirby brings to an end his review of the Lepidoptera. In addition to the illustrations of British Butterflies and Moths, which have been made the principal subject of these entomological volumes of the Naturalist's Library, a large number of exotic species have been figured for the first time, while the author has taken the present opportunity to revise the nomenclature of many genera and species. His great knowledge of the Bibliography of Entomology renders this portion of his studies of especial interest.

R. BOWDLER SHARPE.

Chiswick, April, 1897.

AUTHOR'S PREFACE.

THE present volume completes the series on the Order *Lepidoptera*, as sketched out in the Preface to vol. ii. It includes the *Noctuæ* and *Geometræ*, among the larger Moths, and the *Micro-Lepidoptera*. The first two sections are treated as fully as the preceding groups, all the more important families being noticed or illustrated; but in the case of the *Micro-Lepidoptera*, which, though comparatively little studied, probably far exceed the *Macro-Lepidoptera* in numbers, it was naturally impossible to do more than describe and figure a selection of species belonging to various families, without extending the work to one or two more volumes.

A much larger number of species are described and figured in this volume than in any of the preceding ones, and a considerable number are here figured for the first time. In these cases I have thought it best, as a rule, to reprint the original description of the author who described the species.

As before, Newman's figures have occasionally been drawn upon, in order to illustrate the subjects more fully than the limited number of plates at our disposal would allow. As regards the coloured plates, most of the figures on pl. clviii., and some of those on pl. clvi., are magnified; but the real dimensions are given in the text.

I am indebted to Mr. A. W. Kappel, F.L.S., the Librarian of the Linnean Society, for kindly looking up the abstracts of a paper by the Rev. Lansdown Guilding, which had been lost sight of by Entomologists, and one of which I have reprinted at pp. 267–269.

W. F. KIRBY.

Chiswick, April, 1897.

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THE MOTHS—LEPIDOPTERA HETEROCERA.

(Concluded.)

NOCTUÆ.

This name is applied to a very extensive and homogeneous group of the larger Moths. The most comprehensive classification of the *Noctuæ* was proposed by Guenée in 1852, in his "Species Générale des Lépidoptères: Noctuellites"; but in 1857 another system was published by Lederer in his "Noctuinen Europa's," in which he arranged the genera almost without troubling himself to sort them into families. Later authors have followed an intermediate course, and instead of dividing the *Noctuæ* into groups, sub-groups, and a large number of families, have divided them into a limited number of families only. However, many small groups appear to be natural, and these we propose to treat as Sub-families in the present work. The following characters may be taken as of general application.

Larva.—Cylindrical, naked or pubescent, rarely tufted or hairy; with sixteen legs, or with the first and second pairs of pro-legs more or less rudimentary.

Pupa.—Subterranean; or rarely enclosed in a cocoon.

Imago.—With moderately stout bodies (rarely slender). Antennæ filiform, or, rarely, pectinated; proboscis usually well

developed. Fore-wings triangular; hind-wings broader than the fore-wings, more slender, and folded beneath them like a fan when at rest; nearly always differently, and usually obscurely, coloured; frenulum present. Flight nocturnal or crepuscular; in some families diurnal.

FAMILY XL. THYATIRIDÆ.

Larva.—With sixteen legs, smooth or slightly humped, feeding exposed on trees and shrubs, or between leaves slightly connected with silk.

Pupa.—Usually enclosed in a slight cocoon among moss or rubbish at the foot of the tree on which the larva has fed; more rarely in the mass of leaves towards the extremity of a branch frequented by the larva.

Imago.—Moderately stout, downy; antennæ simple, slightly thickened in the males; wings moderately long and broad, entire, and with the discoidal nervule rising almost from the middle of the discoidal cell; or in the hind-wings, sometimes a little lower; hind-wings, with the costal and sub-costal nervures approximating, and almost or quite united above the end of the cell.

This Family is now classed by many authors with the Bombyces.

GENUS THYATIRA.

Thyatira, Ochsenheimer & Treitschke, Schmett. Eur. iv. p. 77 (1816); vi. (2), p. 161 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 10 (1852).

Eyes naked; palpi long, hairy; last joint naked, very long; antennæ ciliated in the male; thorax with a double crest, approximating in the middle; abdomen slightly crested at the base; wings rounded, marked with large spots; fore-wings

with two of the sub-costal nervules forking near the tip; hind-wings with the discoidal nervule rising near the upper median nervule. Larva with deep incisions, and bifid elevations on the back.

The type of this genus is widely distributed in Europe and Northern and Western Asia. Species or varieties differing little from the European form are likewise met with in India, and in North America as far south as Mexico.

THE PEACH-BLOSSOM MOTH. THYATIRA BATIS.

(*Plate CXXVII., Fig.* 2.)

Noctua batis, Linnæus, Syst. Nat. (ed. x.) i. p. 509, no. 72 (1758); id. Faun. Suec. p. 308 (1761); Esper, Schmett. iv. (i) p. 59, Taf. 86, figs. 6–8; iv. (2) 2, p. 54, Taf. 193, figs. 7–9 (1786); Hübner, Eur. Schmett. iv. fig. 65 (1799?).

Thyatira batis, Treitschke, Schmett. Eur. v. (2), p. 162 (1825); Curtis, Brit. Ent. ii. pl. 72 (1825); Stephens, Ill. Brit. Ent. Haust. iii. p. 48 (1829); Kirby, Eur. Butterflies and Moths, p. 144, pl. 32, figs. 1–1 b (1880); Buckler, Larvæ of Brit. Lepid. iv. pl. 54, figs. 2–2 b (1891); Barrett, Lepid. Brit. Isl. iii. p. 190, pl. 116, figs. 2, 2 a–c (1895).

The Peach-blossom Moth, which is named from the colour of the spots on the fore-wings, is one of the prettiest species found in Britain, and is not rare. The fore-wings are olive-brown, with dark waved transverse lines, darkest towards the base, and with five pale rose-coloured spots on each wing. The largest of these is at the base, and is clouded with brown; two are near the tip, and are sometimes united; a fourth is situated at the hinder angle, and has a brown spot in the middle, and the smallest is on the inner margin. The hind-wings are ochreous-grey, with a pale waved line near the middle, and are darker in the females than in the males.

The Moth is fairly common throughout the British Isles. It expands about an inch and a half. The larva is brown, varied with rusty red, and has an elevation on the third segment, which is bifid at the extremity and directed forwards; and there are five smaller pointed elevations on the back, commencing on the sixth segment, in front of the last of which is a dark quadrilateral spot.

It feeds on bramble, and clings to the under surface of the leaves.

GENUS HABROSYNE.

Habrosyne, Hübner, Verz. bek. Schmett. p. 272 (1822?).
Gonophora, Bruand, Mém. Soc. d'Émul. Doubs. (2) i. p. 89 (1845); id. Ann. Soc. Ent. France (2) vii. p. 42 (1849).

General characters of *Thyatira*, but the antennæ are scarcely ciliated, the palpi hairy, rather short, the last joint naked, and the fore-wings with pale oblique lines, an accessory cell, and with the sub-costal nervules well separated; hind-wings with the discoidal nervule and upper median nervule well separated at their origin. The larvæ are cylindrical and without elevations.

THE BUFF ARCHES. HABROSYNE DERASA.

(*Plate CXXVII., Fig.* 1.)

Noctua derasa, Linnæus, Syst. Nat. (ed. xii.) i. (2) p. 851, no. 158 (1767); Esper, Schmett. iv. (2) 1, p. 449, Taf. 142, fig. 1 (1791?); iv. (2) 2, p. 54, Taf. 193, figs. 4–6 (1799?); Hübner, Eur. Schmett. iv. fig. 66 (1799?).
Thyatira derasa, Treitschke, Schmett. Eur. v. (2) p. 165 (1825); Stephens, Ill. Brit. Ent. Haust. iii. p. 47 (1829); Buckler, Larvæ of Brit. Lepid. iv. pl. 54, figs. 1–1 b (1891).

Gonophora derasa, Kirby, Eur. Butterflies and Moths, p. 143 (1880); Barrett, Lepid. Brit. Isl. iii. p. 186, pl. 116, figs. 1–1 b (1895).

The Moth is of about the same size as the preceding, and is common in most parts of Central and Eastern Europe, as well as in Northern and Western Asia. The fore-wings are yellowish-grey at the base, and are crossed by two oblique white bands, one running from the costa to a little beyond the middle of the inner margin, and the other from the apex to the hinder angle. The triangular area bounded by these bands is clouded with brown and white, and there is a transverse series of parallel fine zig-zag brown lines, forming very acute angles on a whitish ground. The hind margins are brown, with two rows of small white arches, surmounted by an ill-defined white line. The fringes are also whitish. The hind-wings are dusky, slightly tinged with ochreous, and have whitish fringes.

The larva feeds on bramble, and may be found till the end of September. It is smooth, but has a few fine scattered hairs. The head is large, and deep brownish-yellow like the body. On the back of each segment is a coffee-brown hexagonal spot, with a black line running longitudinally through it. Beneath these is a line composed of blackish-brown dots, and the fifth, sixth, and seventh segments have a pale yellowish spot on the sides, bordered with black, and the third and twelfth segments have an elevation on the back. The body is brownish-grey beneath.

The day before their metamorphosis, the larvæ become dingy brown. When at rest they often assume a curved position.

The pupa is greyish-black, thickened in front, with very deep incisions. The terminal spine is simple. The moth appears at the same time as *Thyatira batis*, and, like it, is fairly common, without being actually abundant.

GENUS BOMBYCIA.

Bombycia, Hübner, Tentamen, p. 1 (1810?).
Tethea, pt. Ochsenheimer, Schmett. Eur. iv. p. 64 (1816).
Palimpsestis, pt. Hübner, Verz. bek. Schmett. p. 273 (1822?).
Cymatophora, pt. Treitschke, Schmett. Eur. v. (1), p. 77 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 16 (1852), *nom præocc.*
Ceropacha, pt. Stephens, Ill. Brit. Ent. Haust. iii. p. 51 (1829).

The remaining European species of the *Thyatiridæ* differ considerably from each other, but some authors include them in one genus, and others separate them into several. The names quoted above are only a few of those which have been applied to them. The Moths are green, brown, and grey, with transverse lighter or darker, and sometimes slightly zig-zag, lines; and they differ essentially from the foregoing genera in the abdomen not being crested. The larvæ mostly live between leaves, and often rest with their bodies more or less curved. The section to which *Bombycia or* belongs may be distinguished by the naked eyes, moderately stout body, which is slightly longer than the hind-wings (though more slender than in the hairy-eyed species of the group), by the hairy legs and palpi, and comparatively narrow wings.

THE POPLAR LUTE-STRING. BOMBYCIA OR.

Noctua or, Fabricius, Mant. Ins. ii. p. 165, no. 202 (1787); Hübner, Eur. Schmett. iv. fig. 210 (1799?).
Noctua octogena, Esper, Schmett. iv. (2), i. p. 388, Taf. 128, fig. 5 (1790?); iv. (2) 2, p. 6, Taf. 180, fig. 5 (1794).
Cymatophora or, Treitschke, Schmett. Eur. v. (1), p. 98 (1825); Kirby, Eur. Butterflies and Moths, p. 144, pl. 32, figs.

2–2 b (1880); Buckler, Larvæ of Brit. Lepid. iv. pl. 54, figs. 6, 6 a (1891); Barrett, Lepid. Brit. Isl. p. 198, pl. 117, figs. 2–2 c (1896).

Ceropacha or, Stephens, Ill. Brit. Ent. Haust. iii. p. 53 (1829).

The Poplar Lute-string.

This species expands about an inch and a half. It is common in most parts of Central and Northern Europe, and in Northern Asia.

The fore-wings are ashy-grey, sometimes slightly shot with a peach-blossom tint. The base is very light-coloured, and is bounded by a dark double stripe, beyond which is another double dark zig-zag stripe. Beyond these stripes are two light green spots on a pale ground, the inner of which is sometimes entirely wanting. The outer is elongated, notched above and with a small brown streak beneath. Beyond the central area is another dark double zig-zag line, and then a pinkish gloss, containing a whitish line, which commences at the apex in a curved blackish streak, and is crossed by five blackish nervures. The fringes are brown, streaked with black. The hind-wings are yellowish-grey in both sexes, with darker hind margins, and occasionally a lighter band in the middle. The fringes are greyish-white.

The larva feeds on various species of poplar. It is pale green, or yellowish green, with a rusty-brown head, a dark dorsal line, and a yellowish spiracular line, in which the spiracles stand out white.

The pupa is found in late autumn and early spring at the foot of the tree on which the larva has fed, between fallen leaves which it has spun together.

FAMILY XLI. AGROTIDÆ.

This and the following families of *Noctuæ* differ from the *Thyatiridæ* essentially by the discoidal nervule rising near to or (rarely in the earlier families) from the same point as the upper median nervule, in which latter case it resembles a fourth median nervule, and the median nervure is then said to be four-branched. Sometimes, however, this nervule rises from the middle of the cell in the hind-wings.

There is a peculiar arrangement of markings found in the fore-wings of a great number of Moths, but most often in the *Noctuæ*, which is so well marked that it is called the "*Noctua* pattern."

The fore-wing is crossed by four transverse lines. One, towards the base, is generally incomplete below, and is called the half-line; the next is the first transverse line, and is situated before the middle. There is rather a wide space between this and the second transverse line, or elbowed line, and towards the hind margin is the sub-terminal line, which not infrequently forms a W. These lines may be present or absent, or straight or zig-zag, but some of them are nearly always visible. Between the first and second transverse lines are two markings, one usually placed in the cell and rounded; the other covering the end of the cell and somewhat kidney-shaped. These are called the "orbicular stigma" and the "reniform stigma" respectively; and towards the inner margin, below the orbicular stigma, we often find a third mark, forming a long triangle or streak, and called the "claviform stigma." Between the orbicular and reniform stigma, we often find

a more or less suffused transverse stripe, called the central shade.

The *Agrotidæ*, as the name is here employed, correspond in the main with the *Trifidæ ; Bryophilidæ*, *Bombycoidæ* and *Genuinæ* of Guenée. In these the median nervure is usually only three-branched, whence the name, *Trifidæ*.

Larva.—Generally naked or downy, feeding on low plants, and sometimes beneath the surface of the ground.

Pupa.—Usually subterranean.

Imago.—Usually rather stout; antennæ rarely pectinated; size moderate, or rather small; colours generally subdued; hind-wings generally broader than the fore-wings, and of much weaker structure; the discoidal nervure usually separated at its origin from the upper median nervule, and often more or less rudimentary.

This is a very extensive family, including a great number of sections, and to it belong by far the larger number of *Noctuæ* which inhabit temperate climes.

SUB-FAMILY I. BRYOPHILINÆ.

The types of this sub-family are rather small and slender Moths, and their wings are marbled with green, grey, brown, and whitish. Their larvæ feed on lichens.

GENUS BRYOPHILA.

Pœcilia, Schrank, Fauna Boica (2) ii. p. 157 (1802), *nom. præocc.*

Bryophila, Treitschke, Schmett. Eur. v. (1), p. 47 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 22 (1852).

This is the typical genus of the sub-family. There are several European species, some of which are British; and the genus is also fairly well represented in North America.

THE MARBLED GREEN. BRYOPHILA MURALIS.

Noctua muralis, Forster, Nov. Spec. Ins. p. 74 (1771).
Noctua lichenis, Fabricius, Syst. Ent. p. 614, no. 102 (1775); Esper, Schmett. iv. (1), p. 287, Taf. 118, fig. 8 (1789?).
Noctua glandifera, Denis & Schiffermüller, Syst. Verz. Schmett. Wien, p. 70, no. 2 (1776); Hübner, Eur. Schmett. iv. fig. 24 (1799?).
Bryophila glandifera, Treitschke, Schmett. Eur. v. (1), p. 58 (1825); Stephens, Ill. Brit. Ent. Haust. iii. p. 44 (1829); Buckler, Larvæ Brit. Lepid. iv. pl. 55, figs. 4–4 c (1891).
Bryophila muralis, Kirby, Eur. Butterflies and Moths, p. 152 (1880).

The Marbled Green.

This Moth expands from an inch to an inch and a quarter. It is found in most parts of Europe and temperate Asia. The fore-wings are pale green, with a transverse row of black streaks, edged on the outer side with white. In the middle of the wing is a second double dark line, filled in with dark brown, and bordered likewise with white. This is connected near the inner margin with the basal row of spots by a sinuated black streak. The stigmata are bordered with black, as is also the third transverse line. The sub-marginal line rises from a black spot on the costa, and has two excavations filled in with black. The fringes are marked triangularly with black and white. The hind-wings are lighter in the male than

in the female. They are speckled with white and ashy, and are generally marked with a central lunule. Towards the margins the ashy-grey colour becomes darker, and almost constitutes a band between a sharply defined brown line and the uniform white fringes.

The larva is found in spring on *Jungermannia*, especially when growing on oak-trees; and on lichens growing on walls. It has a brown head, and a pale blue or grey dorsal line, bordered with black. The body is dark yellow, barred with black. It is full grown in July, and assumes the pupa state in a firm cocoon under moss. The Moth appears about a month later.

SUB-FAMILY II. ACRONYCTINÆ.

These are stout-bodied Moths of moderate size, with the fore-wings varied with grey, black, brown, and sometimes green. The hind-wings are grey, brown, or whitish. The larvæ differ much in structure and appearance, but are more or less hairy, or tufted, and feed on trees. Several species are remarkable for having a black dagger-shaped mark towards the hinder angle of the fore-wings.

GENUS ACRONYCTA.

Acronicta, Ochsenheimer, Schmett. Eur. iv. p. 62 (1816).
Acronycta, Treitschke, Schmett. Eur. v. (i), p. 3 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 41 (1852).

There are about a dozen British species usually included in this genus. They differ much in the structure of their larvæ, so much so that some authors have referred them to different families of *Bombyces* and *Noctuæ*. We figure one of the commonest species, *A. psi* (Linn.), but there are two other European species, *A. tridens* (Den. & Schiff.) and *A. cuspis*

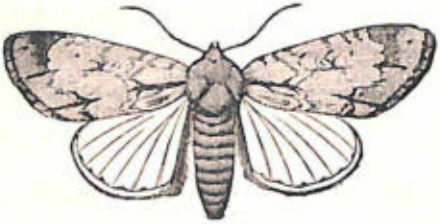
(Hübner), which resemble it so closely as to be hardly distinguishable in the imago state, though the larvæ differ considerably. *A. tridens* (the Dark Dagger) is common in England, though less so than *A. psi*. *A. cuspis* is not British, though it is not rare in many parts of the Continent.

THE COMMON DAGGER. ACRONYCTA PSI.

Noctua psi, Linnæus, Syst. Nat. (ed. x.), i. p. 544, no. 96 (1758); id. Faun. Suec. p. 314, no. 1181 (1761); Esper, Schmett. iv. (1), p. 242, Taf. 115, figs. 1, 2 (1789 ?).

Noctua tridens, Hübner, Eur. Schmett. iv. fig. 4 (1799 ?).

Acronycta psi, Treitschke, Schmett. Eur. v. (1), p. 30 (1825); Stephens, Ill. Brit. Ent. Haust. iii. p. 39 (1829); Kirby, Eur. Butterflies and Moths, p. 149, pl. 32, figs. 7–7 a (1880); Buckler, Larvæ of Brit. Lepid. iv. pl. 56, figs. 2–2 b (1891); Barrett, Lepid. Brit. Isl. iii. p. 250, pl. 122, figs. 2–2 d (1896).



The Common Dagger.

The Common Dagger Moth expands about an inch and a half. It is found in most parts of Europe, Northern Africa, and Siberia. The head and body are ashy-grey, with a broad black line on the sides of the head and thorax. The fore

wings vary from whitish grey to brown, without any reddish or yellowish tinge. At the base is a conspicuous black line, and towards the hinder angle a mark shaped like a ψ. On the costa are several rather indistinct black streaks, and between the stigmata is an x-shaped black mark. The orbicular stigma is round, with a black edge, but the reniform stigma is very faint. The fringes are greyish brown at the base, and white at the tips. The hind-wings are more or less brownish, with the nervures at the tip and the hind margin darker. The larva feeds on beech, lime, poplar, alder, &c. It has a black head with two yellow stripes, and the neck is thickly covered with reddish-brown and dark grey hairs. On the fifth segment is a very long, black, erect, conical, fleshy, tubercle. The dorsal line is broadly sulphur-yellow and terminates in a tapering elevation, which points backwards, on the twelfth segment. The sides are black, with deep red, slightly curved, vertical streaks, generally two on each segment, approximating above, and there is a small white spot between them on four of the segments. The legs are yellowish-brown and above them runs a whitish longitudinal stripe. The pupa is deep reddish-brown, elongated, and obtuse at the extremity. It is enclosed in a firm silky cocoon, in a cavity in rotten wood.

SUB-FAMILY III. LEUCANIINÆ.

This is a well-marked group of moths called "Wainscots" by collectors. The body is generally stout, and the fore-wings rather narrow, of an ochreous or reddish colour, longitudinally but rather indistinctly striated, and often without any markings but a few dots. The hind-wings are white or grey. Most of the species are marsh-frequenting insects, and the larvæ feed on grass and reeds, sometimes in the stems.

GENUS LEUCANIA.

Heliophila, Hübner, Tentamen, p. 1 (1810?), *nom. præocc.*
Leucania, Ochsenheimer, Schmett. Eur. iv. p. 81 (1816); Treitschke, Schmett. Eur. v. (2), p. 289 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 69 (1852).

This genus includes some of the commonest and best-known species of the group.

The fore-wings are pale, oblong, and almost without markings. The species figured is distinguished from its allies by its darker hind-wings.

THE SMOKY WAINSCOT. LEUCANIA IMPURA.

Noctua impura, Hübner, Eur. Schmett. iv. fig. 396 (1804?).
Leucania impura, Treitschke, Schmett. Eur. v. (2), p. 294 (1825), x. (2), p. 89 (1835); Stephens, Ill. Brit. Ent. Haust. iii. p. 75 (1825); Kirby, Eur. Butterflies and Moths, p. 160 (1880); Buckler, Larvæ of Brit. Lepid. iv. pl. 59, figs. 5–5 d (1891).
Leucania punctina, Stephens, Ill. Brit. Ent. Haust. iii. p. 75 (1829).

The Smoky Wainscot.

The Smoky Wainscot has an expanse of from a little over an inch and a quarter to an inch and a half. It is common in Central Europe and Northern Asia.

The fore-wings are greyish ochreous or reddish ochreous, with whitish nervures, and three conspicuous black dots, the first near the middle of the wing, and the others nearer the hind margin. On the hind margin is a row of very minute and indistinct black dots. The fringes are white. The hind-wings are greyish-brown, paler towards the base, with a dark central lunule, and white fringes.

The larva feeds on the leaves of various species of *Carex*. It has a light brown head streaked with darker brown, and a brown collar, bordered with white above, and with dusky beneath. From this collar spring several longitudinal lines; a white dorsal one, then a dull yellow band, and below this a broad pale band, edged with dark brown, and containing two white lines. The spiracles, which are blackish, stand on the lower edge of this band. The ventral surface and the legs are yellowish. It is rather a stout larva, and tapers at the extremity. It is still quite small in the autumn, and is full-grown by the middle of May. The pupa is rather elongated, and of a reddish-brown colour. The Moth generally appears about July.

GENUS HYPHILARA.

Mythimna, pt. Ochsenheimer, Schmett. Eur. iv. p. 78 (1816); Treitschke, Schmett. Eur. v. (2) p. 177 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 68 (1852); Walker, List Lepid. Ins. Brit. Mus. ix. p. 72 (1856); nec Hübner (*restr.*).

Hyphilare, Hübner, Verz. bek. Schmett. p. 239 (1822?).

The species of this genus are of a deeper colour than those of *Leucania*, and the fore-wings are broader; and marked with a white dot in the centre, and with more or less distinct traces of transverse lines.

THE WHITE DOT. HYPHILARA ALBIPUNCTA.

Noctua albipuncta, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 84 (1776); Hübner, Eur. Schmett. iv fig. 233 (1799?).

Mythimna albipuncta, Treitschke, Schmett. Eur. v. (2) p. 187 (1825).

Leucania albipuncta, Kirby, Eur. Butterflies and Moths, p. 163 (1880); Buckler, Larvæ of Brit. Lepid. iv. p. 24 (1891).

The White Dot.

This species measures about an inch and a quarter across the wings. It is a local insect, occurring in many parts of Central and Southern Europe, as well as in Western Asia. In Britain it has only been taken at Folkestone.

The fore-wings are brick-red, with two distinct light transverse lines, edged with dusky. The first of these is nearly straight, and indicates the position of the claviform stigma by a small angle. The orbicular and reniform stigmata are also scarcely visible, but the outline of the latter can sometimes be traced in fresh specimens, and at its extremity is a round white dot. The nervures of the narrow, light, shining central area, are very finely dotted with black and white. Beyond this the ground-colour is darker, and then follows a yellowish line before the uniform brown fringes. The hind-wings are dusted with yellowish-grey or ashy-grey, with whitish fringes bounded by a yellow line.

The larva is fusiform, dull grey, sometimes tinged with reddish, with a white dorsal line, edged with blackish, which fades away behind. There is a sub-dorsal blackish stripe, which is interrupted at the incisions, and generally commences on the fifth segment, and below it is a white line. The spiracles are bounded above by a longitudinal stripe, darker than the ground-colour, and beneath by another stripe which is lighter. The cervical plate is light brown, with the three white longitudinal lines distinctly marked upon it. The head is light brown, and marked with two converging brown longitudinal lines. The body is set with scattered hairs.

The larvæ hybernate while still small, and may be found under stones in spring. They feed upon grass and low plants. They enter the ground when about an inch and a quarter long, generally at the beginning of May.

The pupa is yellowish-brown, and is enclosed in a slight cocoon. The moth usually appears in July, but late specimens may not appear till August.

GENUS NONAGRIA.

Nonagria, Ochsenheimer, Schmett. Eur. iv. p. 82 (1816); Treitschke, Schmett. Eur. v. (2), p. 309 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 99 (1852).

The type of this genus is a brown and very hairy Moth, with a long abdomen, extending considerably beyond the hind-wings. The larva feeds in the stems of reeds.

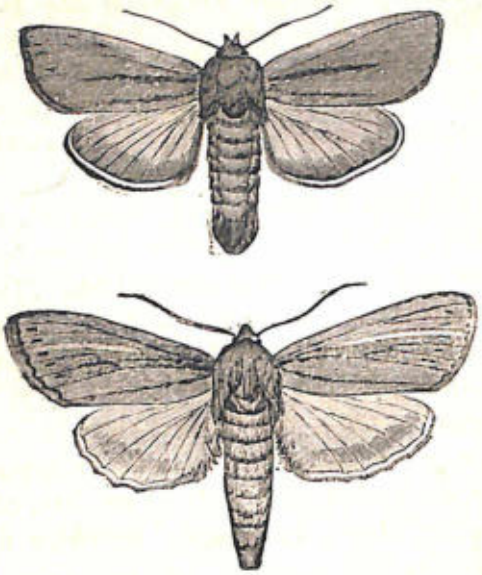
THE REED MOTH. NONAGRIA ARUNDINIS.

Noctua arundinis, Fabricius, Mant. Ins. ii. p. 141, no. 54 (1787).

Noctua typhæ, Esper, Schmett. iv. (2), i. p. 442, Taf. 140, figs. 3–5 (1789); Hübner, Eur. Schmett. iv. fig. 415 (1804?).

Nonagria typhæ, Treitschke, Schmett. Eur. v. (2), p. 327 (1825), x. (2), p. 99 (1835); Stephens, Ill. Brit. Ent. Haust. iii. p. 71 (1829); Buckler, Larvæ of Brit. Lepid. iv. p. 47, pl. 61, figs. 4–4 b (1891).

Nonagria arundinis, Kirby, Eur. Butterflies and Moths, p. 155, pl. 34, fig. 1 (1880).



The Reed Moth.

The Reed Moth is rather a large species, expanding from an inch and a half to two inches. It is common throughout Central Europe. The anennæ are yellowish or brownish,

finely ciliated in the males. The thorax and fore-wings vary from yellowish-brown to greyish-yellow or reddish-brown, with the markings sometimes clearly defined, but not unfrequently entirely obliterated. The nervures of the fore-wings form white lines, but are dusted with darker in dark reddish-brown specimens. At the point where the median nervure divides is a kind of knot, generally with dark spaces behind it, then a row of small dots, and beyond this a pale band and a row of larger dots or streaks. The situation of the orbicular stigma is marked by a pair of dots, and on the third nervure are two larger dots, in addition to several fine points. The fringes are usually darker, and are bounded by a row of small lunules. The hind-wings are more or less yellowish, with lighter nervures, with a grey or blackish shade between them on the hind margin. The fringes are yellowish, and somewhat dentated.

The larva is dull flesh-colour, and elongated, and attains a length of from two to two and a half inches. It has a pale median and two lateral dorsal lines. The head is yellowish-brown, the neck brownish, and the anal plate dark brown. It is shining, and devoid of hairs, and has blackish spiracles. It lives in June on the pith of the reed-mace (*Typha latifolia*). When nearly full-grown it excavates a chamber in the stem, in which to pass its metamorphosis, and eats away the centre until only a thin layer of vegetable tissue, no thicker than thin paper, separates it from the exterior. When this is done, it returns along the gallery which it has previously made, until it is ready to change into the cylindrical, elongated, yellowish-brown pupa. This is attached by the anal extremity to the wall of the gallery, and hangs with its head downwards a short distance from the opening.

The moth breaks through the membrane about the middle

of August, and leaves the empty pupa-case suspended in the gallery in the reed-mace.

SUB-FAMILY IV. GLOTTULINÆ.

This is an exotic group of moderate-sized moths, with the antennæ, palpi, proboscis, and legs all rather short, the thorax pubescent, and the abdomen smooth and silky. The fore-wings are blackish, or varied with bright spots and lines, and the hind-wings are white or brown. One species, *Brithys pancratii*, (Cyrilli), which inhabits South Europe, has dark smoky brown fore-wings and white hind-wings. The larva feeds on the leaves, stalks, and bulbs of *Pancratium maritimum*. I have figured two handsome Indian species.

GENUS POLYTELA.

Polytela, Guenée, Spec. Gén. Lépid. Noct. i. p. 113 (1852).

This genus contains some pretty East Indian moths, with short, pilose palpi, setose antennæ, and a moderately stout abdomen, obtuse at the extremity, and extending a little beyond the hind-wings.

POLYTELA GLORIOSÆ.

(*Plate CXXVII., Fig.* 3.)

Bombyx gloriosæ, Fabricius, Syst. Ent. p. 587, no. 107 (1775).
Polytela gloriosæ, Guenée, Spec. Gén. Lépid. Noct. i. p. 113, pl. 4, fig. 2 (1852); Walker, List Lepid. Ins. Brit. Mus. ix. p. 138, no. 1 (1856); Moore, Lepid. Ceylon, iii. p. 13, pl. 145, figs. 1, 1a (1884); Hampson, Fauna Brit. Ind. Moths, ii. p. 168, fig. 108 (1894).

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This conspicuously-coloured Moth is common in many parts of India and Ceylon, and measures about an inch and a quarter across the wings.

The fore-wings are blue-black, with a large yellow spot towards the tip, and another towards the hinder angle; there are several waved yellow transverse lines, bordered with black; the orbicular stigma is black in the centre, and ringed with yellow, and the reniform stigma is marked with red, and bordered with yellow, except below; there are some large red spots towards the base, and an irregular row of red spots towards the extremity of the wing, but within the level of the large spots at the tip and hinder angle; the fringes are spotted with yellow. The hind-wings are blackish, with yellow fringes, and the body is black, with some slight yellow markings.

The larva is smooth, and cylindrical, and feeds on the bulbs of *Gloriosa* and *Amaryllis*. It is purplish-black, with several longitudinal rows of white spots on the back and sides. The head and legs are red, and there is a red spot on the back of the second segment. There are also purplish blotches on the sides of the three thoracic and the two terminal segments. The pupa is red.

GENUS RAMADASA.

Ramadasa, Moore, Proc. Zool. Soc. Lond. 1877, p. 603.

The type of this genus is a considerably larger Moth than the last, with ascending palpi, and long fore-wings, with the hind margin suddenly oblique below the tip; the hind-wings are longer than broad, and are slightly irregular in outline. The moth was described by Walker as belonging to the *Glottulidæ*, where we leave it; but the genus has been since referred by Mr. Moore to the *Acontiidæ*, and by Sir George Hampson (more appropriately) to the *Palindiidæ*.

RAMADASA PAVO.

(*Plate CXXVII., Fig.* 4.)

Chasmina pavo, Walker, List Lepid. Ins. Brit. Mus. ix. p. 147, no. 2 (1856).

Ramadasa pavo, Moore, Proc. Zool. Soc. Lond. 1877, p. 603, pl. 59, fig. 8; id. Lepid. Ceylon, iii. p. 44 (1884); Hampson, Faun. Brit. Ind. Moths, ii. p. 357, fig. 191 (1894).

This Moth is a native of Ceylon, and is also found in the Andaman Islands and Northern India.

"Glaucous, very minutely speckled with brown, luteous beneath. Head black above, with a luteous band. Palpi testaceous, striped above with black. Proboscis tawny. Antennæ dull tawny. Thorax with a slight testaceous band in front. Abdomen and hind-wings luteous, the former with black spots along each side beneath. Tibiæ and tarsi with black spots and bands. Fore-wings luteous and dotted with black along the basal part of the costa; apical half of the wings pale flesh-colour, divided from the glaucous part by a ferruginous band, which is bordered with black on its inner side; the apical half contains some black streaks and dots, which are spangled with emerald green or blue and purple. Length of the body eight lines; of the wings twenty lines." (*Walker.*)

SUB-FAMILY V. APAMEINÆ.

The *Apameinæ* are small or moderate-sized moths, generally of dull colours, with somewhat short, ascending, pilose palpi, and rather distinctly marked fore-wings, the sub-terminal line often forming a distinct W. The body is stout and pilose, and the thorax is often crested, and the abdomen very long. The larvæ are stout, smooth, and cylindrical, hiding themselves at

the roots or in the stalks of plants, or under leaves. The pupæ are generally subterranean, and enclosed in a casing of agglutinated earth.

The *Apameinæ* are well represented in temperate climates, and several of our British species are abundant, and sometimes very destructive.

GENUS GORTYNA.

Gortyna, Ochsenheimer, Schmett. Eur. iv. p. 82 (1816); Treitschke, Schmett. Eur. v. (2) p. 330 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 120 (1852).

These are stout-bodied moths, with the antennæ crenulated in the males, and with short ascending palpi. The thorax is slightly crested, and the abdomen long and broad. The fore-wings are varied with yellow or reddish, and the markings are very distinct. The larvæ feed, like those of *Nonagria*, inside the stems of thistles, burdock, and similar plants; and the pupæ are found in the same situation. The moths, of which only one species (common in England) is generally distributed in Europe, may be found in meadows in the daytime.

THE FROSTED ORANGE. GORTYNA FLAVAGO.

(*Plate CXXVII., Fig.* 5.)

Noctua flavago, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 86, no. 5 (1776); Esper, Schmett. iv. (1), p. 213, Taf. 112, figs. 2–4 (1788?), iv. (2) i. p. 671, Taf. 176, fig. 1 (1795?); Hübner, Eur. Schmett. iv. figs. 186, 187 (1799?)

Noctua ochracea, Hübner, Beitr. Gesch. Schmett. i. (1), p. 19, pl. 2, fig. M (1786).

Gortyna flavago, Treitschke, Schmett. Eur. v. (2), p. 335 (1825); Stephens, Ill. Brit. Ent. Haust. iii. p. 70 (1829); Kirby, Eur. Butterflies and Moths, p. 181, pl. 34, figs. 5, 5 a (1880); Buckler, Larvæ of Brit. Lepid. iv. pl. 62, figs. 1–1 c (1891).

The Frosted Orange Moth expands from an inch and a quarter to nearly an inch and a half. The fore-wings are rich yellow as far as the half-line, beyond which is a yellow dot, and the remainder of the ground-colour up to the first transverse line is reddish-brown. The central portion of the wings is more or less yellow, marbled with reddish-brown, and the upper stigmata are distinct and surrounded with brown, and sometimes united on the median nervure; there is also a claviform stigma. There is a brown band near the hind margin, from which it is separated by a more or less yellow band, undulated on the inner side. The fringes are long, and greyish-brown. The hind-wings are glossy whitish, with a dusky crescent-shaped mark on the disc, and an indistinct band posteriorly. The fringes are ashy-brown. The thorax is reddish-brown, tinged here and there with deep ochre-yellow, and with a raised crest. The abdomen is more greyish-yellow, with darker incisions. The larva feeds in the stems of Burdock (*Arctium lappa*) and other thick-stemmed plants, such as *Verbascum thapsus*, *Scrophularia aquatica*, Spear Thistle, &c. It feeds on the pith, and there is a hole in the side of the stem through which its excrement is passed, and out of which the moth eventually emerges. It is smooth, dull white, tinged with dark reddish on the back, especially on the fifth, sixth, and seventh segments. The head is yellowish-brown, and there is a dark brown collar and a yellow median line. On the third segment are two large black tubercles, with four smaller ones behind them, and on the fourth segment four black tubercles arranged transversely,

but from the fifth to the eleventh segments they are arranged in a trapeziform manner, the two anterior ones being always the largest; and on the twelfth segment are four larger tubercles arranged in a square. There is a black spot on the last segment, which is lost in the anal fold. The sides are also set with a number of tubercles. The legs are ringed with black, and each of the pro-legs bears a black spot. The transformations take place in the interior of the stem. The pupa is elongated, and reddish-brown in colour. The moth appears after three or four weeks, in August or September.

GENUS XYLENA.

Xylena, Hübner, Tentamen, p. 1 (1810?); Ochsenheimer, Schmett. Eur. iv. p. 85 (1816).

Xylina, pt. Treitschke, Schmett. Eur. v. (3), p. 3 (1826); but not of later authors.

Xylophasia, Stephens, Ill. Brit. Ent. Haust. ii. p. 174 (1829); Guenée, Spec. Gén. Lépid. Noct. i. p. 135 (1852).

This genus includes comparatively large species, with long and rather broad sub-triangular wings, with the hind margins slightly denticulated; the antennæ long, slightly pubescent or ciliated in the male; the thorax slightly crested in front, and the abdomen long, rather stout, and crested. There is an apical tuft in both sexes, and large lateral tufts before the tip in the male. The light W formed by the sub-terminal line on the fore-wings is well marked in many of the species.

The larvæ are stout, shining, cylindrical, with small warty elevations; they are generally found at the roots of plants, or under stones. The pupa is enclosed in a brittle earthy cocoon.

I have figured the type of this genus. One of the commonest British and European *Noctuæ* is the Dark Arches (*X. polyodon*,

Linn.), a species very like the Light Arches in size and appearance, but with much darker and more sharply defined markings. The moths fly at dusk.

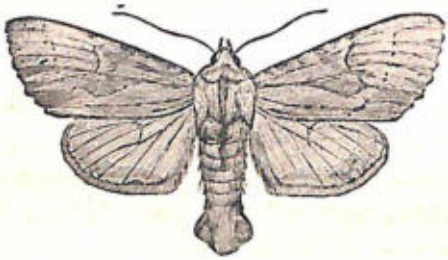
THE LIGHT ARCHES. XYLENA LITHOXYLEA.

Noctua lithoxylea, Fabricius, Mant. Ins. ii. p. 182, no. 299 (1787).

Noctua sublustris, pt. Esper, Schmett. iv. (2) i. p. 408, Taf. 133, fig. 1 (nec fig. 2) (1790?).

Xylina lithoxylea, Treitschke, Schmett. Eur. v. (3), p. 47 (1825), vi. (1), p. 412 (1827).

Xylophasia lithoxylea, Stephens, Ill. Brit. Ent. Haust. ii. p. 175 (1829); Kirby, Eur. Butterflies and Moths, p. 232 (1881); Buckler, Larvæ of Brit. Lepid. iv. p. 52, pl. 63, fig. 1 (1891).



The Light Arches.

This species measures from one inch and three-quarters to two inches across the wings. It is common in Central Europe and Western Asia.

The head and neck are yellowish ashy-grey, the former with two grey streaks. The thorax is grey with a slight crest, and a dark longitudinal stripe. The abdomen is yellowish-grey, whitish above, with dark dorsal tufts. There are also reddish-grey lateral and anal tufts. The antennæ are long, brown and

serrated, and the legs are brown, blackish beneath. The ground-colour of the fore-wings is light grey or yellowish-grey. The costa is streaked with dark brown in several places. All the nervures are dotted or streaked with brown. There is scarcely a trace of transverse striation, and the stigmata are also only slightly indicated, but the central area of the wings shows a dark irregularly-shaped blotch, which terminates in a white spot on the inner side. Next comes a paler space, containing a double row of brown dots. The sub-marginal line forms a distinct W, and beyond it the wings are darkest, being sometimes of a deep rusty brown tint. An indistinct double streak connects the inner margin with the white spot mentioned above. The fringes are dentated, and enclose lighter lines. The hind-wings are yellowish, with brown nervures and a central lunule, and a broad border of the same colour. The fringes are whitish or brownish.

The first reliable account of the larva was published by J. E. Robson in the *Entomologist's Weekly Intelligencer* for 1860. He says:—"The larva of *X. lithoxylea* being marked 'unknown,' I beg to say I have bred the insect this summer from a larva found at the roots of grass; it was of large size; colour dirty white, with a bluish tinge below; head and tail black, with two rows of black shining spots on each segment, one hair in each spot. I found it on the 8th of May; it seemed then nearly full fed; the perfect insect appeared on the 8th of July."

GENUS NEURIA.

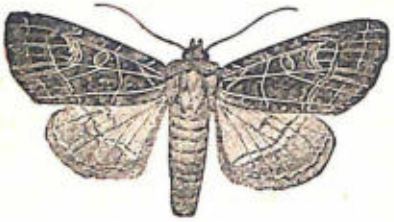
Neuria, Guenée, Ann. Soc. Ent. France, x. p. 241 (1841); id. Spec. Gén. Lépid. Noct. i. p. 166 (1852).

In this genus the antennæ are short, and slightly ciliated especially in the male; the palpi are short, slightly longer than the head, and ascending; the last joint is conical. The body

is stout, and the abdomen extends beyond the hind-wings; the thorax has a bifid crest on each side in front. The wings are rather long and broad, with the hind margins rounded; but the moths may be most easily recognised by the conspicuously white nervures of the fore-wings. We have one species in England.

THE BORDERED GOTHIC. NEURIA RETICULATA.

Noctua reticulata, De Villers, Ent. ii. p. 254 (1789).
Noctua calcatrippæ, Vieweg, Tab. Verz. Churmark Brandenburg Schmett. ii. p. 71 (1790).
Noctua saponariæ, Borkhausen, Eur. Schmett. iv. p. 370 (1792); Esper, Schmett. iv. (2) 2, p. 76, Taf. 198, figs. 3, 4 (1799).
Noctua typica, Hübner, Eur. Schmett. iv. fig. 58 (1799?).
Hadena saponariæ, Treitschke, Schmett. Eur. v. (1), p. 303 (1825); Stephens, Ill. Brit. Ent. Haust. ii. p. 188 (1829).
Mamestra saponariæ, Kirby, Eur. Butterflies and Moths, p. 223 (1881).
Neuria saponariæ, Buckler, Larvæ of Brit. Lepid. iv. p. 66, pl. 66, figs. 5. 5 a (1891).



The Bordered Gothic.

This Moth is found in most parts of Central and Eastern

Europe and in Siberia. It expands from an inch and a half to an inch and three-quarters.

The head is brown, with brown antennæ suffused with white. The neck is yellowish, streaked with brown; the thorax is brown, and the tegulæ are varied with ochreous. The thorax is crested. The abdomen is pale grey, darker posteriorly, and terminated by a brown anal tuft in the male.

The fore-wings are violet-brown, with conspicuous white nervures. The nervures and transverse lines are white and give a reticulated appearance to the wings. There is a halt line and two transverse lines, bordered on both sides with darker. The orbicular and reniform stigmata have white outlines, and the latter has a white central line. The claviform stigma is large and blackish. The sub-marginal line is yellowish-white; it rises from an indistinct dark spot near the apex. On the hind margin is a row of seven black lunules, bordered within with whitish. The fringes are light brown internally, and dark brown externally. The hind-wings are whitish-brown, darker towards the hind margins, with yellowish fringes.

The female is larger than the male, with a stouter body, and darker colouring, especially on the hind-wings.

The larva, which attains its full growth in July and August, feeds on various low plants, especially on the unripe seeds of the catch-fly (*Silene*), and its presence may be detected by the ear-shaped holes which it makes in the pods.

The larva is greyish-yellow or reddish, and only green when young. It is conspicuously striped with brown, but the dorsal line is only slightly paler. The spiracular line is light grey, without markings, and so is the belly. The head is rather large, spherical, and of a dull brown, and there is a brown horny plate on the second, and another on the twelfth segment.

The pupa, which is shining reddish-brown, is formed in a cocoon in the ground.

GENUS MAMESTRA.

Mamestra, Ochsenheimer, Schmett. Eur. iv. p. 76 (1816); Treitschke, Schmett. Eur. ii. (2), p. 127 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 188 (1852).

These are comparatively large, dark-coloured Moths, with simple antennæ. The fore-wings have the hind margin rounded, hardly oblique, and entire, or slightly dentated; the abdomen is stout, longer than the hind-wings, crested at least on the first segment, and tufted at the extremity. The larvæ feed on low plants, and conceal themselves during the day. The pupa is subterranean, and enclosed in an earthen cocoon, as usual in the Family.

The most conspicuous species of the genus is here figured, but the commonest and most destructive is the Cabbage Moth, *Mamestra brassicæ* (Linn.), which much resembles *M. persicariæ*, but is brown rather than black, and has the white mark on the fore-wings much less distinctly defined.

THE DOT. MAMESTRA PERSICARIÆ.

Noctua persicariæ, Linnæus, Faun. Suec. p. 319, no. 1208 (1761); Esper, Schmett. iv. (2) i. p. 390, Taf. 129, figs. 1–3 (1790?); Hübner, Eur. Schmett. iv. pl. 13, fig. 64 (1799?)

Mamestra persicariæ, Treitschke, Schmett. Eur. v. (2), p. 156 (1825); Stephens, Ill. Brit. Ent. Haust. ii. p. 196 (1829); Kirby, Eur. Butterflies and Moths, p. 227, pl. 36, figs. 8, a, b (1881); Buckler, Larvæ of Brit. Lepid. iv. pl. 66, figs. 4–4 c (1891).

The Dot is found throughout the greater part of Europe. It expands from an inch and a half to nearly an inch and three-quarters.

The head and thorax are deep black, with a few scattered yellowish hairs. The abdomen is ashy-grey with a rust-coloured crest on the first segment, and a blackish-brown one on the following segments. The antennæ are also blackish, and finely serrated in the male. The legs are blackish-brown, ringed with white, and tufted above, especially in the male.

The Dot.

The fore-wings are coloured like the thorax, and are sometimes deep black, and sometimes with a purplish gloss. The transverse lines are usually distinct, yellowish, bordered with black. There is a half-line near the base, and the first transverse line forms three curves. This and the second transverse line, which is composed of small lunules filled in with black on the concave side, form the boundaries of the central area. The orbicular stigma is edged with black, and has a black nucleus. The claviform stigma is dark, short, and hollow. The reniform stigma is conspicuously white, and contains a brownish lunule. The sub-marginal line is yellow. The fringes are black, with a border of yellow dots, and are themselves dotted with yellowish, and strongly dentated. The hind-wings are yellowish grey on their basal half, with brown nervures and a central spot. Externally they are dotted with black. The fringes are yellowish white.

In some varieties the stigmata are more or less obsolete.

The larva feeds on hop, and on various species of *Polygonum* and *Sambucus*, but will also feed on various other plants and trees. It attains its full growth in September or the beginning of October. In colour it may be pale or dark green, brownish-green, or quite brown, with a yellowish dorsal line. The head is green or brown, and there is a brownish-green quadrangular spot immediately behind it, edged with yellowish. On the fifth and sixth segments are two dark green triangular spots, one immediately behind the other, and on the twelfth segment is a similar oval spot, succeeded by an elevation. Below the dorsal line are two black lines on each side, and on the belly are oblique whitish streaks, shaded with dark green, which extend as far as the lower lateral line, and are directed forwards; and there are similar oblique lines directed backwards, above the second lateral line. The belly is pale green.

The pupa hybernates in the ground. It is shining reddish-brown. The moth appears in June or July of the next year.

GENUS OLIGIA.

Oligia, Hübner, Verz. bek. Schmett. p. 213 (1822 ?).
Miana, Stephens, Ill. Brit. Ent. Haust. iii. p. 11 (1829); Guenée, Spec. Gén. Lépid. Noct. i. p. 213 (1852).

This genus includes the smallest species of the Sub-family, while *Xylena* includes the largest. The antennæ are pubescent, and more than half as long as the fore-wings, which are sub-triangular, and rather broad; the costa is nearly straight, and the hind margin entire, gradually rounded and scarcely oblique; the hind-wings are rather broad, rounded, and entire; the abdomen is rather slender, crested, and longer than the hind wings.

The larvæ are short and vermiform, tapering at both ends, and feed in the stalks or among tufts of grass near the roots.

The moths of this genus are very variable, and many of them are common; they fly at dusk.

THE CLOAKED MINOR. OLIGIA FURUNCULA.

Noctua furuncula, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 89, no. 3 (1776); Hübner, Eur. Schmett. iv. fig. 545 (1818?).

Noctua bicoloria, De Villers, Linn. Ent. ii. p. 288 (1789).

Noctua victuncula, Hübner, *op. cit.* fig. 96 (1799?).

Noctua humeralis, Haworth, Lepid. Brit. p. 215, no. 149 (1809)

Noctua terminalis, Haworth, *op. cit.* no. 150 (1809).

Noctua rufuncula, Haworth, *op. cit.* p. 216, no. 152 (1809).

Apamea furuncula, Treitschke, Schmett. Eur. v. (2), p. 92 (1825).

Miana humeralis, M. terminalis et M. rufuncula, Stephens, Ill. Brit. Ent. Haust. iii. p. 14 (1829).

Hadena furuncula, Kirby, Eur. Butterflies and Moths, p. 236 (1881).

Miana furuncula, Buckler, Larvæ of Brit. Lepid. iv. p. 102, pl. 68, figs. 4, 4 a (1891).

The Cloaked Minor is common in Europe and Northern and Western Asia. It expands from about three-quarters of an inch to a little over an inch.

It is very variable in colouring. The head and thorax are whitish-grey, with a crest, and a brown-edged collar. The antennæ are dark brown and slender, slightly stouter in the male than in the female. The abdomen is ashy-grey, with small blackish tufts of hair on the middle of the back, and a black anal tuft in the male. The legs are reddish or brownish, ringed with white.

The larva feeds on hop, and on various species of *Polygonum* and *Sambucus*, but will also feed on various other plants and trees. It attains its full growth in September or the beginning of October. In colour it may be pale or dark green, brownish-green, or quite brown, with a yellowish dorsal line. The head is green or brown, and there is a brownish-green quadrangular spot immediately behind it, edged with yellowish. On the fifth and sixth segments are two dark green triangular spots, one immediately behind the other, and on the twelfth segment is a similar oval spot, succeeded by an elevation. Below the dorsal line are two black lines on each side, and on the belly are oblique whitish streaks, shaded with dark green, which extend as far as the lower lateral line, and are directed forwards; and there are similar oblique lines directed backwards, above the second lateral line. The belly is pale green.

The pupa hybernates in the ground. It is shining reddish-brown. The moth appears in June or July of the next year.

GENUS OLIGIA.

Oligia, Hübner, Verz. bek. Schmett. p. 213 (1822?).
Mana, Stephens, Ill. Brit. Ent. Haust. iii. p. 11 (1829); Guenée, Spec. Gén. Lépid. Noct. i. p. 213 (1852).

This genus includes the smallest species of the Sub-family, while *Xylena* includes the largest. The antennæ are pubescent, and more than half as long as the fore-wings, which are sub-triangular, and rather broad; the costa is nearly straight, and the hind margin entire, gradually rounded and scarcely oblique; the hind-wings are rather broad, rounded, and entire; the abdomen is rather slender, crested, and longer than the hind wings.

The larvæ are short and vermiform, tapering at both ends, and feed in the stalks or among tufts of grass near the roots.

The moths of this genus are very variable, and many of them are common; they fly at dusk.

THE CLOAKED MINOR. OLIGIA FURUNCULA.

Noctua furuncula, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 89, no. 3 (1776); Hübner, Eur. Schmett. iv. fig. 545 (1818?).

Noctua bicoloria, De Villers, Linn. Ent. ii. p. 288 (1789).

Noctua victuncula, Hübner, *op. cit.* fig. 96 (1799?).

Noctua humeralis, Haworth, Lepid. Brit. p. 215, no. 149 (1809)

Noctua terminalis, Haworth, *op. cit.* no. 150 (1809).

Noctua rufuncula, Haworth, *op. cit.* p. 216, no. 152 (1809).

Apamea furuncula, Treitschke, Schmett. Eur. v. (2), p. 92 (1825).

Miana humeralis, M. terminalis et M. rufuncula, Stephens, Ill. Brit. Ent. Haust. iii. p. 14 (1829).

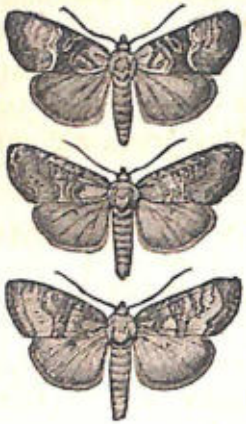
Hadena furuncula, Kirby, Eur. Butterflies and Moths, p. 236 (1881).

Miana furuncula, Buckler, Larvæ of Brit. Lepid. iv. p. 102, pl. 68, figs. 4, 4 a (1891).

The Cloaked Minor is common in Europe and Northern and Western Asia. It expands from about three-quarters of an inch to a little over an inch.

It is very variable in colouring. The head and thorax are whitish-grey, with a crest, and a brown-edged collar. The antennæ are dark brown and slender, slightly stouter in the male than in the female. The abdomen is ashy-grey, with small blackish tufts of hair on the middle of the back, and a black anal tuft in the male. The legs are reddish or brownish, ringed with white.

The fore-wings are divided into two areas across the centre of the wings by a straight white line passing between the orbicular and the reniform stigmata. The inner area is sometimes brownish and sometimes reddish, but is always darker



The Cloaked, Flounced, and Pale Red Minors.

than the outer area. In this area are the first transverse line and the orbicular stigma, both of which are, however, obscured by the ground-colour. The reniform stigma is placed in the paler area, which extends as far as the yellowish sub-marginal line, near the fringes. It is reddish or brownish-white and suffused, and the reniform stigma appears more or less white. Beyond the sub-marginal line the ground-colour is blackish-brown. The fringes are streaked alternately with darker and lighter. The hind-wings are ashy-grey, darker towards the hind margins, and sometimes reddish-grey, with rather paler fringes.

We have figured the type and the two varieties, *O. terminalis* (the Flounced Minor) and *O. rufuncula* (the Plain Red Minor) of Haworth and Stephens, both of which are found in Britain.

The variety *O. terminalis* has a duller colour, and wants the white line on the fore-wings, which are only slightly clouded, and of a uniform ferruginous brown, with the hind margins slightly clouded with rufous, and marked with a pale waved striga. The hind-wings are deep brown with ashy cilia.

The variety *O. rufuncula* has two straight paler lines in the middle of the ferruginous fore-wings, and another rather obscure waved one near the hind margin. On the hind margin itself is a row of very small triangular black spots. The hind-wings are reddish-brown with rufous cilia.

SUB-FAMILY VI. CARADRININÆ.

These are small dull-coloured Moths, with a small head, short antennæ, palpi, and proboscis, and a smooth abdomen. The fore-wings are oblong and entire, the hind-wings are broad, rounded, and folded, varying from brown to whitish, and without markings above. The larvæ are short and thick, with a small bristly head. They feed on low plants, and the moths are easily to be found among herbage in the day-time. The pupæ are subterranean, and construct earthen cocoons.

GENUS CARADRINA.

Caradrina, Ochsenheimer, Schmett. Eur. iv. p. 80 (1816); Hübner, Verz. bek. Schmett. p. 230 (1822?); Treitschke, Schmett. Eur. v. (2), p. 246 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 241 (1852).

This genus may be distinguished from the others of the Family by the rather short and broad wings, with the lines and stigmata fairly well marked. There are several closely allied species in Europe.

THE MOTTLED RUSTIC. CARADRINA MORPHEUS.

Noctua morpheus, Hufnagel, Berlin. Mag. iii. p. 302, no. 52 (1767).
Noctua sepii, Hübner, Eur. Schmet. iv. fig. 161 (1799?)
Caradrina morpheus, Treitschke, Schmett. Eur. v. (2), p. 249 (1825); Stephens, Ill. Brit. Ent. Haust. ii. p. 157 (1829); Kirby, Eur. Butterflies and Moths, p. 165 (1880); Buckler, Larvæ of Brit. Lepid. iv. p. 111. pl. 69, figs. 2–2 b (1891).
Caradrina sepii, Stephens, *op. cit.* p. 158 (1829).

The Mottled Rustic.

The Mottled Rustic is common in Northern and Central Europe. It expands about an inch and a quarter.

The head and thorax are dull yellowish-brown, the abdomen being slightly paler, and the antennæ are ash-coloured. The legs are pale grey.

The fore-wings are yellowish brown with a confused pattern, sometimes arranged in dark shades or stripes. Near the base is a pale half-line, or a few dots. A dark shade represents the first transverse line. The stigmata are edged with yellowish, and are dark within, the orbicular stigma being elongated, and the reniform stigma more or less obscured. The second transverse line and the sub-marginal line are

faintly yellowish, and the marginal area is usually dark. The fringes are ferruginous. The hind-wings are yellowish-white in the male, with a brownish line in front of the fringes. In the female they are completely covered with grey dusting.

The larva feeds of *Convolvulus*, lettuce, dock, and other low plants. It is reddish-brown, with a whitish dorsal line. There is a fine yellowish sub-dorsal line, bordered with dark brown, and a sagittate spot pointing backwards on each side of segments five to twelve. Over the legs is a dark brown band, in which stand the blackish spiracles. The belly and legs are pale red, and the head is shining brown.

The pupa is shining dark reddish-brown, somewhat stout, with two minute bristles at the extremity of the abdomen.

The moth is found from June to August.

SUB-FAMILY VII. AGROTINÆ.

This Sub-family is one of the most characteristic of this division of the *Noctuæ*. The species are of moderate size, with the antennæ sometimes pectinated in the males, but more often simply ciliated, the palpi well developed, with the last joint short but distinct, and short legs, with rather long spurs, and the tibiæ, especially the front tibiæ, generally set with small spines. The fore-wings are generally brown or reddish, with the "Noctua"-pattern well marked. The hind-wings are brown or grey, and sometimes yellow. The abdomen is stout, and does not usually extend much beyond the hind-wings.

The larvæ are maggot-like, and feed on low plants, hiding themselves under leaves in the daytime, or else they live under the surface of the ground, and eat through the roots and destroy the plants. Hence they are called "Cut-worms" in America.

GENUS AGROTIS.

Agrotis, Hübner, Tentamen, p. 1 (1810?); Ochsenheimer, Schmett. Eur. iv. p. 66 (1816); Treitschke, Schmett. Eur. v. (1), p. 125 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 257 (1852).

This genus includes a great number of species, in which the fore-wings are rather long, with the claviform stigma well marked. The hind-wings are broad, of an iridescent grey or whitish colour, and are folded beneath the fore-wings, which slightly overlap above them. We will notice two species, one of which is the commonest and most destructive species in Europe; while the other, which is very similar to some of the larger European species, forms an important article of food with some Australian tribes.

THE COMMON DART. AGROTIS SEGETUM.

Noctua segetum, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 81, no. 12, and p. 252, no. 3, Taf. 1a, fig. 3, Taf. 1b, fig. 3 (1776).

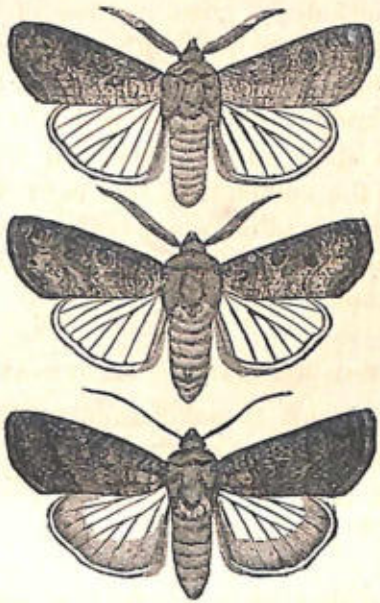
Noctua fuscosa, Esper, Schmett. iii. (1), p. 324, Taf. 64, fig. 4 (1782?)

Noctua segetis, Hübner, Eur. Schmett. iv. fig. 146 (1799?)

Agrotis segetum, Treitschke, Schmett. Eur. v. (1), p. 155 (1825); Stephens, Ill. Brit. Ent. Haust. ii. p. 115 (1829); Kirby, Eur. Butterflies and Moths, p. 204, pl. 36, fig. 7 (1880); Buckler, Larvæ of Brit. Lepid. v. pl. 71, figs. 1–1 b (1893); Barrett, Lepid. Brit. Isl. iii. p. 228, pl. 125, figs. 1–1 g (1896).

The Common Dart, or Turnip Moth, is common in Europe and Northern Asia. It measures from an inch and a quarter to an inch and three-quarters across the wings.

The fore-wings are very variable in colour and may be greyish mouse-colour, yellowish-brown, or coloured like bark. The surface is covered with black specks, and in well-marked specimens the following zig-zag transverse lines may be distinguished; the half-line near the base, commencing on the costa, and ending midway between the costa and the



The Common Dart.

inner margin; an entire first transverse line, which the claviform stigma touches; and the second transverse line, composed of lunules with the concavity on the outer side, and beyond which commences a pale band. In front of the grey fringes is a yellowish line, bounded on the inner side by a row of small triangular black spots. The orbicular and reniform stigmata have blackish centres, and are bordered with brown.

Larvæ of the Common Dart Moth feeding on a turnip.

The hind-wings are snow-white in the male, with a narrow brown border, and white fringes. In the female the hind-wings are more or less dusted with grey.

The larva is usually brown and dusky grey, in alternate stripes. There is a pale dorsal line, running from the head to the extremity of the body, and bordered on each side by a dark line. Next to this are four dull black dots on each segment, the two anterior of which are the smallest and are placed closest together. The spiracles are black, and there is a black dot on each side of them. The legs and pro-legs are brownish-grey. The head is convex, light brown, with two stripes composed of dark brown dots. Both the head and body are remarkably shining. It is a very ugly larva.

It feeds on the roots of grass, corn, turnips, carrots, cabbage, and many other plants, and is often very destructive. The larva hybernates two or three inches below the surface of the ground in an oval hollow, and in the spring attacks the roots without coming to the surface. It remains hidden during the day, and is only found on the roots at night. It prefers young roots, and drags down the stem and leaves under the ground.

The smooth brown pupa is formed in April, May, or June, and the moth emerges about four weeks later.

THE BUGONG MOTH. AGROTIS SPINA.

(*Plate CXXVII., Fig.* 7.)

Agrotis spina, Guenée, Spec. Gén. Lépid. Noct. i. p. 269 (1852); Walker, List Lepid. Ins. Brit. Mus. x. p. 348, no. 100 (1856).

This Moth, which expands from an inch and a quarter to two inches, abounds in many parts of Australia, Tasmania, and

New Zealand. It is a very variable species, with oblong greyish-brown fore-wings, sometimes unicolorous, sometimes streaked and dotted with black, with the orbicular and reniform stigmata well marked, greyish, with a long and broad black dash between them, and a black streak beyond. The usual lines are double, and more or less distinctly marked; there is a pale line at the base of the fringes, preceded by a row of black spots. The hind-wings are slightly transparent, with the nervures and outer part of the wing blackish; on the under side is a large black spot near the apex. The female is larger and darker, especially on the hind-wings.

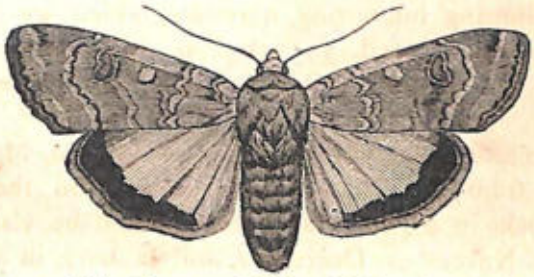
The following interesting narrative, which we quote from Kirby and Spence (ed. vi. vol. i. p. 259) relates to *Agrotis spina* and not to the butterfly named below (Cf. *antea*, vol. i. p. 20):—

"A species of butterfly also (*Euplœa hamata*, MacLeay), as we learn from Mr. Bennett, congregates on the insulated granitic rocks in a particular district, which he visited in the months of November, December, and January, in such countless myriads (with what object is unknown), that the native blacks, who call them *Bugong*, assemble from far and near to collect them, and, after removing the wings and down by stirring them on the ground previously heated by a large fire, and winnowing them, eat the bodies, or store them up for use by pounding and smoking them. The bodies of these butterflies abound in an oil with the taste of nuts, and, when first eaten, produce violent vomitings, and other debilitating effects; but these go off after a few days, and the natives then thrive and fatten exceedingly on this diet, for which they have to contend with a black crow, which is also attracted by the *Bugongs* in great numbers, and which they despatch with their clubs, and use as food."

GENUS TRIPHÆNA.

Triphæna, Ochsenheimer, Schmett. Eur. iv. p. 69 (1816); Treitschke, Schmett. Eur. v. (1), p. 252 (1825); Guenée, Spec. Gén. Lépid. i. p. 315 (1852).

In this genus, the palpi are short, and the antennæ slightly pubescent in the male. The abdomen is depressed, and tufted at the tip; it is a little longer than the hind-wings. The fore-wings are rather long, sub-triangular, and brown or reddish-brown; but the hind-wings are bright yellow, with black borders.



The Common Yellow Underwing.

The larvæ are cylindrical, and like most of those of the sub-family, they feed on low plants, and conceal themselves during the day. The moths sit with their wings folded, as described under *Agrotis*, and like the larvæ, hide themselves during the day, in outhouses, among long grass or hay, or among strawberry leaves, and if disturbed, suddenly expand their wings, and fly off with a rapid though somewhat heavy flight, soon, however, descending and disappearing in some situation where the dark colour of the folded wings is likely to conceal them.

Several species are abundant in Europe and in England, one of which is the Common Yellow Underwing, *Triphæna pronuba*

(Linn.). Guenée appropriately remarks that the species of this genus, which has been accepted by all Entomologists, exhibit a very strong family likeness. Nevertheless, Lederer and those who have followed his arrangement, treat *Triphæna* as a mere section of *Agrotis*. The type of the largest and handsomest of the European species is figured on the accompanying plate.

THE BROAD-BORDERED YELLOW UNDERWING.

TRIPHÆNA FIMBRIA.

(*Plate CXXVII., Fig.* 6)

Noctua fimbria, Linnæus, Syst. Nat. (ed. xii.) i. (2), p. 842, no. 113 (1767); Esper, Schmett. iv. (1), p. 144, Taf. 103, figs. 1–6 (1789?); Hübner, Eur. Schmett. iv. fig. 102 (1799?), figs. 551, 552 (1804?).

Triphæna fimbria, Treitschke, Schmett. Eur. v. (1), p. 266 (1825); Stephens, Ill. Brit. Ent. Haust. ii. p. 105 (1829); Kirby, Eur. Butterflies and Moths, p. 187, pl. 35, figs. 1–1 c (1880); Buckler, Larvæ of Brit. Lepid. v. pl. 74, figs. 2–2 b (1893); Barrett, Lepid. Brit. Isl. iv. p. 5, pl. 137, figs. 2, 2 a–d (1896).

The Broad-bordered Yellow Underwing is a native of Central and Southern Europe and Asia Minor. It expands from two inches to two inches and a quarter.

The fore-wings vary considerably, from the palest greenish clay-colour to the darkest chestnut or reddish-brown, with markings of varying intensity. The female, as is usual with Moths, is much more variable than the male. There is a curved half-line near the base, and the first transverse line is oblique. From the base to this line the colouring is very dark. The orbicular and reniform stigmata are placed on a paler area, and are bordered with whitish; they are sometimes connected; the former is very large. Between the orbicular stigma and

the second transverse line there is a dark band, usually tinged with greenish. Beyond this the wings are lighter as far as the sub-marginal line. Near the apex of the wings is a dark spot, beyond which runs the sub-marginal line. The hind-wings are bright yellow, approaching to orange, with a deep velvety black sub-marginal band bordered with yellow, and yellow fringes.

The larva lives through the winter, and attains its full growth in May. It feeds at the roots of primroses, *Atriplex*, and potato, the tubers of which it bores into, and on various low plants. It is very greedy and will attack and wound other caterpillars, and drive them away. In spite of its short legs and stout body it can move about very quickly.

The head is reddish-brown with dark lines, and the body varies from light brown to yellowish grey. On the back is a pale line bordered on each side with darker, and on each segment there are two oblique brown lines. The spiracles are black on the middle segments. The anal plate is pale, and so are the belly and legs.

The pupa is dark brown, and very convex anteriorly. It is enclosed in a brittle earthen cell.

GENUS GRAPHIPHORA.

Graphiphora, Hübner, Tentamen, p. 1 (1816); Ochsenheimer, Schmett. Eur. iv. p. 68 (1816); Stephens, Ill. Brit. Ent. Haust. ii. p. 128 (1829).

Noctua, pt. Linnæus, Syst. Nat. (ed. x) i. p. 508 (1758); Treitschke, Schmett. Eur. v. (1), p. 206 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 321 (1852).

In this genus the antennæ are most frequently simple, the abdomen rather longer than the hind-wings, somewhat flattened, and slightly tufted. The fore-wings are usually of a light brown or reddish-brown colour, with very distinct

markings, the claviform stigma only being usually indistinct or obsolete. The hind-wings are brown or grey.

The larvæ, which feed on low plants, and hide themselves under leaves during the daytime, as is the usual habit in this Sub-family, are stout and cylindrical, with a small head, and very distinct lines.

The name *Noctua* has been applied to this genus by many recent authors, but in any case wrongly. It is true that Schrank indicated the *Agrotinæ* as the types of *Noctua*, but Latreille afterwards indicated *Triphæna fimbria* (Linn.) (*anteà*, p. 43) as the type; and this would stand as such, but that Poda, Cuvier, and Lamarck had already indicated another species as the type.

The type of *Graphiphora* is *G. c.-nigrum* (Linn.), wrongly called by Hübner and others *G. gothica* (Linn.), which is a different species. Another of the rather numerous species of the genus is here figured.

THE DOUBLE-SPOTTED SQUARE-SPOT.

GRAPHIPHORA TRIANGULUM.

Noctua triangulum, Hufnagel, Berlin. Mag. iii. p. 306, no. 58 (1766); Treitschke, Schmett. Eur. v. (1), p. 240 (1825); Buckler, Larvæ of Brit. Lepid. v. pl. 76, figs. 4–4 c (1893).

Noctua sigma, Knoch, Beitr. Ins. iii. p. 94, pl. 4, fig. 7 (1783); Esper, Schmett. iv. (2) 2, p. 24, Taf. 186, figs. 1, 3 (1797 ?); Hübner, Eur. Schmett. iv. fig. 497 (1804 ?).

Graphiphora triangulum, Stephens. Ill. Brit. Ent. Haust. ii. p. 133 (1829).

Agrotis triangulum, Kirby, Eur. Butterflies and Moths, p. 191 (1880).

This Moth is common in most parts of Central and Eastern Europe. It expands from an inch and a half to about an

inch and three-quarters. The head and collar are light reddish brown, and the thorax is dark brown, varied with ferruginous, and has a double crest. The abdomen is brownish-grey, and reddish at the tip. The antennæ are light brown, serrated in the male, and filiform in the female. The fore-wings are light reddish-brown, here and there shaded with darker. Close to the base is a black spot, which is divided from above by the black half-line. The first transverse line is very distinct, and is pale, bordered with black on both sides. The orbicular and reniform stigmata are both

The Double-Spotted Square-Spot.

ringed with lighter; they are pale and merge into a pale spot on the costa. Between the orbicular stigma and the first transverse line there is a dark brown spot, and between the stigmata there is another similar spot. Beyond the reniform stigma follows the pale second transverse line, and beyond this is the sub-marginal line, which rises from a dark brown spot on the costa. The fringes are similar to the ground-colour, with a double border. The hind-wings are brownish-grey in both sexes, and are slightly reddish towards the base, with white fringes, bounded by a black and a yellow line.

The larva feeds on various low plants in autumn. When disturbed, it rolls itself into a ring. It hybernates, and is full-grown in April. It is narrowed in front and stout behind, and of a reddish ashy-grey colour, marbled with darker along

the back. On both sides is a pale reddish stripe, and on the back a pale longitudinal line bordered with black. On the upper part of each segment, from the fourth to the eighth, are two indistinct oblique brown streaks, which approximate somewhat towards the incisions, and are best marked on the eleventh and twelfth segments. When young, the larva is green.

The pupa is dark brown, and the moth appears in June or July.

SUB-FAMILY VIII. ORTHOSIINÆ.

This group much resembles the last, but the antennæ are generally strongly pectinated, dentated, or ciliated, at least in the males. The body is stout and very hairy; and the extremity of the abdomen is often depressed. The transverse lines of the fore-wings, and the orbicular and reniform stigmata, are more or less distinctly marked, and the reniform stigma is nearly always marked with blackish below. In repose the fore-wings cover the hind-wings, and slightly overlap.

The larvæ are cylindrical, velvety, with a round head, and without tubercles. They feed on trees or low plants, and hide themselves during the day.

The moths, which have generally brown, reddish-brown, or yellow fore-wings, and brown or grey hind-wings, mostly appear in spring and autumn, and many of the rarest, as well as the commonest, species are to be found sipping the flowers of sallows and ivy. Many of the species are very variable.

GENUS CUPHANOA.

Cuphanoa, Hübner, Verz. bek. Schmett. p. 230 (1822?).
Tæniocampa, Guenée, Ann. Soc. Ent. France, viii. p. 477 (1839); id. Spec. Gén. Lépid. Noct. i. p. 346 (1852).

The species of this genus are of dull colour, and frequent blossoming sallows in early spring. The proboscis and palpi are rather short, but the third joint of the latter, though short, is visible. The legs are short and very hairy. These moths are usually called "Quakers" by collectors. They have a general resemblance to the *Bombyces*, and were classed with them by some of the older writers. They are moths with stout hairy bodies; and the abdomen, which extends a little beyond the hind-wings, is obtuse in the male, and more or less pointed in the female.

THE COMMON QUAKER. CUPHANOA CERASI.

Noctua cerasi, Fabricius, Spec. Ins. p. 600, no. 42 (1781).
Noctua stabilis, Vieweg, Tab. Verz. Churmark Brandenburg Schmett. ii. p. 14 (1789); Hübner, Eur. Schmett. iv. fig. 171 (1799?).
Orthosia stabilis, Treitschke, Schmett. Eur. v. (2), p. 233 (1825); Stephens, Ill. Brit. Ent. Haust. ii. p. 143 (1829).
Tæniocampa stabilis, Kirby, Eur. Butterflies and Moths, p. 173 (1880); Buckler, Larvæ of Brit. Lepid. v. pl. 81, figs. 4, 4a (1890).

The Common Quaker.

The Common Quaker is an abundant species in Central and Southern Europe. It expands from an inch and a quarter to about an inch and a half.

The fore-wings are reddish-ochreous, with dull yellowish

transverse lines with dark borders. The orbicular stigma extends towards the reniform stigma, and the yellow lines encircling them are sometimes connected, but there is usually a central shade passing between them. The claviform stigma is represented by a yellow dash. The sub-marginal line is thick, yellowish, and bordered with brown; and there is a yellow line at the base of the unicolorous fringes, and a row of small black dots in front of this line. In the female the fore-wings are broader than in the male. The hind-wings are uniform ashy grey or whitish, with an ashy grey shade against the yellowish-white fringes, and a distinct central lunule.

The larva feeds on lime, beech, elm, poplar, oak, and some fruit-trees. It is green, dotted with yellowish, with a yellowish dorsal line extending to the twelfth segment, and a similar line on each side, which is continued as far as the last pair of pro-legs. On careful examination a third narrower line may be detected between the dorsal and lateral lines, which consists of a row of irregular dots. The head is green, and the front of the next segment is yellowish. On the penultimate segment is a short yellow transverse line, pointed at each end, and with somewhat of a lunulated appearance. The back is set with single fine hairs. The yellowish dots already mentioned are slightly raised above the surface. When disturbed the larva drops to the ground and twists itself violently, making its head and tail meet alternately on each side.

The pupa is formed in an earthen cell in the ground, without a cocoon. It is shining brown, with two points at the extremity. The moth commences to develop in the pupa before the end of the winter, and a few warm days in spring will cause it to emerge, and the warmth of a room will often bring it out in two or three days.

GENUS ORTHOSIA.

Orthosia, Ochsenheimer, Schmett. Eur. iv. p. 79 (1816); Treitschke, Schmett. Eur. v. (2), p. 201 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 358 (1852).

Orthosia much resembles *Cuphanoa*, but the antennæ of the males are pubescent, and simple, or occasionally serrated. The third joint of the palpi is invisible, being entirely concealed among the hairs of the second. The legs are longer and less hairy than in the last genus. The lines and stigmata of the fore-wings are well marked, and the wings are much sloped when the moths are at rest.

The larvæ are stout and cylindrical, velvety, and marbled, with only the stigmatal line distinctly marked. They feed on trees and low plants, and hide themselves during the day under bark, or under bushes.

The species of *Orthosia* are found in summer and autumn, instead of in spring. They are more prettily marked than those of *Cuphanoa*.

THE YELLOW-LINE QUAKER. ORTHOSIA MACILENTA.

Noctua macilenta, Hübner, Eur. Schmett. iv. fig. 418 (1804?).
Noctua flavilinea, Haworth, Lepid. Brit. p. 243 (1809).
Orthosia flavilinea, Stephens, Ill. Brit. Ent. Haust. ii. p. 148, pl. 19, fig. 2 (1829).
Orthosia macilenta, Treitschke, Schmett. Eur. v. (2), p. 215 (1825); Stephens, Ill. Brit. Ent. Haust. iii. p. 68 (1829); Kirby, Eur. Butterflies and Moths, p. 176 (1880); Buckler, Larvæ of Brit. Lepid. v. pl. 92, figs. 6, 6 a (1893).

This is a common species in Central Europe. It expands nearly an inch and a half.

The fore-wings are reddish-yellow or pale fulvous, usually

with two black dots near the base in place of a half-line, and a row of dots in the position of the first transverse line. The orbicular stigma is seldom distinct, but it has a slight indication of a dark centre. The reniform stigma is enclosed in a yellow border, and is most distinct on its lower half, which is filled in first with ferruginous, and then with black. The second transverse line is also composed of dots. The sub-marginal line is the most distinct; it is hooked above, but runs for the rest a straight course. It is yellow, with a ferruginous border on the inner side. In front of the unicolorous dentated fringes is a row of small triangular dots, with a yellow line separating them from the fringes. The hind-wings are yellowish ashy grey with a slight lunule, and yellow fringes.

The Yellow-line Quaker.

The head and thorax have the same colour as the fore-wings, and the abdomen is yellowish-grey, with reddish-yellow hair on the sides, and an anal tuft of the same in the male. The antennæ are slightly pectinated in the male.

The larva feeds on beech, oak, and birch. It is greyish-brown, with numerous minute white dots, and several white lines.

The pupa is formed in an excavation in the ground, and the moth emerges in August or September.

GENUS GLÆA.

Glæe, Hübner, Tentamen, p. i. (1810 ?).
Glæa, Stephens, Ill. Brit. Ent. Haust. ii. p. 159 (1829).

Cerastis, Ochsenheimer, Schmett. Eur. iv. p. 84 (1816); Treitschke, Schmett. Eur. v. (2), p. 395 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 377 (1852).

The Chestnuts may be known by their obtuse, almost uniformly coloured wings, which are held nearly flat when at rest; and the broad, depressed, and rather short abdomen. There are three British species, which are very similar, two of which are common, and the third and largest (*C. erythrocephala*, Denis & Schiffermüller) rare.

The larvæ are smooth, velvety, and cylindrical, and hide by day among the low plants on which they feed. The moths appear in late autumn and early spring.

Stephens rightly objects to the name *Cerastis*, as being too similar to *Cerastes* to be retained.

THE CHESTNUT MOTH. GLÆA VACCINII.

Noctua vaccinii, Linnæus, Syst. Nat. (ed. x.), i. p. 832, no. 166 (1758); id. Faun. Suec. p. 320, no. 1212 (1761); Esper, Schmett. iv. p. 549, Taf. 161, figs. 1–6 (1791); Hübner, Eur. Schmett. iv. fig. 177 (1799?).

Cerastis vaccinii, Treitschke, Schmett. Eur. v. (2), p. 401 (1825); Buckler, Larvæ of Brit. Lepid. v. pl. 93, fig. 5–5 c (1893).

Glæa vaccinii, Stephens, Ill. Brit. Ent. Haust. ii. p. 161 (1829).

Orrhodia vaccinii, Kirby, Eur. Butterflies and Moths, p. 184, pl. 34, fig. 9 (1880).

The Chestnut Moth is common in most parts of Northern and Central Europe, to Armenia and Siberia. It expands about an inch and a quarter.

The fore-wings are yellowish rusty brown, with pale transverse

lines. Near the base is a half-line separated by a dark band from the first transverse line. The usual stigmata are surrounded by a grey or yellow edging. The orbicular stigma is large, oblong and oblique, and the reniform stigma is blackish on its lower part; there is a dark central shade. Between the second transverse line and the sub-marginal line there is also a dark band. The fringes are yellow, streaked with brown, and there is a silky lustre over the entire surface of the wings. The hind-wings are ashy grey, with a reddish lustre, and coppery fringes.

The Chestnut Moth.

The thorax is of the same colour as the fore-wings, and is covered with thick smooth hair. The antennæ are pale ferruginous brown, finely dentated in the male, with white or yellowish scales at the base. The abdomen is broad and flat, grey and reddish, with a rusty brown anal tuft, and hair of the same colour on the sides.

The larva feeds on the leaves of poplar, oak, elm, raspberry, blackberry, *Vaccinium*, and various low plants. It is purplish-brown, with indistinct paler dorsal and sub-dorsal lines and light grey spots. There is a greyish ochreous spiracular line, and black spiracles. The belly is paler than the back, and has a greenish tinge.

The pupa, which is reddish-brown, is formed in the ground. The moth appears in October and November, and, after hybernation, in March and April.

GENUS EUPSILIA.

Eupsilia, Hübner, Verz. bek. Schmett. p. 231 (1822 ?)
Scopelosoma, Curtis, Brit. Ent. xiv. p. 635 (1837); Guenée, Spec. Gén. Lépid. Noct. i. p. 385 (1852).

This genus resembles the last, but may easily be distinguished by its larger size and dentated wings, with a conspicuous white spot in the middle of the fore-wings. The larva is notorious for its cannibalistic propensities.

THE SATELLITE. EUPSILIA SATELLITIA.

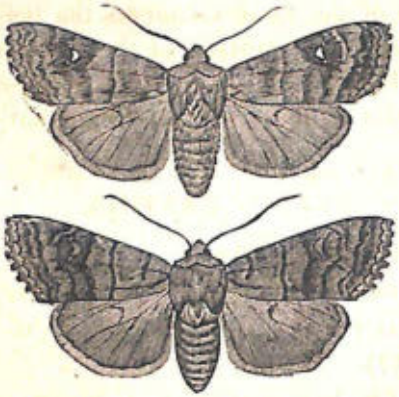
Noctua satellitia, Linnæus, Syst. Nat. (ed. xii.), i. (2), p. 855, no. 176 (1767); Esper, Schmett. iv. (2) i. p. 618, Taf. 169, figs. 6–10 (1793?); Hübner, Eur. Schmett. fig. 182 (1799?)
Noctua transversa, Hufnagel, Berlin. Mag. iv. p. 418, no. 102 (1767).
Cerastis satellitia, Treitschke, Schmett. Eur. v. (2), p. 414 (1825).
Glæa satellitia, Stephens, Ill. Brit. Ent. Haust. ii. p. 163 (1829).
Scopelosoma satellitia, Curtis, Brit. Ent. xiv. pl. 635 (1837); Kirby, Eur. Butterflies and Moths, p. 183 (1880); Buckler, Larvæ of Brit. Lepid. v. pl. 84, fig. 1 (1893).

The Satellite is common in most parts of Europe and Siberia. It expands from an inch and a half to an inch and three-quarters.

It is very variable in colouring, but is most frequently reddish-brown or ferruginous, though occasionally yellowish-brown or greyish-brown specimens are met with. The head and thorax are unicolorous, the latter being crested. The antennæ are of the same colour as the thorax, and are dentated in the male, but only notched in the female. The abdomen is

reddish or yellowish-grey, broad and flat, with paler hair on the sides, and a pale anal tuft. The legs are grey, suffused with reddish or yellowish.

The fore-wings are long and narrow, and are of almost uniform width from the first transverse line. The usual lines are distinct, and darker than the ground-colour. There is a half-line, and the first transverse line is almost straight. The central area is the darkest portion of the wings. The orbicular stigma is hardly visible. Beyond it is a central shade,



The Satellite.

which forms an angle towards the reniform stigma. The latter is well marked, and is formed of a white or ochre-yellow spot, convex towards the base, but excavated on its outer side. At both ends are two white or yellow dots. Sometimes the spots are yellow, and the dots white, or *vice versa*. The second transverse line is zig-zag, and the sub-marginal line forms a faint waved line. The outer band beyond it is pale. The fringes are unicolorous, and bordered with a row of small yellowish lunules. The whole surface of the wings is very shining. The

hind-wings are yellowish-grey, with a slight central spot, and yellowish fringes.

The larva feeds on oak, beech, elm, pear, and other trees. It is velvety-black, tending towards brown, with a rusty-brown head. The cervical plate is black, and square, bordered on each side with a fine yellow or white line. The sides and belly are pale clay-colour. On the anal segment are two longitudinal yellow streaks, and on the sides are two slight dark longitudinal lines. On the second, third, fifth, and eleventh segments are white spots above the legs. The legs are shining black, but the pro-legs are of the same colour as the belly, with only a black spot. The whole surface of the body is covered with small scattered hairs. The moth appears in September and October, and again in the spring after hybernation.

GENUS XANTHIA.

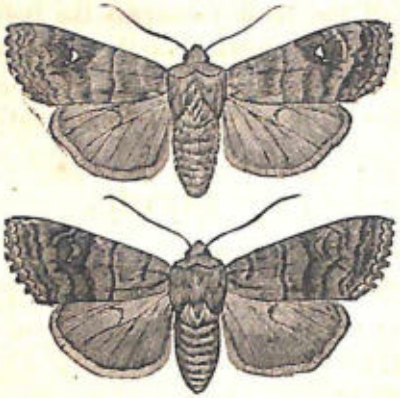
Xanthia, Hübner, Tentamen, p. 1 (1816); Ochsenheimer, Schmett. Eur. iv. p. 82 (1816); Treitschke, Schmett. Eur. v. (2), p. 341 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 389 (1852).

The type of this genus appears to be *X. sulphurago* (Den. & Schiff.), an East European species, but I have described one of our British species. The moths of this genus are all much alike, and have yellow or ochreous fore-wings, which are broad, moderately long, and slightly pointed at the tip, the hind-margin waved, and slightly more oblique below the middle than above. The antennæ are ciliated.

The larvæ are velvety, and rather short and thick, with the abdomen not so short as in the preceding genera. When young, they feed on the buds of trees; but when older, they descend to the ground, and hide themselves among low plants, upon which they then feed.

reddish or yellowish-grey, broad and flat, with paler hair on the sides, and a pale anal tuft. The legs are grey, suffused with reddish or yellowish.

The fore-wings are long and narrow, and are of almost uniform width from the first transverse line. The usual lines are distinct, and darker than the ground-colour. There is a half-line, and the first transverse line is almost straight. The central area is the darkest portion of the wings. The orbicular stigma is hardly visible. Beyond it is a central shade,



The Satellite.

which forms an angle towards the reniform stigma. The latter is well marked, and is formed of a white or ochre-yellow spot, convex towards the base, but excavated on its outer side. At both ends are two white or yellow dots. Sometimes the spots are yellow, and the dots white, or *vice versa*. The second transverse line is zig-zag, and the sub-marginal line forms a faint waved line. The outer band beyond it is pale. The fringes are unicolorous, and bordered with a row of small yellowish lunules. The whole surface of the wings is very shining. The

hind-wings are yellowish-grey, with a slight central spot, and yellowish fringes.

The larva feeds on oak, beech, elm, pear, and other trees. It is velvety-black, tending towards brown, with a rusty-brown head. The cervical plate is black, and square, bordered on each side with a fine yellow or white line. The sides and belly are pale clay-colour. On the anal segment are two longitudinal yellow streaks, and on the sides are two slight dark longitudinal lines. On the second, third, fifth, and eleventh segments are white spots above the legs. The legs are shining black, but the pro-legs are of the same colour as the belly, with only a black spot. The whole surface of the body is covered with small scattered hairs. The moth appears in September and October, and again in the spring after hybernation.

GENUS XANTHIA.

Xanthia, Hübner, Tentamen, p. 1 (1816); Ochsenheimer, Schmett. Eur. iv. p. 82 (1816); Treitschke, Schmett. Eur. v. (2), p. 341 (1825); Guenée, Spec. Gén. Lépid. Noct. i. p. 389 (1852).

The type of this genus appears to be *X. sulphurago* (Den. & Schiff.), an East European species, but I have described one of our British species. The moths of this genus are all much alike, and have yellow or ochreous fore-wings, which are broad, moderately long, and slightly pointed at the tip, the hind-margin waved, and slightly more oblique below the middle than above. The antennæ are ciliated.

The larvæ are velvety, and rather short and thick, with the abdomen not so short as in the preceding genera. When young, they feed on the buds of trees; but when older, they descend to the ground, and hide themselves among low plants, upon which they then feed.

They are called "Sallows," either from their yellow colour, or because some of their larvæ feed on sallow catkins. The moths appear in September.

THE BARRED SALLOW. XANTHIA ICTERITIA.

Noctua fulvago, Linnæus (nec Clerck), Faun. Suec. p. 312 (1761).

Noctua icteritia, Hufnagel, Berlin. Mag. iii. p. 296, no. 43 (1767).

Noctua cerago, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 86, no. 9 (1776); Hübner, Eur. Schmett. i figs. 144, 145, 190 (1804?)

Xanthia cerago, Treitschke, Schmett. Eur. v. (2) p. 370 (1825); Stephens, Ill. Brit. Ent. Haust. iii. p. 64 (1829); Buckler, Larvæ of Brit. Lepid. v. p. 73, pl. 84, figs. 5–5 c (1893).

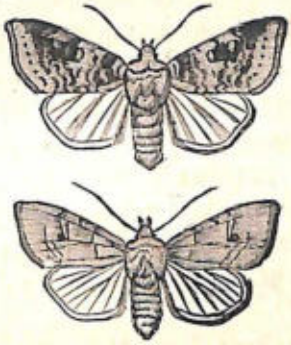
Xanthia gilvago, Stephens (nec. Den. & Schiff.), *op. cit.* iii. p. 65 (1829).

Xanthia fulvago, Kirby, Eur. Butterflies and Moths, p. 182 (1880).

This Moth is common in Northern and Central Europe, and in Northern Asia. It expands from an inch and a quarter to an inch and a half.

The fore-wings are Canary-yellow with several ferruginous spots of different sizes. The transverse lines are broken up into spots and streaks. In front of the position of the first line there are two or three ferruginous spots. The centre of the wing is crossed by a broad band, fading on the inner side, and composed of three rows of reddish and rusty spots. In the largest external spot are three yellow dots near the costa. In the middle of the band, on the sub-costal nervure, is a small dark-brown spot, usually centred with yellowish. This belongs to the reniform stigma, which is generally indistinctly marked.

The orbicular stigma is also seldom visible, and is often only indicated by a fine line and pale patch. In front of the yellowish-brown fringes is a row of dots. The hind-wings are white, with fringes of the same colour. The head and the crested thorax are pale yellow, the abdomen whitish, and the antennæ ferruginous.



The Barred Sallow.

The larva feeds in early spring on the catkins of sallow, but leaves them as it approaches its full growth, and then feeds on plantain and other low plants, though it will also eat the young shoots of the sallow when nothing else is available. It is greyish-brown, with a black horny plate on the second segment marked with three white lines, of which the middle one is indistinct. There is a white dorsal line bordered on both sides by fine pale lines, and a greyish spiracular line.

The pupa is enclosed in an earthen cocoon in the ground. The moth appears in August.

SUB-FAMILY IX. COSMIINÆ.

The moths of this Sub-family are usually rather small, with pubescent antennæ, ascending and approximating palpi, and

with the abdomen rather slender, pointed, and furnished with an ovipositor in the female. The wings are usually ornamented with sharply-defined markings, and are sloped very much when the insect is at rest.

The larvæ are rather brightly coloured, and roll themselves up in the leaves of trees, like those of Tortrices. Some, like certain of the *Orthosiinæ*, are called "Cannibals" by collectors, for they are very fond of attacking and devouring other larvæ.

The moths, which appear in July and August, fly actively at dusk.

GENUS COSMIA.

Cosmia, Hübner, Tentamen, p. 1 (1816); Ochsenheimer, Schmett. Eur. iv. p. 84 (1816); Treitschke, Schmett. Eur. v. (2), p. 379 (1825); Guenée, Spec. Gén. Lépid. Noct. ii. p. 8 (1852).

The species of *Cosmia* are comparatively small *Noctuæ*, with simple antennæ, approximating and slightly ascending palpi, a short proboscis, smooth thorax, and a moderately slender abdomen as long as the hind-wings. The wings are rather long and broad, and the fore-wings are marked with oblique or angulated pale lines, often rising in pale spots on the costa.

The larvæ are smooth, with well-marked incisions, and live in a bunch of leaves drawn together with silk. The pupa is very tapering at the tip, and is found between leaves, or in a cocoon on the surface of the ground.

THE LESSER-SPOTTED PINION. COSMIA AFFINIS.

Noctua affinis, Linnæus, Syst. Nat. (ed. xii.) i. (2), p. 841, no. 144 (1767); Esper, Schmett. iv. (1), p. 414, Taf. 134, fig. 1 (1790?); Hübner, Eur. Schmett. iv. fig. 201 (1799?).

Cosmia affinis, Treitschke, Schmett. v. (2) p. 389 (1825); Stephens, Ill. Brit. Ent. Haust. iii. p. 61 (1829); Kirby, Eur. Butterflies and Moths, p. 179, pl. 33, fig. 13 (1880): Buckler, Larvæ of Brit. Lepid. v. p. 86, pl. 86, figs. 5–5 c (1893).

The Lesser-spotted Pinion.

This Moth, which is the type of the genus, is common in Central and Southern Europe. It expands a little over an inch.

The fore-wings are reddish-brown, varied with ferruginous and blackish, with the lines pale grey and indistinct, whitish towards the costa. The half-line is represented by a scarcely visible dash, the first transverse line is also slender, often as thin as a hair, and both these lines are sometimes entirely wanting. The second transverse line is likewise not very distinct, expanding into a greyish cloud on the costa; it is sharply bent outwards before the middle. The sub-marginal line, which is frequently very indistinct or quite absent, is also merged in a grey cloud on the costa. The central area is trapeziform, bordered with reddish. The orbicular stigma is centred with black, and the reniform stigma is shaped like a figure of 8, each ring of the 8 being centred with black. A dark central shade, which is slightly angulated, passes between the stigmata. There is a row of indistinct blackish dots near the fringes. The fringes are yellowish-brown, and not dentated. The hind-wings are black, but yellowish towards the base, with the fringes deep yellow.

The larva lives between the leaves of the elm, which it weaves loosely together with a few silken threads, but it is also sometimes met with on low plants. It is pale bluish-green, sometimes slightly yellowish, especially just before its metamorphosis, and the head is of the same colour as the body. It is marked with five longitudinal white lines, three on the back, and one on each side over the spiracles. The three dorsal lines converge at the anal fold, where they become nearly united. The segment behind the head bears a cervical plate, and on the succeeding segments are small black tubercles set with a few dark hairs. The spiracles are black. When young the body is blackish, with a white median dorsal line. After the second moult the five pale lines first appear in the dark ground-colour; and at the second moult the larva becomes green.

The moth appears in July and August. It is closely allied to another species, *C. diffinis* (Linn.), which is much more distinctly marked with very conspicuous white spots on the costa, from which the lines rise.

SUB-FAMILY X. HADENINÆ.

This is an extensive group which has much resemblance to the *Apameinæ*, and, like these, the sub-terminal line of the fore-wings generally forms a strongly-marked W. The moths are of moderate size, often with marbled markings on the fore-wings, and are usually grey, brown, or green. They are generally hairy, with short palpi, and naked eyes.

The larvæ are long and smooth, with no excrescences, except that the penultimate segment is sometimes slightly raised. They feed openly on low plants, and the pupæ are formed in earthen cocoons in the ground.

GENUS EPIA.

Epia, Hübner, Verz. bek. Schmett. p. 475 (1822 ?).
Dianthœcia, Boisduval in Silbermann, Revue Ent. ii. p. 245 (1834); id. Gen. Ind. Meth. p. 124 (1840); Guenée, Spec. Gén. Lépid. ii. p. 16 (1852).

This is a well-marked group of moderate-sized moths, with conspicuous brown-and-white marbled and festooned markings, and the abdomen crested at the base, carinated, conical at the extremity, and provided, in the female, with a prominent ovipositor. The larvæ are cylindrical, smooth, and velvety, and live in the pods of different species of *Dianthus*, *Lychnis*, *Silene*, *Saponaria*, and other Caryophyllaceous plants, feeding on the seeds. The pupæ are subterranean. The moths fly actively, at dusk, over the flowers on which their larvæ feed. Most of the British species are rather local, and are quite as abundant on the coast as inland, several species being found only on the sea-cliffs of the Isle of Man, and of the Hill of Howth near Dublin, and in similar localities.

THE VIPER'S BUGLOSS MOTH. EPIA IRREGULARIS.

Noctua irregularis, Hufnagel, Berlin. Mag. iii. p. 394, no. 65 (1767).
Noctua echii, Borkhausen, Eur. Schmett. iv. p. 166 (1792); Hübner, Eur. Schmett. iv. fig. 91 (1799 ?).
Noctua brecciæformis, Esper, Schmett. iv. (2) 2, p. 79, Taf. 198, fig 5 (1799 ?).
Miselia echii, Treitschke, Schmett. Eur. v. (2), p. 343 (1825).
Dianthœcia irregularis, Kirby, Eur. Butterflies and Moths, p. 222 (1881).

The Viper's Bugloss Moth is a native of Southern and Central Europe, and South-Eastern Siberia. It is exceedingly

rare in Britain, having only been captured once or twice in the South of England. It expands about an inch and a quarter.

The head and thorax are pale yellow, and the collar and tegulæ are bordered with yellow. The abdomen is greyish-yellow, whitish on the sides, with a light brown anal tuft. The antennæ are light brown, slightly notched in the male, and finer and filiform in the female. The legs are greyish-yellow.

The Viper's Bugloss Moth.

The fore-wings, on which all the transverse lines are distinctly marked, are pale yellow, extensively marbled with dark brown and white. The half-line ends in a brown or black dot. The first and second transverse lines are formed of brown lunules, with the convexity directed inwards. The orbicular stigma is distinctly yellow, ringed with white. The reniform stigma is ear-shaped, with a dark centre. The claviform stigma is represented by a black streak. The sub-marginal line is white and clearly defined, and the marginal band is fawn-coloured. The fringes are brown and whitish, and are edged with a white line. The hind-wings are greyish-yellow towards the base, with a slight lunule, and a curved line, beyond which there is a brown band, and whitish fringes.

The larva feeds on Viper's Bugloss (*Echium vulgare*), and on *Gypsophila paniculata* in July. It is yellowish-grey in colour, and is obliquely striped with darker on the back.

The moth appears in May and June.

GENUS DIPHTHERA.

Diphthera, Hübner, Tentamen, p. 1 (1816).
Agriopis, Boisduval, Gen. Ind. Meth. p. 123 (1840); Guenée, Spec. Gén. Lépid. Noct. i. p. 58 (1852).

In this genus the antennæ are pubescent and filiform, but slightly denticulated at the base, which is furnished with a strong tuft of hairs. The palpi are straight and rather long. The body is stout and hairy, and the abdomen is slightly crested. The legs are stout, with very thick tibiæ in the male, and all the tarsi thickly spined below. The wings are entire, with very distinct markings.

The larvæ are stout and cylindrical, and hide themselves under the bark of trees during the day. The pupæ are deeply buried in the ground, and are enclosed in an earthen cocoon.

There is a species belonging to the *Acronyctinæ* (*Moma orion*, Esper) which has a very close resemblance to the type of this genus, and to which, by some oversight, Ochsenheimer and his successors have applied the name *Diphthera*, the original type of which is the following species.

THE MARVEIL DU JOUR. DIPHTHERA APRILINA.

(*Plate CXXVII., Fig.* 8.)

Noctua aprilina, Linnæus, Syst. Nat. (ed. x.) i. p. 514, no. 99 (1758); id. Faun. Suec. p. 313, no. 1178 (1761); Esper, Schmett. iv. (1), p. 276, Taf. 118, figs. 1–3 (1789?).
Noctua runica, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 70, no. 1 (1776); Hübner, Eur. Schmett. iv. fig. 71 (1799?), figs. 721, 722 (1818?).
Miselia aprilina, Treitschke, Schmett. Eur. v. (1), p. 411 (1825); Stephens, Ill. Brit. Ent. Haust. iii. p. 25 (1829).

Dichonia aprilina, Kirby, Eur. Butterflies and Moths, p. 215, pl. 37, figs. 3–3 b (1880).

Agriopis aprilina, Buckler, Larvæ of Brit. Lepid. vi. p. 30, pl. 91, figs. 2, 2 a (1895).

The "Marveil du Jour" is common in Central and in some parts of Southern and Eastern Europe. It expands from an inch and a half to two inches.

The fore wings are of a light apple-green or sea-green, which tends towards yellowish or almost white in old and worn specimens. The costa is spotted with black and white, and from it rise the black transverse lines, which are bordered with white. The half-line is represented by two black spots towards the base, and the first and second transverse lines are formed of a number of lunules just touching at their extremities. Between the indistinct stigmata runs a black central shade. The sub-marginal line rises from a black hook near the apex of the wings; it consists of a zig-zag black line, sometimes broken into spots, and bordered with white on each side. The fringes are chequered with black and white, and are bounded by black dots on the inner side. The hind-wings are blackish with a central and a sub-marginal band of lighter, succeeded by a black line at the base of the brownish-white fringes. The head and thorax are mostly green, the latter with a transverse black stripe in front, and the abdomen is brown.

The larva feeds on oak at night, remaining hidden in the chinks of the bark during the day.

It is smooth, greyish-brown, sometimes tinged with red. The head is almost black, with yellowish dots. On the back is an interrupted whitish median dorsal line intersecting the ground-colour, which here takes the form of a series of lozenge-shaped spots; and on the sides is a pale spiracular line, bounded above by a waved darker stripe.

The pupa is slender, and of a brown colour. The moth appears in September and October.

GENUS PHLOGOPHORA.

Trigonophora, pt. Hübner, Verz. bek. Schmett. p. 217 (1822 ?).

Phlogophora, pt. Treitschke, Schmett. Eur. v. (1), p. 369 (1825); Stephens, Ill. Brit. Ent. Haust. iii. p. 83 (1829); Guenée, Spec. Gén. Lépid. Noct. ii. p. 62 (1852).

Solenoptera, Duponchel, Cat. Lépid. d'Europe, p. 134 (1844), *nom. præocc.*

Brotolomia, Lederer, Noct. Eur. p. 115 (1857).

Palpi rather large, ascending, the third joint small, but distinct. Antennæ ciliated, and in the male, sub-dentate. Thorax rather stout, with a short, pointed crest in front and a larger one behind, which is bifid at the extremity; abdomen rather short, much more slender than the thorax, with rows of small tufts on the back and sides, and a larger one at the extremity. Fore-wings rather long, the tip rounded off, and the hind margin oblique and excavated; hind-wings slightly indented. Wings folded round the body in repose.

The naked green larva feeds on a variety of plants, and the pupa is found in the ground.

There is curious confusion about the title of this genus, which was originally used in rather an extended sense, the names *Trigonophora* and *Phlogophora* being originally synonymous. Stephens selected *Noctua meticulosa*, Linn., as the type of *Phlogophora*, and this must stand. Duponchel, however, in 1844, proposed a new and inadmissable name for *N. meticulosa*, and wrongly restricted *Phlogophora* to *Noctua lucipara* (Linn.) (already separated under the generic name of *Euplexia* by Stephens), and *N. empyrea*, Hübner. Finally

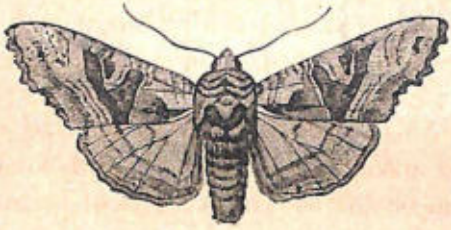
Lederer, in 1857, restricted the name *Trigonophora* to *Empyrea*, and rejecting the name *Solenoptera*, Dup., proposed a new genus for *Noctua meticulosa*, thus losing sight of the name *Phlogophora* altogether.

THE ANGLE-SHADES. PHLOGOPHORA METICULOSA.

Noctua meticulosa, Linnæus, Syst. Nat. (ed. x.), i. p. 513; no. 95 (1758); id. Faun. Suec. p. 309, no. 1164 (1761); Esper, Schmett. iv. (1), p. 220, Taf. 112, figs. 5–7 (1790); Hübner, Eur. Schmett, iv. fig. 67 (1799?).

Phlogophora meticulosa, Treitschke, Schmett. Eur. v. (1) p. 373 (1825); Stephens, Ill. Brit. Ent. Haust. iii. p. 83 (1829); Buckler, Larvæ of Brit. Lepid. vi. p. 30, pl. 91, figs. 3–3 g (1895).

Habryntis meticulosa, Kirby, Eur. Butterflies and Moths, p. 239, pl. 38, fig. 8 (1881).



The Angle-Shades.

The Angle-Shades is common in most parts of Central Europe and the Mediterranean region. It expands from an inch and a half to two inches. The fore-wings are pale ochreous, with a slight rosy tinge in front of the basal area, and in the suffused sub-marginal line. The central area is olive-brown, and triangular. It is bordered by the pale transverse lines. The orbicular and reniform stigmata are

oblique, converging at their lower ends. The marginal area is ochreous-grey, tinged with rose-colour towards the hind margin, with two darker parallel transverse bars. The hind-wings are whitish, sometimes with a faint rosy tinge posteriorly, as well as a dusky central crescent and two or three faint dusky waved lines.

The larva feeds on nettle, chickweed, hemlock, primrose, mullein, and various other low plants, and if touched or disturbed, at once feigns death, turning its head to one side, and lying quite still. The insect is double-brooded, and the autumnal larvæ hybernate after the last moult but one, and pupate in early spring, the moth appearing in May or June; whilst the second brood, from eggs laid in July, appears about September. The larva is grass-green, occasionally brownish, thickly powdered with obscure whitish dots, with an interrupted slender white dorsal line, and a pale spiracular line, the spiracles being whitish, finely ringed with black.

The pupa, which is shining reddish-brown, with a fine apical point, is enclosed in a slight cocoon in the ground.

FAMILY XLI. CUCULLIIDÆ.

Larva long, naked, cylindrical, brightly coloured, and feeding exposed on the flowers or leaves of herbaceous plants or trees.

Pupa varying in habits and structure, generally enclosed in a cocoon, and sometimes, but not always, subterranean; and often furnished with a prominent ventral appendage.

Imago with simple antennæ, well-developed palpi, and long proboscis. The thorax is stout, with the collar raised; the abdomen and wings are often long, pointed, and comparatively narrow. The wings are usually brown or grey, with longitudinal streaks. The usual "*Noctua*"-pattern is rarely visible.

These moths come freely to flowers at dusk, flying over them somewhat in the manner of Sphinges, which some of them considerably resemble in shape. They are generally called "Sharks" by collectors.

At one time Dr. Butler proposed to transfer this family to the *Notodontidæ*, but has now decided to replace them in the *Noctuæ*.

GENUS CALOCAMPA.

Cucullia, pt. Schrank, Fauna Boica, ii. (2), p. 157 (1882).
Calocampa, Stephens, Ill. Brit. Ent. Haust. ii. p. 172 (1829); Guenée, Spec. Gén. Lépid. Noct. ii. p. 115 (1852).

Antennæ long, thickened, ciliated; palpi short, compressed, very scaly. Thorax square, slightly crested in front; abdomen depressed, slightly tufted at the extremity in the male. Wings long; fore-wings dentated; hind-wings rather broad. Wings folded longitudinally when at rest, like those of a *Lithosia*.

Larva long, smooth, cylindrical, feeding in clusters on the summit of low plants.

Pupa with two apical spines. It is deeply buried in the ground, and forms no cocoon, but lines the cavity with silk.

THE SWORD-GRASS MOTH. CALOCAMPA EXOLETA.

(*Plate CXXVIII., Fig.* 6, *larva.*)

Noctua exsoleta, Linnæus, Syst. Nat. (ed. x.), i. p. 513, no. 104 (1758); id. Faun. Suec. p. 315, no. 1085 (1761).
Noctua exoleta, Esper, Schmett. iv. (2), i. p. 433, Taf. 138, figs. 1–3 (1790?); Hübner, Eur. Schmett. iv. fig. 2 (1799?).
Xylina exoleta, Treitschke, Schmett. Eur. v. (3), p. 7 (1826).

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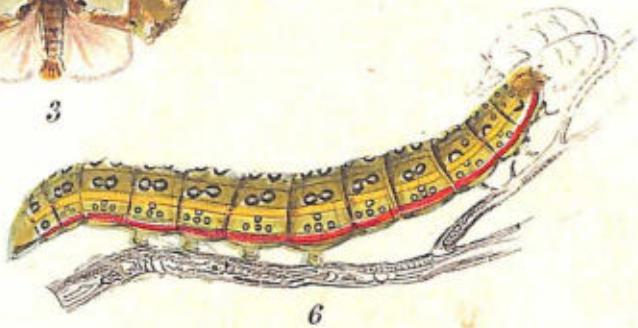

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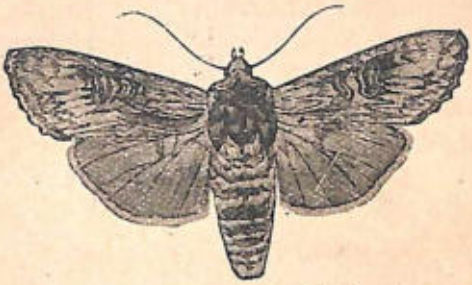
1. *Tarache dispar.*
2. *Galgula partita.*
3. *Canna malachites.*
4. *Rhodophora gauræ*
5. *Rhodophora gauræ, larva*
6. *Calorampa excoleta, larva*
7. *Periphanes delphinii*
8. *Argyritis argentina.*
9. *Chloridea rhexiæ.*

Calocampa exoleta, Stephens, Ill. Brit. Ent. Haust. ii. p. 173 (1829); Curtis, Brit. Ent. vi. pl. 256 (1829); Kirby, Eur. Butterflies and Moths, p. 243, pl. 38, figs. 12–12 b (1881); Buckler, Larvæ of Brit. Lepid. vi. pl. 96, figs. 2-2 d (1895).



The Sword-grass Moth.

The Sword-grass Moth is common throughout the greater part of Europe, Northern Africa, and Siberia. It expands about two inches and a quarter. The head is pale grey, and the thorax black, with scattered white hairs. The tegulæ are white. The abdomen is covered with long grey hair above, with a black shade in the middle, and yellowish-grey hair on the sides, forming zig-zag tufts.

The fore-wings vary from dark brown to grey. On the hind margin is a dark line containing four or five white dots near the apex of the wings. From the base to the hind margins, the whole of the wings are covered with numerous fine longitudinal brown streaks on an ashy-grey ground. The outer part of the wings is dark brown, especially in the neighbourhood of the reniform stigma. There are no transverse lines. The orbicular stigma is elongated, and similar in shape to the reniform, but smaller. Both are surrounded by slender dark lines, and the reniform stigma is shaded externally

with black. Beyond the stigmata is the lightest part of the wings, with a double row of dots, one or two sagittate marks, and an indistinct zig-zag sub-marginal line. The hind-margins and fringes are dark brown. The hind-wings are dusky grey, with light grey fringes, and the lunule of the under side showing through.

The larva is very handsome, and has suggested the name of the genus, *Calocampa*, which is derived from the Greek καλός, *beautiful*, and κάμπη, *a worm*. Stainton's opinion of the larva is as follows:—"Any one who has not yet seen the larva of *C. exoleta* has a treat in store. I have only once seen it, and then I nearly screamed with delight. No figure can give any idea of the beauty of the living larva." It is bright green, with a pair of white spots on each side of the back, each pair being connected by a black blotch. Below them is a yellow stripe. This is succeeded by a space on which stands a row of three white dots on each segment, ringed with black; and on most of the segments there is a fourth dot above the middle one. Just over the legs there is a red stripe, bordered with white. It feeds on a variety of plants, but prefers lettuce, spinach, and asparagus. The larvæ are very difficult to rear, being liable to the attacks of ichneumons, and if the pupæ are not kept at exactly the proper degree of moisture, the specimens are crippled. The larva is slow and sluggish in its movements, and if touched, it contracts itself and emits a green liquid.

The pupa is shining reddish brown, and so delicate that the outlines of the moth are visible through it. It remains in this state for about four weeks, the moth appearing on the wing in September and October.

GENUS CUCULLIA.

Cucullia, Schrank, Fauna Boica, ii. (2), p. 157 (1802); Ochsenheimer, Schmett. Eur. iv. p. 87 (1816); Hübner, Verz. bek. Schmett. p. 246 (1822?); Treitschke, Schmett. Eur. v. (3), p. 85 (1826); Guenée, Spec. Gén. Lépid. Noct. ii. p. 123 (1852).

In this genus, the antennæ are simple, the palpi short and ascending, and the proboscis long. The collar is hood-like, and there are large lateral tufts on the thorax. The abdomen is moderately stout, and longer than the hind-wings. The fore-wings are long, narrow, and lanceolate, and, in the typical species, the hind margin is rather strongly dentated. The hind-wings are also long and rather pointed, but not much narrower than the fore-wings.

The larvæ are long and stout, with the incisions well-marked; the head is somewhat retractile and flattened. They feed on low plants, preferring the flowers. The pupæ are soft, with a projection behind, and are enclosed in large solid oval cocoons in the ground.

The types of this genus were indicated by Hübner as *C. verbasci* (Linn.) and *C. scrophulariæ* (Den. & Schiff.).

THE MULLEIN MOTH. CUCULLIA VERBASCI.

Noctua verbasci, Linnæus, Syst. Nat. (ed. x.), i. p. 515, no. 108 (1758); id. Faun. Suec. p. 315, no. 1186 (1761); Esper, Schmett. iv. (2) 1 i. p. 437, Taf. 139, figs. 1–4 (1790?); Hübner, Eur. Schmett. iv. fig. 266 (1799?).

Noctua scrophulariæ, Esper (nec Den. & Schiff.), Schmett. iv. (2) 1 p. 516, Taf. 154, fig. 1 (1791?).

Cucullia verbasci, Treitschke, Schmett. Eur. v. (3), p. 127 (1826); Stephens, Ill. Brit. Ent. Haust. iii. p. 85 (1829);

Kirby, Eur. Butterflies and Moths, p. 248, pl. 39, figs. 3–3 c (1881); Buckler, Larvæ of Brit. Lepid. vi. p. 67, pl. 97, figs. 1–1 d (1895).

The Mullein Moth is common in Central and Southern Europe, and in Western Asia. It expands about an inch and three-quarters.

The Mullein Moth.

The head is bone-coloured in front, brown above; the collar is pale grey in front, varied with yellow, with fine brownish transverse lines, and a broad brown band behind. The tegulæ are bordered with brown, and are marked with a few black dots. The abdomen is yellowish-grey, with an interrupted black dorsal line, which is continued on the thorax to the collar. There is a reddish-yellow anal tuft. The antennæ are yellowish-brown.

The fore-wings are marked with a rather broad band of rich brown on the costa and inner margin, the portion of the wings between being dull yellow, like fossil wood. There is a series of black dots running from the base in this area. Towards the middle of the inner margin are two white lunules, one above the other, and before and beyond these are two faint white spots, one in the middle of the wing, and the other near the fringes. The fringes themselves are brown, streaked w[illegible] white, deeply and acutely dentated, and there is a yellow line on their inner edge. The hind-wings are darkest towards the

fringes, usually dark brown, but becoming more yellow towards the base, and sometimes they are entirely pale, especially in some male specimens. The fringes are yellow, bisected by a dark line, and, like the fore-wings, deeply dentated.

The larva feeds on the leaves of various species of mullein, fig-wort, and other low plants. It is smooth and pearly white, with a blue, yellow, or green tinge, varying with the food. The head is dotted with yellow and black. On each segment of the body is a somewhat broad bright yellow transverse band, bordered with several larger and smaller black spots.

The larvæ have a great power of jumping, and are very difficult to hold in the hand. When young they live gregariously, but afterwards become solitary. Their numbers are kept in check by ichneumon-flies, birds, and numerous other foes.

The pupa is yellowish-brown, with the covers of the head and eyes blackish. The moth appears in April and May.

GENUS ARGYRITIS.

Argyritis, Hübner, Verz. bek. Schmett. p. 247 (1822?); Walker, List Lepid. Ins. Brit. Mus. xi. p. 657 (1857).

This genus resembles *Cucullia*, Schrank, but the species may be distinguished by their generally smaller size, short but pointed wings, and brilliant silvery coloration. The larva is pilose, and the segments are more or less expanded, or warty. The species figured resembles a large *Palparia*.

ARGYRITIS ARGENTINA.

(*Plate CXXVIII., Fig.* 8.)

Noctua argentina, Fabricius, Mant. Ins. ii. p. 162, no. 185 (1787); Hübner, Eur. Schmett. iv. fig. 553 (1804?).

Cucullia argentina, Treitschke, Eur. Schmett. v. (3), p. 98 (1826); Kirby, Eur. Butterflies and Moths, p. 254 (1881).

This species is a native of Southern Russia and Siberia. It expands an inch and a quarter.

The head and thorax are pale grey, and the abdomen is milk-white. The antennæ are white at the base, and brownish above, and the legs are pale grey, darker at the joints. The fore-wings are narrow and lanceolate, pale ochre-yellow, with a broad silvery or pearly-white stripe running from the base across two-thirds of the length of the wing; the marginal portion of the latter is varied with gilded yellow. Near the end of the mother-of-pearl stripe, and on the edge of the white fringes, is a row of black dots. The hind-wings are clear shining milky white.

The larva feeds on a species of wormwood growing on the steppes. It is sea-green, with seven bluish-white longitudinal lines. It is expanded in the middle of each segment, and is dotted with black in the incisions. The head is bluish-white.

FAMILY XLII. HELIOTHIDÆ.

Larvæ cylindrical, with the incisions slightly marked. They feed openly on low plants, often choosing the flowers.

Pupæ conical at the extremity, and enclosed in cocoons.

Imago of small or moderate size, with simple antennæ, and stout palpi; thorax stout, downy; abdomen smooth, subconical; tibiæ generally spined. Flight usually diurnal.

GENUS PERIPHANES.

Periphanes, Hübner, Verz. bek. Schmett. p. 247 (1822?); Stephens, List Brit. Anim. Brit. Mus. v. Lepid. p. 127 (1852).

Chariclea, Curtis, Brit. Ent. ii. pl. 76 (1825); Stephens, Ill. Brit. Ent. Haust. iii. p. 92 (1829); Guenée, Spec. Gén. Lépid. Noct. ii. p. 167 (1852).

Antennæ simple, the basal joint pilose beneath; palpi thickly scaled; proboscis well developed; front with a truncated cone-shaped projection. Thorax slightly crested in front; abdomen crested at the base, and more or less tufted on the sides and at the tip; fore-wings rather pointed; legs short and stout, pilose; front tibiæ very short, with two shining horny spurs at the extremity, the inner one long and curved.

THE PEASE-BLOSSOM MOTH. PERIPHANES DELPHINII.

(*Plate CXXVIII., Fig.* 7.)

Noctua delphinii, Linnæus, Syst. Nat. (ed. x.) i. p. 518, no. 124 (1758); Esper, Schmett. iv. (1) p. 664, Taf. 175, figs. 1–4 (1793?); Hübner, Eur. Schmett. iv. fig. 204 (1799?), fig. 622 (1804?).

Xylina delphinii, Treitschke, Schmett. Eur. v. (3), p. 82 (1826).

Chariclea delphinii, Curtis, Brit. Ent. ii. pl. 76 (1825); Stephens, Ill. Brit. Ent. Haust. iii. p. 92 (1829); Kirby, Eur. Butterflies and Moths, p. 257, pl. 39, fig. 8 (1881).

The Pease-blossom Moth is common in many parts of Central and Eastern Europe, but has only been taken once or twice in Britain. It expands about an inch and a quarter.

The fore-wings are of a beautiful purplish-red colour, paler in some parts, and darker in others. The basal area is pale rose-colour as far as the first transverse line. The first and second transverse lines are both white, with a purple border on each side. The central area is whitish towards the costa, but becomes darker near the reniform stigma, which exists only as a dark spot, from which a shade extends across the wing. The hind margin is dull yellow, and so are the fringes. The

hind-wings are white at the base, especially in the male, with dark nervures and a central spot, but are darker in the female. In both sexes they are frequently tinged with rose-colour. On the hind margin is a grey band, which becomes lighter towards the white fringes.

The larva feeds on larkspur (*Delphinium consolida*), and is often met with in fallow fields on the Continent. When young the larvæ live gregariously. They are violet-grey, the head being marked with several black spots. There is a narrow, sulphur-yellow dorsal line, and another on each side. In addition, the surface of the body is covered with small black tubercles, each bearing a fine hair.

The pupa is reddish-brown, with greenish wing-cases. It is formed in the ground.

The moth is on the wing in May and June.

GENUS RHODOPHORA.

Alaria, Westwood in Jardine's Nat. Libr. Exot. Moths, p. 200 (1841); Walker, List Lépid. Ins. Brit. Mus. xi. p. 674 (1857), *nom. præocc.*

Rhodophòra, Guenée, Spec. Gén. Lépid. Noct. ii. p. 170 (1852).

Antennæ simple, slightly pubescent in the male. Palpi short, clothed with velvety scales, and indistinctly jointed. Proboscis very slender; front rounded. Thorax partly crested, and not very stout. Abdomen smooth, and conical in the male. Legs short; front tibiæ with at least one long spine. Wings entire; fore wings rather pointed at the tip. Larva very long and slender, with transverse bands.

RHODOPHORA GAURÆ.

(*Plate CXXVIII., Figs.* 4 (*imago*), 5 (*larva*).)

Phalæna gauræ, Abbot & Smith, Lepid. Georg. ii. pl. 99 (1797).

Alaria gauræ, Westwood in Jardine's Nat. Libr. Exot. Moths, p. 200, pl. 24, figs. 4, 5 (1841); Walker, List Lepid. Ins. Brit. Mus. xi. p. 675, no. 1 (1857).

Porphyrinia matutina, Hübner, Zutr. Exot. Schmett. iii. p. 35, figs. 557, 558 (1825).

Rhodophora gauræ, Guenée, Spec. Gén. Lépid. Noct. ii. p. 170 (1852).

This delicately-tinted Moth is not uncommon in the Southern United States, and measures rather more than an inch in expanse.

The fore-wings are of a somewhat yellowish-white, with the basal half, the fringes, the border, and a sub-terminal band, which does not quite extend to the inner margin, pale rose-colour. Hind-wings white, with a suffused pale rose-coloured border. Under side of the fore-wings tinged with the same colour. Head and thorax sulphur-yellow.

The larva is yellow, with a black transverse band on each segment. The head is rusty-brown. The belly and legs are white, with a black spot on each of the pro-legs. It feeds on *Gaura biennis* in August.

The colours of the moth so closely resemble those of the flowers of the plant on which it feeds, that when it settles on them, it is scarcely distinguishable from them.

GENUS CHLORIDEA.

Chloridea, Westwood in Jardine's Nat. Libr. Exot. Moths, p. 198 (1841); Walker, List Lepid. Ins. Brit. Mus. xi. p. 77 (1857).

Aspila, Guenée, Spec. Gén. Lépid. Noct. ii. p. 174 (1852).

The antennæ are long, slender, and simple; the palpi straight, approximating, squamous, and compressed, with the third joint long, slender and beak-shaped; the proboscis is well-developed. The thorax is crested, and the abdomen is

short and conical, and pointed in both sexes. The front tibiæ are set with short spines beneath, but have no apical spur. The fore-wings are long, pointed and triangular, with the hind margin gradually curved; and the hind-wings are long, and rounded at the extremity.

The larvæ are smooth and cylindrical, with the incisions well-marked, and feed exposed on flowers; and the pupa is subterranean.

CHLORIDEA RHEXIÆ.

(*Plate CXXVIII., Fig. 5.*)

Phalæna rhexiæ, Abbot & Smith, Lepid. Georgia, ii. pl. 100 (1797).

Chloridea rhexiæ, Westwood in Jardine's Nat. Libr. Exot. Moths, p. 198, pl. 24, fig. 3 (1841); Walker, List Lepid. Ins. Brit. Mus. xi. p. 678, no. 1 (1857).

Aspila rhexiæ, Guenée, Spec. Gén. Lépid. Noct. ii. p. 175 (1852).

The fore-wings are green, with three nearly parallel oblique yellowish lines; the stigmata small, but distinctly marked, the thorax green, and the abdomen white, with transverse dusky bands. The hind-wings are white, tinged with reddish-brown externally, but the fringes are yellowish. The antennæ are reddish beneath.

The larva is green, with a yellow upper and a white lower lateral line, the last narrow; between them is a row of small reddish spots. It feeds on the buds and blossoms of *Rhexia virginica*, and other plants, and also on tobacco, to which it is very destructive by destroying the main shoot.

In Abbot's time, hand-picking and throwing hot sand or wood-ashes upon the plants were resorted to for the destruction of the larvæ. A specimen, which Abbot reared, spun a

slight cocoon in the ground on July 25th, and the moth emerged on August 9th. It is a common species in the Southern United States, and some authors consider it to be identical with the West Indian *C. virescens* (Fabr.).

GENUS HELIOTHIS.

Heliothis, Hübner, Tentamen, p. 2 (1810?); Ochsenheimer, Schmett. Eur. iv. p. 91 (1816); Treitschke, Schmett. Eur. v. (3), p. 215 (1826); Guenée, Spec. Gén. Lépid. Noct. ii. p. 177 (1852).

This genus includes species of moderate size, and of rather varied colours, which fly by day. The antennæ are simple and pubescent, or ciliated; the palpi ascending, and approximating, with the last joint distinct. The front of the head is convex, and the proboscis is well-developed. The thorax and abdomen are smooth and downy, and the latter is obtuse at the extremity. The legs are long, and the front and hind tibiæ are set with small spines. The wings are rather broad, and entire, and there is a conspicuous dark band on the under side of the hind-wings.

The larvæ, which are long, with a large head, feed openly on low plants, preferring the flowers. Several of them are noted for their cannibalistic propensities.

The pupæ are conical and subterranean.

These moths belong rather to warm climates than to cold, and several species are almost cosmopolitan, and extremely destructive abroad, but very rare in England. Such are *H. armiger* (Den. & Schiff.) and *H. peltiger* (Hübner). The species noticed below, which is the type of the genus, though not very abundant, is less rare with us. It is found flying by day in clover fields.

THE MARBLED CLOVER MOTH. HELIOTHIS DIPSACEA.

Noctua dipsacea, Linnæus, Syst. Nat. (ed. xii.), i. (2), p. 856, no. 185 (1767); Esper, Schmett. iv. (2), pp. 21, 641, Taf. 172, figs. 1–3, Taf. 185, figs. 1–6 (1797?); Hübner, Eur. Schmett. iv. fig. 311 (1799?).

Heliothis dipsacea, Treitschke, Schmett. Eur. v. (3), p. 220 (1826); Stephens, Ill. Brit. Ent. Haust. iii. p. 109 (1830); Kirby, Eur. Butterflies and Moths, p. 255, pl. 39, fig. 7 (1881); Buckler, Larvæ of Brit. Lepid. vi. p. 75, pl. 99, figs. 3–3 e (1895).

The Marbled Clover Moth.

The Marbled Clover is a common Moth in most parts of Europe and Northern Africa, as well as in Northern and Western Asia. It expands about an inch and a quarter.

The ground-colour of the fore-wings is usually pale greenish-yellow, but specimens in which the green predominates, or which are rusty yellow, with the markings suffused, are by no means unfrequently met with. The head and thorax are generally greenish-yellow, the former being a little darker, while the abdomen is greyish-yellow, almost white beneath, with some ferruginous hairs in the anal tuft. The antennæ are rusty brown, and the legs white, suffused with brown.

In distinctly marked specimens both the half-line and the first transverse line are brown or black. A broad dark central band crosses the wings over the reniform stigma, which is dar:

grey. Beyond this is the second transverse line, which is indicated by a few dots on a pale ground. The marginal band contains a row of dots on the nervures, and an ill-defined zig-zag line, tending to rusty brown, separates it from the area preceding the fringes. The fringes are ferruginous brown, with a row of black spots at the base. The hind-wings are yellowish-white, with a broad black central lunule, and a broad black marginal band, containing a rather large white spot, divided by a dark nervure. The fringes are bisected by a brown line. Sometimes the markings of the hind-wings run together, leaving the yellowish-white markings clouded or broken up, and more rarely only two yellowish spots remain on the wing.

The female is smaller than the male, and is usually duller in colour.

The larva feeds on yellow snap-dragon (*Linaria*), chicory, plantain, red campion, and a variety of other low plants. It is elongated, and tapers at both extremities. The larva is straw-coloured, heavily streaked with reddish brown, with a broad continuous violet-brown dorsal line. The sub-dorsal line is straw-coloured, and is bordered below by a broad sinuous violet-brown band. The spiracular line is yellow, also bordered below with brown. On each segment is a reddish transverse band. The head is paler than the body, and is covered with black dots. It is found in July and August.

The pupa is dark brown, slightly glossy, dusted with bluish. It is slender, attenuated towards the head, and has a small tubercle on the front, and two stiff points at the extremity.

The moth is double-brooded, being found in May and the beginning of June, and again in July and August. It hovers in the sun over flowering thistle-heads, clover, &c.

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Noctua dipsacea, Linnæus, Syst. Nat. (ed. xii.), i. (2), p. 856, no. 185 (1767); Esper, Schmett. iv. (2), pp. 21, 641, Taf. 172, figs. 1–3, Taf. 185, figs. 1–6 (1797?); Hübner, Eur. Schmett. iv. fig. 311 (1799?).

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In distinctly marked specimens both the half-line and the first transverse line are brown or black. A broad dark central band crosses the wings over the reniform stigma, which is dark

grey. Beyond this is the second transverse line, which is indicated by a few dots on a pale ground. The marginal band contains a row of dots on the nervures, and an ill-defined zig-zag line, tending to rusty brown, separates it from the area preceding the fringes. The fringes are ferruginous brown, with a row of black spots at the base. The hind-wings are yellowish-white, with a broad black central lunule, and a broad black marginal band, containing a rather large white spot, divided by a dark nervure. The fringes are bisected by a brown line. Sometimes the markings of the hind-wings run together, leaving the yellowish-white markings clouded or broken up, and more rarely only two yellowish spots remain on the wing.

The female is smaller than the male, and is usually duller in colour.

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The pupa is dark brown, slightly glossy, dusted with bluish. It is slender, attenuated towards the head, and has a small tubercle on the front, and two stiff points at the extremity.

The moth is double-brooded, being found in May and the beginning of June, and again in July and August. It hovers in the sun over flowering thistle-heads, clover, &c.

GENUS ANARTA.

Anarta, Ochsenheimer, Schmett. Eur. iv. p. 30 (1816); Hübner, Verz. bek. Schmett. p. 220 (1822 ?); Treitschke, Schmett. Eur. v. (3), p. 200 (1826); Guenée, Spec. Gén. Lépid. Noct. ii. p. 189 (1852).

Antennæ slender, slightly pubescent. Palpi short, straight, pilose. Head small; front narrow, convex. Thorax and abdomen short and pilose, the latter stout in the female. Legs short; tibiæ pilose, without spines or spurs. Wings thick, densely scaled; hind-wings usually white or yellow.

Larvæ short, cylindrical, naked, living exposed upon low shrubs. They form cocoons of silk, mixed with fragments of earth, &c.

The moths fly rapidly by day, and many species are Alpine or Arctic in habitat.

THE BEAUTIFUL YELLOW UNDERWING. ANARTA MYRTILLI.

Noctua myrtilli, Linnæus, Faun. Suec. p. 311, no. 1168 (1761); Esper, Schmett. iv. (2), p. 582, Taf. 165, figs. 1–3 (1793 ?); Hübner, Eur. Schmett. iv. fig. 98 (1799 ?).

Anarta myrtilli, Treitschke, Schmett. Eur. v. (3), p. 201 (1826); Curtis, Brit. Ent. pl. 145 (1826); Stephens, Ill. Brit. Ent. Haust. iii. p. 111 (1830); Kirby, Eur. Butterflies and Moths, p. 258 (1881); Buckler, Larvæ of Brit. Lepid. vi. pl. 100, figs. 3, 3 a (1895).

The Beautiful Yellow Underwing is common in most parts of Europe. It measures about an inch across the wings.

The head is brown, and the collar reddish-brown, striped with yellowish-white, and so is the crested thorax. The abdomen is black, dusted with yellow, and with yellowish-white incisions. At the sides and extremity it is covered with

reddish-brown hair. The antennæ are dark brown; and the legs are yellow, spotted with black. The fore-wings are straight on the costa, and produced, but hardly pointed at the apex. They are bright reddish-brown, marbled with white. The half-line, the two transverse lines, and the sub-marginal line are all distinctly white, and somewhat broad. From the base to the first transverse line are a few whitish patches, suffused with yellow. In the central area is a somewhat triangular white spot. The greater part of the orbicular stigma is contained in this spot, and is ringed with darker, with a dark spot in the

The Beautiful Yellow Underwing.

centre. The reniform stigma is beyond the white spot, and from it extend several white rays as far as the second transverse line. The sub-marginal line is very distinct, and beyond it the wings are uniform reddish-brown as far as the fringes, which are dark reddish-brown, and spotted with white. The hind-wings are bright yellow towards the base, with a small black lunule, and a broad velvety-black marginal band.

The larva lives on bilberry (*Vaccinium myrtillus*) and heath (*Calluna vulgaris*). It is of a beautiful grass-green, with a bluish head, and numerous whitish markings. The dorsal line is formed of a row of elongated spots, and on each side is a

row of nearly semi-circular spots, whilst a third series of spots forms a zig-zag spiracular line. The spiracles are white, ringed with black. It is found at the end of July, and in August.

The pupa is short and dark brown, and lies among fallen portions of the food-plant in its cocoon.

The moth is generally developed in the same year, but sometimes passes the winter in the pupa and emerges in April or May of the following year. It flies by day on heaths.

FAMILY XLIII. ACONTIIDÆ.

The "Minores" of Guenée include five families, all of which are represented in Britain except the *Hæmerosiidæ*. For the present I am inclined to unite the first four under the name of *Acontiidæ*; the fifth, the *Phalænoidæ* or *Brephidæ*, is very distinct from the others, and will be noticed later on.

Larva.—Resembles that of the *Geometridæ* or *Tortrices*. Solitary, smooth, without protuberances, with from ten to sixteen legs, and feeding on low plants.

Pupa.—Contained in a slight cocoon under the surface of the ground.

Imago.—Of small size, varied colour, and often flying by day; the body is slender, and scaly rather than downy; the proboscis is moderately long. The abdomen is rarely crested, and the legs are long, slender, and unarmed. The fore-wings are broad, and are often provided with an accessory cell; the hind-wings are broad, and frequently coloured more or less like the fore-wings. In repose they are somewhat sloping, and are not entirely covered by the fore-wings.

GENUS EROTYLA.

Erotyla, Hübner, Tentamen, p. 2 (1810?).

Emmelia, Hübner, Verz. bek. Schmett. p. 254 (1822 ?).
Agrophila, Boisduval, Gen. Ind. Meth. p. 175 (1840); Guenée, Spec. Gén. Lépid. Noct. ii. p. 204 (1852), *nom. præocc.*

Antennæ short, slender, setaceous; palpi short, straight; eyes large. Thorax round, scaly; collar rather large. Abdomen rather long, slender, sub-conical, and carinated in the male. Legs bare, rather stout. Wings entire, with long fringes; fore-wings oblong, smooth and silky, with the fringes unicolorous; hind-wings unicolorous above.

Larva long, smooth, with only two pairs of pro-legs. It lives on low plants in dry places. The pupæ are enclosed in small earthen cocoons.

THE SPOTTED SULPHUR MOTH. EROTYLA TRABEALIS.

Pyralis trabealis, Scopoli, Ent. Carniol. p. 40, no 610 (1763).
Noctua sulphuralis, Linnæus, Syst. Nat. (ed. xii.), i. (2), p. 881, no. 333 (1766).
Noctua arabica, Hufnagel, Berlin. Mag. iii. p. 142, no. 95 (1767).
Noctua sulphurea, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 93, no. 6 (1776); Esper, Schmett. iv. (2) i. p. 576, Taf. 164, fig. 6 (1793 ?); Hübner, Eur. Schmett. iv. fig. 291 (1799 ?).
Erastria sulphurea, Treitschke, Schmett. Eur. v. (3), p 251 (1826).
Erastria sulphuralis, Stephens, Ill. Brit. Ent. Haust. iii. p. 117 (1830).
Emmelia trabealis, Kirby, Eur. Butterflies and Moths, p. 279 (1881).
Agrophila sulphuralis, Hellins, Entom. Monthly Mag. iv. p. 115 (1867); Buckler, Lepid. Brit. Isl. vi. p. 89, pl. 100, figs. 5–5 c (1895).

row of nearly semi-circular spots, whilst a third series of spots forms a zig-zag spiracular line. The spiracles are white, ringed with black. It is found at the end of July, and in August.

The pupa is short and dark brown, and lies among fallen portions of the food-plant in its cocoon.

The moth is generally developed in the same year, but sometimes passes the winter in the pupa and emerges in April or May of the following year. It flies by day on heaths.

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Imago.—Of small size, varied colour, and often flying by day; the body is slender, and scaly rather than downy; the proboscis is moderately long. The abdomen is rarely crested, and the legs are long, slender, and unarmed. The fore-wings are broad, and are often provided with an accessory cell; the hind-wings are broad, and frequently coloured more or less like the fore-wings. In repose they are somewhat sloping, and are not entirely covered by the fore-wings.

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Agrophila, Boisduval, Gen. Ind. Meth. p. 175 (1840); Guenée, Spec. Gén. Lépid. Noct. ii. p. 204 (1852), *nom. præocc.*

Antennæ short, slender, setaceous; palpi short, straight; eyes large. Thorax round, scaly; collar rather large. Abdomen rather long, slender, sub-conical, and carinated in the male. Legs bare, rather stout. Wings entire, with long fringes; fore-wings oblong, smooth and silky, with the fringes unicolorous; hind-wings unicolorous above.

Larva long, smooth, with only two pairs of pro-legs. It lives on low plants in dry places. The pupæ are enclosed in small earthen cocoons.

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Agrophila sulphuralis, Hellins, Entom. Monthly Mag. iv. p. 115 (1867); Buckler, Lepid. Brit. Isl. vi. p. 89, pl. 100, figs. 5–5 c (1895).

This Moth is common in Central Europe, Asia Minor, and Siberia, but is local and rather scarce in Britain. It expands from three-quarters of an inch to nearly an inch.

The pattern consists of a mixture of brownish-black and sulphur-yellow. The head, collar and tegulæ are sulphur-yellow, bordered with brownish-black, and the thorax is black, with yellow spots. The antennæ are black. The abdomen is brownish-grey with yellowish incisions, and the legs are brown, yellowish beneath.

The Spotted Sulphur Moth.

The narrow fore-wings are sulphur-yellow, with five black spots along the costa, from the fourth of which runs a narrow blackish band transversely across the wings. This is sometimes dusted with yellow, and has a slight metallic lustre. From the base to this line run two straight black bars across the wings, one along the inner margin, and the other above and parallel with the first. The stigmatal area is marked with black spots. Beyond the transverse band is an undulating yellow stripe, and in front of the fringes, which are brownish-black varied with yellow, runs a straight yellow line. The hind-wings are unicolorous brownish-black with white fringes.

The larva feeds on bind-weed (*Convolvulus arvensis*). It is usually grass-green, sometimes brown, with a black dorsal line, and a double white line above the legs. The incisions are dark green,

The following very interesting description of the brown variety of the larva is given by Mr. J. Hellins in the "Entomologists' Monthly Magazine," and is quoted in Mr. Buckler's work :—

"Hübner's figures of this species leave me little that is new to say about it. Still, I feel much indebted to Mr. Brown for enabling me to rear a larva which Mr. Buckler has figured.

"Unluckily, although the moth had laid several eggs, they all perished in the Post Office save one, and the single larva did not live to become a pupa, having been hatched on June 25th, and dying on August 15th.

"I potted for it a small plant of *Convolvulus arvensis*, and on two little shoots of this, bearing in all not more than five or six very small leaves, it fed and grew and moulted contentedly during the first half of its fifty days' life, its longest journey all that time not exceeding an inch and an half.

"Had the other eggs escaped *squashing* on their journey, probably I might have had the pleasure of seeing both the varieties which Hübner figures, but the green one yet remains a desideratum. My single larva was of the brown variety.

"When first hatched, it was a dingy grey little looper, with a black transverse dorsal hump on each of the four middle segments; but at each moult these humps became less, till at last there remained nothing but the usual dorsal dots, black and distinct, and these too afterwards disappeared.

"When full-grown the larva is about an inch long; the legs twelve; the body cylindrical, thickest at the fourth segment; the segmental divisions deeply indented. When at rest the middle segments are generally arched, and the head bent down. The colour is rich chocolate-brown; dorsal line rather darker, and edged with very fine paler lines; sub-dorsal line also darker, but scarcely visible; spiracular stripe broad, of a pale yellow, and with a fine brown thread running throughout its length, immediately after the last moult. There were some

rich yellow and orange spots also in it, but these disappeared in time, and the whole stripe grew paler."

The pupa is reddish brown, and is placed, in its cocoon, between blades of grass.

The moth appears in May and June, and again in August. It flies in dry open places in the sunshine.

GENUS TARACHE.

Tarache, Hübner, Verz. bek. Schmett. p. 261 (1822 ?).
Acontia, pt. Ochsenheimer, Schmett. Eur. iv. p. 91 (1816); Treitschke, Schmett. Eur. v. (3) p. 237 (1826; nec Hübner); Guenée, Spec. Gén. Lépid. Noct. ii. p. 214 (1852).

This genus includes a considerable number of pretty little day-flying species, found in various parts of the world. It is generally called *Acontia;* but Hübner restricted that name to *A. malvæ* (Esper), a yellow moth, an inch and a half in expanse, which is found in South Europe.

In *Tarache* the head is small, with the front convex, the antennæ short, cylindrical, almost smooth, the palpi short, scaly, raised, and approximating; the third joint distinct. Proboscis moderately long. Thorax round, smooth, clothed with large smooth scales. Abdomen smooth, rather slender, cylindrical, and carinated. Wings entire, the fringes usually long and bicolorous; fore-wings thick, squamose, marbled with black and white; hind-wings with the hind margin waved.

The larvæ, which have only two pairs of pro-legs, are very long and slender, and feed on low plants. The pupæ are enclosed in small earthen cocoons.

Several exotic species have yellow hind-wings, as is the case with the one we have figured.

TARACHE DISPAR.

(*Plate CXXVIII., Fig.* 1.)

Aconția dispar, Walker, List Lepid. Ins. Brit. Mus. xii. p. 790, no. 21 (1857).

This species is a native of South Africa.

"Male.—White. Head brown; palpi obliquely ascending; third joint black, not more than one-fourth of the length of the second. Abdomen luteous. Fore-wings brown, with a glaucous tinge, and varied with dark brown; some indistinct and incomplete whitish undulating bands, and a large white costal patch, which is beyond the middle, and contains a brown costal spot and a black mark, the latter indicating the reniform spot; marginal lunules black. Hind-wings luteous; discal spot, discal band, and border brown. Length of the body five lines; of the wings twelve lines." (*Walker.*)

GENUS CANNA.

Canna, Walker, List Lepid. Ins. Brit. Mus. xxxiii. p. 790 (1865).

The antennæ are simple, and the palpi are stout, pilose, and ascending, with the third joint very short; the proboscis is well developed. The abdomen is tapering, much more slender than the thorax, and not extending beyond the hind-wings; it has a small tuft at the extremity. The legs are stout and hairy, with strong spurs, and the tarsi spiny beneath. The wings are broad and entire, and the fore-wings are rectangular at the apex.

CANNA MALACHITES.

(*Plate CXXVIII., Fig.* 3.)

Tetesilla malachites, Oberthür, Études d'Ent. v. p. 80, pl. 3, fig. 9 (1880).

Canna splendens, Moore, Proc. Zool. Soc. Lond. 1888, p. 412; Butler, Ill. Lepid. Heter. Brit. Mus. vii. p. 59, pl. 128, fig. 4 (1889).

rich yellow and orange spots also in it, but these disappeared in time, and the whole stripe grew paler."

The pupa is reddish brown, and is placed, in its cocoon, between blades of grass.

The moth appears in May and June, and again in August. It flies in dry open places in the sunshine.

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Acontia, pt. Ochsenheimer, Schmett. Eur. iv. p. 91 (1816); Treitschke, Schmett. Eur. v. (3) p. 237 (1826; nec Hübner); Guenée, Spec. Gén. Lépid. Noct. ii. p. 214 (1852).

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In *Tarache* the head is small, with the front convex, the antennæ short, cylindrical, almost smooth, the palpi short, scaly, raised, and approximating; the third joint distinct. Proboscis moderately long. Thorax round, smooth, clothed with large smooth scales. Abdomen smooth, rather slender, cylindrical, and carinated. Wings entire, the fringes usually long and bicolorous; fore-wings thick, squamose, marbled with black and white; hind-wings with the hind margin waved.

The larvæ, which have only two pairs of pro-legs, are very long and slender, and feed on low plants. The pupæ are enclosed in small earthen cocoons.

Several exotic species have yellow hind-wings, as is the case with the one we have figured.

TARACHE DISPAR.

(*Plate CXXVIII., Fig.* 1.)

Acontia dispar, Walker, List Lepid. Ins. Brit. Mus. xii. p. 790, no. 21 (1857).

This species is a native of South Africa.

"Male.—White. Head brown; palpi obliquely ascending; third joint black, not more than one-fourth of the length of the second. Abdomen luteous. Fore-wings brown, with a glaucous tinge, and varied with dark brown; some indistinct and incomplete whitish undulating bands, and a large white costal patch, which is beyond the middle, and contains a brown costal spot and a black mark, the latter indicating the reniform spot; marginal lunules black. Hind-wings luteous; discal spot, discal band, and border brown. Length of the body five lines; of the wings twelve lines." (*Walker.*)

GENUS CANNA.

Canna, Walker, List Lepid. Ins. Brit. Mus. xxxiii. p. 790 (1865).

The antennæ are simple, and the palpi are stout, pilose, and ascending, with the third joint very short; the proboscis is well developed. The abdomen is tapering, much more slender than the thorax, and not extending beyond the hind-wings; it has a small tuft at the extremity. The legs are stout and hairy, with strong spurs, and the tarsi spiny beneath. The wings are broad and entire, and the fore-wings are rectangular at the apex.

CANNA MALACHITES.

(*Plate CXXVIII., Fig.* 3.)

Telesilla malachites, Oberthür, Études d'Ent. v. p. 80, pl. 3, fig. 9 (1880).

Canna splendens, Moore, Proc. Zool. Soc. Lond. 1888, p. 412; Butler, Ill. Lepid. Heter. Brit. Mus. vii. p. 59, pl. 128, fig. 4 (1889).

Diphthera malachites, Hampson, Faun. Brit. Ind. Moths, ii. p. 294 (1894).

This is a beautiful Moth, which was first brought from the Island of Askold, near the mouth of the Amoor, but it has since been found in Northern India.

The head and front of the thorax are green; the antennæ and the hinder part of the thorax are rufous, and the abdomen is white, with a tuft of stiff black hairs on the middle of the back. The fore-wings are green, with the half-line, and the two transverse lines white, more or less bordered with black. The basal and central areas are rufous, the former marked below with a black spot, and the latter containing a green spot on a dusky ring near the costa, and greatly extended in the inner margin. Towards the hind margin are two black spots containing a white dot, and bordered inside with white, and outside with buff. The hind-wings are brown, more or less clouded towards the hind margin.

GENUS BANKIA.

Bankia, Guenée, Spec. Gén. Lépid. Noct. ii. p. 231 (1852).

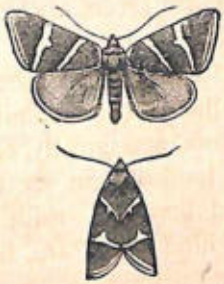
Antennæ hardly ciliated; palpi slightly ascending, thickly scaled; proboscis very slender. Thorax globular, thickly scaled. Abdomen long, and thicker and more obtuse in the female than in the male. Legs slender, almost bare, with rather long scales. Fore-wings oblong; hind-wings broad, rounded, the lower discoidal nervule as thick as the sub-median nervules, and rising above them from the discoidal, which is equally thick.

THE SILVER-BARRED MOTH. BANKIA OLIVANA.

Tortrix olivana, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 126, no. 1 (1776).

Pyralis bankiana, Fabricius, Spec. Ins. ii. p. 275, no 1 (1781)

Noctua argentula, Esper, Schmett. iv. (2) 1, p. 559, Taf. 163, fig. 3 (1792 ?).
Noctua olivea, Hübner, Eur. Schmett. iv. fig. 292 (1799 ?).
Erastria argentula, Treitschke, Schmett. Eur. v. (3), p. 255 (1826) ; Kirby, Eur. Butterflies and Moths, p. 278 (1881).
Erastria bankiana, Stephens, Ill. Brit. Ent. Haust. p. 117 (1830).
Bankia bankiana, Buckler, Larvæ of Brit. Lepid. vi. p. 94, pl. 101, figs. 4, 4a (1895).



The Silver-barred Moth.

The Silver-barred Moth is found in Central Europe, and in Asia Minor and Siberia. It expands about an inch.

The head and thorax are olive-green varied with white. The collar is golden yellow. The antennæ are rusty brown, and the legs and abdomen brownish-grey, the latter with a yellowish anal tuft.

The fore-wings are dark olive-green, approaching brown, with two oblique silvery transverse lines, the first of which has a silvery hook representing the orbicular stigma, and the second a slight prominence representing the reniform stigma. In front of the fringes is a straight silvery line, and a small dull comma-like mark may be seen near the apex of the wings. The hind-wings are grey.

The larva feeds on various grasses, especially annual

meadow-grass (*Poa annua*). It is yellowish-green, with a light green head. There is a dark green dorsal line, and a yellow sub-dorsal line, whilst the spiracles are flesh-coloured.

The pupa is short and stout, with two fine points at the extremity. It is at first shining drab, but by the following spring has become dark brownish-green. It is placed in a cocoon close to the ground.

The moth is found from June to August.

Pyralis bankiana, described by Fabricus in 1781, is certainly the present species, and is represented by a specimen in the existing Banksian Collection; but the insect which he originally described under the same name in his "Systema Entomologiæ" (1775) is something quite different.

GENUS GALGULA.

Galgula, Guenée, Spec. Gén. Lépid. Noct. ii. p. 239 (1852); Walker, List Lepid. Ins. Brit. Mus. xii. p. 817 (1857).

Antennæ smooth, but a little thickened in the male. Palpi short, ascending, the last joint distinct and pointed. Thorax and abdomen scaly, the former long, and the latter short, and pointed at the tip in the female. Legs, slender, bare. Wings entire, smooth, silky, with rather short fringes; the markings rather indistinct. There is no accessory cell, the sub-costal nervure forming two bifurcations opposite each other.

This genus belongs to Guenée's *Anthophilidæ*, which is the fourth family into which he divides his *Minores*.

GALGULA PARTITA.

(*Plate CXXVIII., Fig.* 2.)

Galgula partita, Guenée, Spec. Gén. Lépid. Noct. ii. p. 239 (1854).

This is a little North American Moth, which measures rather less than an inch across the wings.

The fore-wings are pale grey, with the margins marked with reddish, and the two central lines slightly visible, curved, and brownish on the inner side. Before the first line, and after the second, run rows of small black dots. The two upper stigmata are faintly visible; they are slightly darker than the ground-colour, and surrounded with paler, and they are separated by a large square mark which extends to the costa. The hind-wings are pale grey, with the borders and nervures indistinctly blackish, and the fringes paler. The under side is tinged with pale brick-red.

GENUS EUSTROTIA.

Eustrotia, Hübner, Verz. bek. Schmett. p. 253 (1822?).
Hydrelia, Guenée, Ann. Soc. Ent. France, v. p. 227 (1841); id. Spec. Gén. Lépid. Noct. ii. p. 234 (1882).

Antennæ short, hardly pubescent; palpi short, arched, scaly, and divergent; proboscis short. Thorax short, rounded, and thickly scaled. Abdomen obtuse and carinated in the males, thicker and rounded in the females. Legs stout with long spurs. Wing entire, rounded, with long close fringes; fore-wings distinctly marked, with no accessory cell; hind-wings broad, unicolorous, with the hind margin slightly waved.

Larva slender, feeding on plants growing in swampy places. Pupa contained in a slight web among grass and moss.

THE SILVER HOOK MOTH. EUSTROTIA UNCULA.

Phalæna uncula, Clerck, Icones, pl. 3, fig. 7 (1759).
Tortrix uncana, Linnæus, Faun. Suec. p. 342, no. 1305 (1761).
Noctua unca, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 91, no. 4 (1776); Esper, Schmett. iv. (2) i. p. 580, Taf. 164, fig. 7 (1793?); Hübner, Eur. Schmett iv. fig. 293 (1799?).

Erastria unca, Treitschke, Schmett. Eur. v. (3), p. 253 (1826); Stephens, Ill. Brit. Ent. Haust. iii. p. 117 (1830).

Erastria uncula, Kirby, Eur. Butterflies and Moths, p. 278 (1881).

Hydrelia uncana, Buckler, Larvæ of Brit. Lepid. vi. p. 96, pl. 101, fig. 5 (1895).

The Silver Hook Moth.

The Silver Hook Moth is common in Central and Northern Europe, Asia Minor, and Siberia. It expands about an inch.

The head and collar are reddish-grey, and the rest of the body is uniform ashy-grey. The antennæ are dark brown and filiform, and the legs are grey. The thorax is not crested.

The fore-wings are nearly triangular, with the hind margin somewhat curved outwards, and the apex rather acute. The costa is narrowly ashy-grey, below which is a broad, yellowish, almost flesh-coloured, band, which runs to the apex, where it terminates in a dark spot. The inner margin also is narrowly bordered with grey, to which succeeds a flesh-coloured band. The central area is shining brown. At the base of the wings is a white nervure, usually filled up with silvery, which touches a large silvery spot with a dark nucleus in the middle of the wings. A broad transverse line, shaded with brown and silver, stretches in front of the brownish fringes, up to which the surface is uniform brown, but separated from them, first by a dark line, and then by a white one. The hind-wings are reddish ashy-grey with whitish fringes, enclosed by a double ashy-grey line.

The moth flies in damp meadows in June and July, and is very plentiful at Killarney, and is also found in some localities in Devonshire and Cornwall.

The larva lives on grass, and especially on sedge (*Carex*). It rests, stretched out at full length, upon the blades of grass, and loops in walking. When young, it is a tiny greenish creature, with brown dots, each bearing a small fine hair. After each moult the green colour becomes more intense, and when full-grown it is slender, cylindrical, and about an inch in length. It is then velvety-green, with a yellowish-green head. There is a dark dorsal line, and a fine pale green sub-dorsal line. The spiracular line is light yellow, and broad, and on it the spiracles show brownish. The last segments are the palest, and the ventral surface is also paler.

GENUS ANTHOPHILA.

Antophila, Hübner, Tentamen, p. 2 (1810?)

Anthophila, Ochsenheimer, Schmett. Eur. iv. p. 93 (1816); Treitschke, Schmett. Eur. v. (3), p. 273 (1826); *nec Haworth; nec Guenée, restr.*

Eromene, Hübner, Verz. bek. Schmett. p. 256 (1822?).

Micra, Guenée, Ann. Soc. Ent. France, x. p. 224 (1841); id. Spec. Gén. Lépid. Noct. ii. p. 241 (1852), *nom præocc.*

Thalpochares, Lederer, Noct. Eur. p. 43 (1857).

These are small day-flying *Noctuæ*, which are usually scarce in collections, rather because they are likely to be overlooked than from their actual rarity. They are found flying in weedy places. The type of the genus is *A. purpurina* (Den. & Schiff.), a South European Moth; an allied species is noticed below.

The antennæ are short, and finely ciliated in the male. Palpi rather short, ascending, scaly, with the last joint distinct

The proboscis is long, and the eyes large and prominent. Thorax globular, scaly; abdomen nearly smooth. Fore-wings rather pointed at the tips, with distinct lines; stigmata not conspicuous; no accessory cell. Hind-wings rather small, and uniformly coloured.

Larva stout, tapering at the ends; head small. Feeding on low plants, at the extremity of the stalks.

THE PURPLE MARBLED MOTH. ANTHOPHILA OSTRINA.

Noctua ostrina, Hübner, Eur. Schmett. iv. figs. 399, 648 (1804 ?).

Anthophila ostrina, Treitschke, Schmett. Eur. v. (3), p. 270 (1826); Curtis, Brit. Ent. iii. pl. 140 (1826); Stephens, Ill. Brit. Ent. Haust. iii. p. 119 (1830).

Trothisa ostrina, Kirby, Eur. Butterflies and Moths, p. 282 (1881).

The Purple Marbled Moth.

This Moth is found in Southern Europe and in some parts of Central Europe, but is very scarce in England. It is also found in Asia Minor, Northern Africa, and Siberia. It expands about three-quarters of an inch.

The head and thorax are either white, varied with sulphur-yellow, or dusted with brownish or reddish. The abdomen is yellowish, pale brown, or ashy-grey, with white incisions. The antennæ are pale ferruginous, and the legs are whitish.

The fore-wings are pale yellow or sulphur-yellow, with a darker yellow transverse line across the middle of the wings. There is always a black dot representing the reniform stigma,

and generally another near the base. On the costa is a pale area, succeeded by another transverse line rising from a dark spot at the apex of the wings, and beyond this is a distinct white zig-zag line. The fringes are white, intersected by two fine yellow lines. The outer half of the wings is either striated with red, or with red and grey, or is simply yellowish-white. The hind-wings are yellowish-white, with white fringes, and are sometimes dusted with ashy-grey.

The larva is said to feed on the shoots of thistles.

The moth appears in June.

DIVISION II.—NOCTUÆ QUADRIFIDÆ.

Larvæ with the front pairs of pro-legs generally more or less imperfectly developed, and looping in gait. They feed on low plants or trees, but never beneath the ground, or in the stems of plants.

Pupa usually enclosed in a silken cocoon; rarely subterranean; frequently covered with a bluish efflorescence.

Imago with long ascending palpi, with the last joint long, and sometimes spatulate. Wings generally very large in proportion to the size of the body, with the median nervure generally four-branched. The hind-wings frequently participate in the markings of the fore-wings. Wings more or less expanded in repose.

This is a very large group of *Noctuæ*, and includes the bulk of the exotic species. For this Division, I propose to follow Guenée's arrangement almost in its entirety, for any modifications which have been proposed have been suggested only in works dealing with local faunæ.

Guenée divides the *Quadrifidæ* into eight tribes, of which he gives the outline sketch;—

§ Discoidal nervule variable ; wings sloping. Moths with silky wings, concolorous, or with ocellated markings. Discoidal nervule as well developed as the others ... *Sericeæ.*

Moths of small size, with angulated or dentated wings, or with metallic markings; hind-wings differently coloured to the fore-wings, with the discoidal nervule generally less developed than the median nervules ... ... *Variegatæ.*

Abdomen depressed ; wings clouded ; hind-wings differently coloured from the fore-wings ; discoidal nervule always less developed than the median nervules, and separated from them at its origin ... ... *Intrusæ.*

§ § Discoidal nervule as strongly developed as the median nervules, and rising near them ; wings more or less expanded when at rest. Moths of moderate size ; the fore- and hind-wings with similar colours and markings, or with considerable markings on the under side ... ... *Extensæ.*

Large or moderate-sized moths, the hind-wings differently coloured to the fore-wings, and most frequently of two colours. *Limbatæ.*

Moths of large size, with the last joint of the palpi long and linear ; wings broad, having similar colours and markings. *Patulæ.*

Moths with the last joint of the palpi moderately long, and not spatulate ; abdomen smooth ... ... *Serpentinæ.*

Moths resembling *Pyralidæ*, with very long palpi and long legs. Wings slender, the fore- and hind-wings with similar markings, and with distinct markings on the under surface. *Pseudo-Deltoidæ.*

Of these eight divisions, four only are represented in Europe by a few genera and species.

I.—NOCTUÆ SERICEÆ.

These are pretty little moths, almost confined to tropical America. They are divided into two families, the *Palindiidæ*, slender-bodied moths, with short and broad wings, with transverse lines or metallic markings, and angulated or sub-caudate hind-wings, with a black spot near the middle of the hind margin; and the *Dyopsidæ*, which have stouter bodies, and darker coloured and longer wings, with an ocellated spot near the anal angle of the hind-wings. I have figured a representative of each of these families.

FAMILY PALINDIIDÆ.

GENUS EULEPIDOTIS.

Eulepidotis, Hübner, Verz. bek. Schmett. p. 291 (1822 ?).
Palindia, pt. Guenée, Spec. Gén. Lépid. Noct. ii. p. 274 (1852).

The head is small, and the antennæ and ascending palpi are long and slender; proboscis slender and rather short. The abdomen is smooth, slender, and rather pointed. The legs are long, with the hind tibiæ somewhat thickened. The wings are broad, entire, with the hind margin of the fore-wings nearly straight, and the hind-wings broad, and more or less angulated.

EULEPIDOTIS DETRACTA.

(*Plate CXXIX., Fig.* 1.)

Palindia detracta, Walker, List Lepid. Ins. Brit. Mus. xii. p. 847, no. 7 (1857).

The following is Walker's description of this Brazilian species :—

"**Female.**—White. Head and pro-thorax pale brown. Abdomen slightly luteous towards the tip. Wings with a glaucous tinge along the exterior border; cilia pale brown. Fore-wings

with black dots along the costa, and with two slender, testaceous, brown-bordered, bands, which are approximate hindward, and are dilated on the costa; an indistinct undulating grey line between the second band and the border. Hind-wings slightly luteous, with a black marginal line, a black posterior marginal dot, and a white stripe, which includes, near the margin, an assemblage of black points; the latter are bounded in front and behind by some little brown lines. Length of the body, 5–6 lines; of the wings, 12–14 lines."

FAMILY DYOPSIDÆ.

GENUS LITOPROSOPUS.

Litoprosopus, Grote, Trans. Amer. Ent. Soc. ii. p. 309 (1870).

The antennæ are rather short, thick, and filiform; the palpi short, ascending, with the third joint long, smoothly scaled, and sub-spatulate; the proboscis is unusually stout and well developed; the abdomen is rather longer than the hind wings, and tufted at the tip. The wings are entire; the fore-wings are long, and the hind-wings are marked with a large ocellated spot.

LITOPROSOPUS HATUEY.

(*Plate CXXIX., Fig. 9.*)

Noctua hatuey, Poey, Cent. Lepid. Cuba, pl. 6 (1833).

Dyops hatuey, Guenée, Spec. Gén. Lépid. Noct. ii. p. 284 (1852); Walker, List Lepid. Ins. Brit. Mus. xii. p. 855, no. 3 (1857); Gundlach, Entom. Cubana, p. 347 (1881).

The fore-wings are reddish-brown, with rather indistinct black transverse lines, and sometimes a yellow spot at the hinder angle, marked with shining blue specks. The hind-wings are brown, yellowish at the base, and with a transverse yellowish stripe. Towards the anal angle is a sub-ocellated spot, with two shining blue spots in the centre, surmounted

by a red or buff crescent. The moth differs considerably in the length and breadth of the wings.

This Moth, which is a native of North and Central America and the West Indies, was first described from Cuba; it expands from two to three inches.

II.—NOCTUÆ VARIEGATÆ.

This Division, which is fairly well represented in Europe, is divided by Guenée into eight families, as follows:—

A.—Abdomen crested, or terminating in diverging pencils of hair. Wings more or less angulated, with distinct lines and spots.

a. Abdomen crested. Hind-wings without markings, and concave, dentated, or polygonal. Antennæ simple. *Eriopidæ.*

b. Abdomen with two diverging pencils of hair at the tip. Hind-wings with the discoidal nervure well marked. Antennæ of the male ciliated for half their length ... ... *Eurhipidæ.*

c. Abdomen slightly crested. Wings scarcely angulated, shining; hind-wings with the median nervure three-branched. *Placodidæ.*

B.—Abdomen inflated. Wings conical, usually furnished with one or more velvety prominences on the inner margin.

a. Larvæ with the first pairs of pro-legs short or wanting. Palpi curved, but slender. Wings often marked with metallic spots... ... ... *Plusiidæ.*

b. Larvæ with sixteen legs. Wings with no metallic spots. Palpi very thick ... ... *Calpidæ.*

c. Larvæ resembling those of *Notodontidæ*. Wings silky, not metallic. Antennæ long, pectinated to half their length in the male ... ... *Hemiceridæ.*

C.—Wings entire, thick. Abdomen stout, conical. Palpi straight, beak-like ... ... *Hyblæidæ.*

Larvæ with from twelve to sixteen legs. Abdomen depressed in the male. Wings angulated, with the orbicular stigma punctiform ... ... *Gonopteridæ*.

As before, we will proceed to notice some representative genera and species of these eight families. The families *Calpidæ*, *Hemiceridæ*, and *Gonopteridæ* have considerable resemblance to the *Notodontidæ*, and have been referred to that family by some authors.

FAMILY ERIOPIDÆ.

GENUS CALLOPISTRIA.

Callopistria, Hübner, Verz. bek. Schmett. p. 216 (1822 ?); Walker, List Lepid. Ins. Brit. Mus. xii. p. 861 (1857).

Eriopus, Treitschke, Schmett. Eur. v. (1), p. 365 (1825); Guenée, Spec. Gén. Lépid. Noct. ii. p. 291 (1852).

Antennæ slender, pubescent in the male, frequently nodose at one-third of their length. Palpi straight; second joint broad, very hairy, third small. Proboscis short and slender; front of the head tufted.

Body rather slender; thorax with a bifid crest; abdomen conical, crested at the base, and pointed at the extremity in the male. Legs clothed with woolly hair. Fore-wings dentated, with a small tuft of projecting scales on the inner margin; hind-wings broad, with a more or less distinct concavity opposite the cell. Discoidal nervule rising from the discocellular nervule close to the cellular fold.

Larva smooth, cylindrical, with sixteen legs, feeding on low plants.

Pupa smooth, shining, subterranean.

Two species are found in Europe, though not in Britain. An allied North American species is here figured.

1.

2.

3.

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9.

1. *Eulepidotis detracta.*
2. *Plusia microgamma.*
3. *Eutelia rufatrix.*
4. *Plusia gamma, larva.*
5. *Callopistria argentilinea.*
6. *Hemiceras sigula.*
7. *Hyblæa puera.*
8. *Gonodonta acmeplera.*
9. *Liloprosopus hatuey.*

1. *Eulepidotis detracta*
2. *Phisia macrogramma*
3. *Eulepia subsors*
4. *Plusia gamma Linn.*
5. *Callopistria argentea*
6. *Remigia sigula*
7. *Hebilica puera*
8. *Pseudodonta coronifera*
9. *Isogona scalaris*

CALLOPISTRIA ARGENTILINEA.

(*Plate CXXIX., Fig.* 5.)

Callopistria argentilinea, Walker, List Lepid. Ins. Brit. Mus. xii. p. 863, no. 6 (1857).

"**Male.**—Ferruginous. Abdomen cinereous. Fore-wings with several undulating pale red bands; sub-marginal line pale red, very zig-zag; orbicular and reniform stigmata also pale red; three undulating, transverse silvery lines; reniform stigma in part with a silvery border; a row of marginal black dots, with silvery lunules; cilia with pale dots. Hind-wings cinereous red; cilia with whitish streaks. Length of the body, 5 lines; of the wings, 12 lines" (*Walker*).

FAMILY EURHIPIDÆ.

GENUS EUTELIA.

Eutelia, Hübner, Verz. bek. Schmett. p. 259 (1822?); Walker, List Lepid. Ins. Brit. Mus. xii. p. 872 (1857).

Eurhipia, Boisduval, Ind. Meth. p. 70 (1829); id. Gen. Ind. Meth. p. 122 (1840); Guenée, Spec. Gén. Lépid. Noct. ii. p. 305 (1852).

Antennæ dentated in the male, and strongly pubescent to the middle, and then simple to the tip; a large tuft of hair at the base. Palpi ascending, the second joint hairy, the third long, naked, sub-spatulate. Proboscis short. Thorax crested, and with a large raised collar. Abdomen stout, conical, much longer than the hind-wings, with the terminal segments crested, and a large cottony tuft on the third segment. Tip of the abdomen with six pencils of hairs, the lateral ones long and diverging. Wings slightly angulated and dentated, with very distinct markings. In repose the wings are folded and the abdomen raised.

The larva is short, smooth, cylindrical, with a large head. It feeds on trees.

Pupa short, obtuse, subterranean.

The *Eurhipidæ* are a small family, though widely distributed. The only European species does not extend to England.

EUTELIA (?) RUFATRIX.

(*Plate CXXIX., Fig.* 3.)

Penicillaria (*?*) *rufatrix*, Walker, List Lepid. Ins. Brit. Mus. xv. p. 1775 (1858).

This species inhabits Jamaica.

"Red, mostly white beneath. Antennæ stout, simple. Tarsi with white bands. Fore-wings with a few curved white lines, with an oblique white band, which is widened towards the interior border, with a sub-costal black streak, and a black spot on the exterior border near the tip, which is occupied by a testaceous white-bordered spot, and with a black dot near the base of the interior border; hind part of the exterior border very oblique. Hind-wings white, with broad red borders, which contain a short white line near the interior angle; interior border marked with black towards its tip. Length of the body, 5 lines; of the wings, 12 lines" (*Walker*).

This Moth stands in the British Museum under *Eutelia*, but differs from the type of that genus in its much more angulated fore-wings. A new genus should probably be formed for its reception.

GENUS VARNIA.

Varnia, Walker, Journ. Linn. Soc. Zool. vii. p. 69 (1863); Moore, Lepid. Ceylon, iii. p. 66 (1884).

Dysodia, Hampson (nec Clemens), Faun. Brit. Ind. Moths, i. p. 368 (1892).

The larva is short, smooth, cylindrical, with a large head. It feeds on trees.

Pupa short, obtuse, subterranean.

The *Eurhipidæ* are a small family, though widely° distributed. The only European species does not extend to England.

EUTELIA (?) RUFATRIX.

(*Plate CXXIX., Fig.* 3.)

Penicillaria (?) *rufatrix*, Walker, List Lepid. Ins. Brit. Mus. xv. p. 1775 (1858).

This species inhabits Jamaica.

"Red, mostly white beneath. Antennæ stout, simple. Tarsi with white bands. Fore-wings with a few curved white lines, with an oblique white band, which is widened towards the interior border, with a sub-costal black streak, and a black spot on the exterior border near the tip, which is occupied by a testaceous white-bordered spot, and with a black dot near the base of the interior border; hind part of the exterior border very oblique. Hind-wings white, with broad red borders, which contain a short white line near the interior angle; interior border marked with black towards its tip. Length of the body, 5 lines; of the wings, 12 lines" (*Walker*).

This Moth stands in the British Museum under *Eutelia*, but differs from the type of that genus in its much more angulated fore-wings. A new genus should probably be formed for its reception.

GENUS VARNIA.

Varnia, Walker, Journ. Linn. Soc. Zool. vii. p. 69 (1863); Moore, Lepid. Ceylon, iii. p. 66 (1884).

Dysodia, Hampson (nec Clemens), Faun. Brit. Ind. Moths, i. p. 368 (1892).

Antennæ simple; palpi ascending, scaly, rather long, and pointed at the tip. Body very stout and hairy. Abdomen conical, extending beyond the hind-wings. Wings small in comparison with the size of the body, with small transparent spots; fore-wings oblong, hind-wings oval. An East Indian genus, referred by some authors to the *Thyrididæ*.

VARNIA IGNITA.

(*Plate CLV., Fig.* 6.)

Varnia ignita, Walker, List Lepid. Ins. Brit. Mus. xxxiii. p. 825 (1865).

Dysodia ignita, Hampson, Faun. Brit. Ind. Moths, i. p. 368, fig. 249 (1892).

"Deep red, very stout, brown beneath. Head and fore part of the thorax reddish-brown. Palpi smooth, stout, obliquely ascending, larger than the breadth of the head; third joint lanceolate, about one fourth of the length of the second. Abdomen extending rather beyond the hind-wings. Wings minutely reticulated with black; a dark reddish oblique irregular band; fringe with a few whitish streaks; exterior border slightly and irregularly dentate. Length of the body 8 lines; of the wings 16 lines. *Hab.* Silhet" (*Walker*).

FAMILY PLUSIIDÆ.

Passing over the family *Placodidæ*, which includes a few pretty Palæarctic and American species, most of which are tinged with purple or rosy, we arrive at the *Plusiidæ*, one of the most extensive and best-known families of the *Quadrifidæ*. Several species are here described and figured.

GENUS ABROSTOLA.

Abrostola, Ochsenheimer, Schmett. Eur. iv. p. 88 (1816); Stephens, Ill. Brit. Ent. Haust. iii. p. 96 (1829); Guenée, Spec. Gén. Lépid. Noct. ii. p. 320 (1852).

The species of this genus are of moderate size, with the thorax tufted and the abdomen crested. The fore-wings have no metallic spots or pale lines, and no tooth on the inner margin; but the stigmata are well-marked, and are bordered with raised scales. The larvæ feed on nettles, &c., and are provided with sixteen legs, but the first pair is imperfectly developed, and they loop in walking. There is a hump on the penultimate segment. The pupæ are enclosed in cocoons made of silk mixed with moss and earth.

THE LIGHT SPECTACLE MOTH. ABROSTOLA TRIPLASIA.

Noctua triplasia, Linnæus, Syst. Nat. (ed. x.) i. p. 507, no. 118 (1758); id. Faun. Suec. p. 318 (1761).
Noctua tripartita, Hufnagel, Berlin. Mag. iii. p. 419 (1767).
Noctua triplasia, Hübner, Eur. Schmett. iv. fig. 269 (1799?).
Noctua asclepiadis, Esper (nec Den. & Schiff.), Schmett. iv. (2) i. p. 616, Taf. 169, figs. 4, 5 (1793?).
Noctua urticæ, Hübner, Eur. Schmett. iv. fig. 625 (1804?).
Plusia urticæ, Treitschke, Schmett. Eur. v. (3), p. 145 (1826).
Abrostola urticæ, Stephens, Ill. Brit. Ent. Haust. iii. p. 97 (1829); Buckler, Larvæ of Brit. Lepid. vi. pl. 102, fig. 1 (1895).
Abrostola tripartita, Kirby, Eur. Butterflies and Moths, p. 261 (1881).

The Light Spectacle Moth is found throughout the greater part of Europe and Northern Asia, and is not uncommon in England. It expands from an inch and a quarter to an inch and a half.

The head and thorax are brown, and the latter is crested. The abdomen is yellowish, with paler incisions, with brown tufts in the middle, and a brown anal tuft. The antennæ are brown, and the legs are also brown with lighter rings. The fore-wings are dark grey, suffused with greenish-white in the basal area, and on the tegulæ. All three stigmata are present, and are connected by black spaces around the orbicular and claviform stigmata, whilst between the orbicular and reniform stigmata is a blackish space. There are two transverse lines, beyond which is a greenish-white band with a slight reddish lustre, whilst at the apex is a black spot bisected

The Light Spectacle Moth.

by a pale line. The fringes are bordered with dark brown, slightly dusted with white, and dentated. The hind-wings are brown, rather lighter towards the base, with a slight lunule. The fringes are grey, intersected by two brown lines, and tipped with white.

The larva feeds on nettles. It is grass-green, and the head is heart-shaped. The three thoracic segments have double white longitudinal streaks on the back and sides, and the succeeding segments have each a dark green mark, pointed behind, and surrounded with white, and similar oblique markings on the sides, the intervening spaces being dotted with white. The legs are green, and above them are green and white longitudinal lines, interrupted in the incisions. Sometimes the larva is brown instead of green.

GENUS PLUSIA.

Plusia, Hübner, Tentamen, p. 2 (1810); Ochsenheimer, Schmett. Eur. iv. p. 89 (1816); Treitschke, Schmett. Eur. v. (3) p. 134 (1826); Guenée, Spec. Gén. Lépid. Noct. ii. p. 324 (1852).

The genus *Plusia*, the type of which is the Burnished Brass Moth, *P. chrysitis* (Linn.), is represented by numerous species in all parts of the world. They are moderately sized moths, with the thorax and abdomen crested, and rather pointed fore-wings, with metallic spots, often resembing letters; or metallic lines or blotches. There is no tooth on the inner margin, and the stigmata are not bordered with raised scales. The hind-wings are usually light brown, and rounded. The larvæ, which feed on low plants, are much attenuated in front, and the first two pairs of pro-legs are absent. The pupæ are soft, and are enclosed in loose silken cocoons.

Many of the moths fly by day, and often at dusk. They hover over flowers, and their flight is rapid when disturbed; but much less so than that of the Humming-bird Hawk Moth (*Macroglossa stellatarum*). (Cf. *anteà*, vol. iv. p. 8.)

THE BURNISHED BRASS MOTH. PLUSIA CHRYSITIS.

Noctua chrysitis, Linnæus, Syst. Nat. (ed. x.), i. p. 513, no. 90 (1758); id. Faun. Suec. p. 311, no. 169 (1761); Esper, Schmett. iv. (1), p. 186, Taf. 109, figs. 1–5 (1789?); Hübner, Eur. Schmett. iv. fig. 272 (1799?), figs. 662, 663 (1804?).

Plusia chrysitis, Treitschke, Schmett. Eur. v. (3), p. 169 (1826); Stephens, Ill. Brit. Ent. Haust. iii. p. 105 (1830); Kirby, Eur. Butterflies and Moths, p. 263 (1881); Buckler, Larvæ of Brit. Lepid. vi. pl. 102, fig. 3 (1895).

The Burnished Brass Moth is common throughout the greater part of Europe as well as in Northern and Western Asia. It expands from an inch and a quarter to an inch and a half.

The Burnished Brass Moth.

The head is orange-yellow, and so is the collar, which is bordered with grey, whilst the tegulæ are varied with grey and brownish. The thorax is grey, with a well-marked orange-coloured crest. The abdomen is yellowish-brown, with three tufts, the first of which is dark rusty brown, and the two others yellowish-brown. The antennæ are yellowish-brown and the legs whitish-grey.

The fore-wings are short and broad, and strongly emarginate, with pointed tips. They are greyish-brown or reddish-brown, with a broad band near the base, usually of a golden-green colour, but somewhat variable in tint, the green predominating in some specimens, and the yellow in others. There is a second band of the same colour beyond the middle, which is placed obliquely, and is not uncommonly united to the first by an oblong patch near the inner margin. Near the apex is a deep brown transverse line, and the nervures are also of this colour. The fringes are greyish-brown or reddish-brown. The hind-wings are greyish-brown, with a metallic gloss, and rather darker on the hind margin. The fringes are yellowish-grey.

The moth is double-brooded, and the larva is found in May and June, and again in August and September. It feeds on a

variety of plants, including nettles, thistles, wild mint, &c. It is green, with a number of fine white lines on the back. On the thoracic segments is a white dorsal line, and on the sides a broad white stripe. The whole of the body is set with fine white hairs, and the incisions are yellowish. Sometimes there is a green dorsal line, and green streaks on the sides. It weaves a slight cocoon, and the pupa varies from dark reddish-brown to blackish-brown.

THE GAMMA OR SILVER Y MOTH. PLUSIA GAMMA.

(*Plate CXXIX., Fig.* 4, *larva.*)

Noctua gamma, Linnæus, Syst. Nat. (ed. x.), i. p. 513, no. 91 (1758); id. Faun. Suec. p. 312 (1761); Esper, Schmett. iv. (1), p. 204, Taf. 111, figs. 1–4 (1789?); Hübner, Eur. Schmett. iv. fig. 283 (1799?).

Plusia gamma, Treitschke, Schmett. Eur. v. (3), p. 185 (1826); Stephens, Ill. Brit. Ent. Haust. iii. p. 103 (1830); Kirby, Eur. Butterflies and Moths, p. 265, pl. 40, figs. 3–3 b (1881); Buckler, Larvæ of Brit. Lepid. vi. p. 112, pl. 102, figs. 8–8 b (1895).

The Gamma Moth.

This common and well-known species has a wide range, extending throughout the Palæarctic Region from Greenland to Abyssinia and occurring also in North America. It has even been seen fluttering in the sun at the top of Mont Blanc, no doubt

carried up by a current of air. It measures from an inch and a third to upwards of an inch and a half in expanse.

It is variable in colouring, but is most frequently light or dark grey varied with ferruginous, but may be bluish ashy-grey, almost devoid of any rusty tint, or entirely rusty brown approaching to black. The head and collar are brownish-grey, and are bordered, like the tegulæ and the crested thorax, with light grey. The abdomen is light yellowish-grey, with raised brown tufts. The antennæ are light brown, and the legs grey.

The fore-wings have a metallic gloss. There is a half-line near the base, and then two zig-zag transverse lines, which look like silvery threads. The basal area is the palest. From the base to the second transverse line runs a white median nervure, on which are seen, in the central area, traces of the two stigmata, bordered with silver. Near the inner margin is a shining silver or golden mark, resembling the letter Y, or rather the Greek γ. Below this mark the ferruginous tint is darkest, merging into dull golden. The marginal area commences beyond a pale transverse line. It is brownish, shaded with golden. The fringes are somewhat dentated, greyish, spotted with dusky brown. The hind-wings are yellowish-brown at the base, with darker nervures, and a broad blackish border. The fringes are white, dotted with brown.

The larva is found from spring to autumn. There are sometimes three broods in one year, and the last may pass the winter in any stage. The larva feeds on various low plants, sometimes including grass. It is green, with fine scattered hairs. The head is brownish-green. On the back are fine whitish or yellowish lines, and above the legs is a yellow stripe. The spiracles are dark green. Some specimens are brownish-green, with indistinct lines. The pupa is dark brown, and is enclosed in a white cocoon. Except in the

case of hibernated specimens, the moth appears in a fortnight or three weeks.

The larva has not proved injurious in Britain, but has been so at times on the Continent, when it has appeared in large numbers.

PLUSIA MICROGAMMA.

(*Plate CXXIX., Fig. 2.*)

Noctua microgamma, Hübner, Eur. Schmett. iv. fig. 698 (1818?)

Plusia microgamma, Treitschke, Schmett. Eur. v. (3), p. 198 (1826); Kirby, Eur. Butterflies and Moths, p. 266 (1882).

This species is a native of Eastern Europe, and is also found in some parts of Germany. It expands about an inch and a quarter.

It is pale ashy-grey. The fore-wings are divided into three areas by two silver transverse lines bordered with blackish. The basal area, the costa, and the upper part of the marginal band are very pale. The first transverse line first becomes distinct below a whitish nervure, after which the central area is darker. On this part stands a silver mark like a comma, one of the arms of the usual γ mark being wanting. There are two stigmata towards the pale costa, of which the orbicular is oval and indistinct, and the reniform is bordered with black, with a silver centre. The marginal area is broad, with a metallic lustre, and is darkest towards the submarginal line. This is dull white, moderately curved, with two obtuse teeth in the middle. Beyond this there are no markings as far as the fringes, which are striped with dark and light grey, and bordered with two white lines. The hind-wings are pale yellow with a broad black marginal band, and yellow and black fringes.

THE SCARCE BURNISHED BRASS MOTH. PLUSIA CHRYSON.

Noctua chryson, Esper, Schmett. iv. (2) 1, p. 446, Taf. 141, fig. 2 (1789).

Noctua orichalcea, Hübner (nec Fabricius), Beitr. Schmett. ii. p. 28, pl. 4, fig. W (1790).

Plusia orichalcea, Treitschke, Schmett. Eur. v. (3), p. 173 (1826); Stephens, Ill. Brit. Ent. Haust. iii. p. 105 (1830); Warren, in Buckler's Larvæ of Brit. Lepid. vi. p 100 (1895).

Plusia chryson, Kirby, Eur. Butterflies and Moths, p. 263 (1882).

The Scarce Burnished Brass Moth.

The Scarce Burnished Brass Moth has a wide range throughout Central and Southern Europe, Asia Minor, and Siberia, but is local and rare in Britain. It expands about an inch and three-quarters.

The head, collar, and thoracic crest are pale ferruginous, and the thorax itself and the tegulæ are violet-brown. The abdomen is yellowish-grey, with a black line along the middle, on which stand dark brown raised tufts of hair, the first and third of which are the largest. The antennæ are long, and pale ferruginous, with white scales. The front legs are densely hairy above, whitish beneath, and the hind-legs are yellowish-white.

The fore-wings are of a delicate violet-brown, the costa and

apex being the palest, with two transverse lines enclosing the dark central area. The first of these consists of deep brown curves, and the second passes through a large trapeziform golden patch near the innermargin, and terminates in a small white, C-shaped hook. The patch is shining greenish-golden, and is bordered on the inner side by a dark shade, and on the outer by a pale reddish, almost peach-blossom, marginal band. The fringes are reddish-grey, and dentated. The hind-wings have a metallic shine, and are pale yellowish-brown at the base, and darker on the nervures and hind margins, with the fringes striped with lighter and darker.

The larva feeds on hemp agrimony (*Eupatorium cannabinum*) and *Salbia glutinosa*. When full-grown, it is green with a dark green dorsal line, and fine white sub-dorsal lines from the third to the twelfth segment. On the sides are oblique white lines. The spiracles are small and white, the last being the largest. The anterior segments are very extensile. It hides under the leaves of its food-plant during the day. The pupa is brownish-black, with the under part of the wing-sheaths pale green, but this colour changes to dull pink before the moth appears. The perfect insect flies in July and August.

FAMILY CALPIDÆ.

The moths of this family are easily recognised by their pointed and often pectinated antennæ, large hairy beak-like palpi, and the waved or strongly toothed inner margin of the fore-wings. The family is represented in South Europe by one species, *Calpe capucina* (Esper); but the majority of the species are American.

GENUS GONODONTA.

Gonodonta, Hübner, Verz. bek. Schmett. p. 163 (1822?); Guenée, Spec. Gén. Lépid. Noct. ii. p. 364 (1852).

In this genus the fore-wings are rather pointed, with two teeth on the inner margin, and the hind-wings are rounded, and most frequently black and yellow. The antennæ are rather long and thick, and very slightly ciliated. The larvæ are rather short, with a large head, and sixteen very long legs, especially the claspers. The pupa is obtuse, and is enclosed in a cocoon among leaves or moss.

GONODONTA ACMEPTERA.

(*Plate CXXIX., Fig.* 8.)

Phalæna acmeptera, Sepp, Surin. Vlind. i. pl. 49 (1848).

This species is found in Surinam. It expands an inch and a half.

Fore-wings rich brown, purplish on the marginal area, which is bounded within by some indistinct zig-zag light and dark lines; there is a broad yellowish-white costal band, ceasing before the tip; towards the base it tapers below, the space between it and the costa being ferruginous. Hind-wings orange, with a broad black border, and yellowish-white fringes. The head and the long, broad, compressed palpi are snow-white, and the thorax is purplish-grey, with the abdomen yellow, and spotted with black on the back.

The larva has fourteen legs, and is black, with numerous transverse lines and small spots, which are white in the young larva, and yellow in the full-grown larva. On the abdominal segments are two lateral rows of large spots, which are yellow in the young larva, and deep orange-red in the full-grown larva, in which those of the lower row are very large and irregular in shape. The larva forms a cocoon of leaves lined with silk. It feeds on the lower shoots of *Brunsfelsia undulata*, hiding itself under the leaves, and dropping down at the least touch.

When the costal spots are present, they form the commencement of two slightly marked transverse bands. The hind-wings are black, with a curved orange band, more or less divided into three, and bordered with red, and another orange spot on the hind margin towards the anal angle. On the under side the fore-wings are largely orange, and the hind-wings have two black spots towards the anal angle. The abdomen is black, with the segments narrowly bordered with fulvous.

"Larva with a few short silky hairs, dark purplish-grey above, olive-green below; with dorsal and lateral white lines; a sub-dorsal row of minute white dots and rings; a row of black dots on lateral line; head, and second segment, and front legs, black. Feeds on *Bignoniaceæ* (Thwaites). Pupa dark reddish-brown" (*Moore*).

This is one of the most widely-ranging of all the tropical *Noctuæ*, being found in India, Burma, China, Ceylon, Java, to North Australia, South Africa, Madagascar, Mauritius, South and Central America, and the West Indies; Hübner has even figured it as European, but probably in error.

FAMILY GONOPTERIDÆ.

GENUS SCOLIOPTERYX.

Scoliopteryx, Germar, Prodr. Ent. p. 14 (1810); Walker, List Lepid. Ins. Brit. Mus. xiii. p. 1009 (1857).

Gonoptera, Latreille, Fam. Nat. p. 476 (1825); Guenée, Spec. Gén. Lépid. Noct. ii. p. 405 (1852).

The *Gonopteridæ* are a small family remarkable for the irregular outline of the fore-wings. *Scoliopteryx*, which includes the only European representative, has short antennæ, ciliated in the male; straight, woolly, thick palpi; a prominent frontal tuft; short, strong, legs; and broad, angulated, and strongly dentated and excavated fore-wings. The larvæ are long and

1 2. Scoliopteryx libatrix.
3. Pantydia spartia.
4. Nephelina edusa.
5. Anthocharis sublucida.

slender, with sixteen legs, and feed on trees; and the pupæ are enclosed in oblong silken cocoons, between leaves at the ends of the branches.

THE HERALD MOTH. SCOLIOPTERYX LIBATRIX.

(*Plate CXXX., Figs* 1, 2.)

Bombyx libatrix, Linnæus, Syst. Nat. (ed. x.) i. p. 507, no. 54 (1758); id. Faun. Suec. i. p. 304 (1761); Esper, Schmett. iii. p. 357, Taf. 69, fig. 4 (1782 ?).

Phalæna Geometra Salictaria, Poda, Ins. Mus. Græc. p. 92, no. 29. pl. ii. fig. 8 (1761).

Noctua libatrix, Hübner, Eur. Schmett. iv. fig. 436 (1804 ?).

Calpe libatrix, Treitschke, Schmett. Eur. v. (2), p. 172 (1825).

Calyptra libatrix, Stephens, Ill. Brit. Ent. Haust. iii. p. 50 (1829).

Scoliopteryx libatrix, Kirby, Eur. Butterflies and Moths, p. 185, pl. 39, fig. 1 (1880).

Gonoptera libatrix, Buckler, Larvæ of Brit. Lepid. vi. pl. 103, fig. 1 (1895).

The Herald Moth is common throughout Europe, Northern and Western Asia, and North America. It expands from an inch and a half to an inch and three-quarters.

The head and thorax are reddish, with a ferruginous crest. The antennæ are yellowish-brown. The abdomen is grey, varied with reddish, and the legs are brown, spotted with white, with the last joint of the tarsi white, except for a few brown spots above.

The fore-wings are reddish-brown, marbled with red. There is an irregular red patch at the base, a round white spot on the disc, and two oblique transverse white bands, one a little before the middle, and the other a little beyond it. From the outer band to the apex the colour is grey speckled with dusky, and traversed by a very faint waved whitish streak. The reddish

patch is sprinkled with yellow, and there is a distinct row of small white marks along the median nervure. The hind-wings are ashy-grey, becoming darker towards the hind margin. The fringes of the fore-wings are ferruginous, and those of the hind-wings ashy-grey.

The larva feeds upon willows and poplars, about which the moth may frequently be seen flying. The former is slender, grass-green, with scattered minute hairs. The incisions are yellow, and there is a white or yellowish lateral line and red stigmata.

The pupa is black and very tapering, and is attached to the cocoon by its terminal bristle. The cocoon is usually interwoven with leaves.

The moth appears in June or July from hybernated imagos or pupæ, and again plentifully in October. It is common from autumn to spring, concealed in weedy banks, under bridges, between the chinks of palings or thatch, and in out-houses.

III.—NOCTUÆ INTRUSÆ.

The *Intrusæ* are a small group, including three families, all represented in Britain. They are thus defined by Guenée :—

A.—Larvæ with the penultimate segment more or less prominent, green, with distinct lines, or else with dull uniform colours, and not looping when they walk. In the moth the abdomen is flattened above in both sexes, and the wings are thick and lustrous ... *Amphipyridæ.*

B.—Larvæ fusiform, of varied colours, and somewhat looping. Moths with the abdomen often inflated in the females, and with the hind-wings well developed, but never brightly coloured, or coloured like the fore-wings. *Toxocampidæ.*

C.—Larvæ stout, cylindrical, resembling those of *Orthosiidæ* in

shape, and with sixteen legs. Moths resembling *Geometridæ*, with slender bodies, short palpi, and slender, silky wings; the hind-wings are large, folded in repose, and similarly coloured to the fore-wings. *Stilbiidæ.*

FAMILY AMPHIPYRIDÆ.

GENUS AMPHIPYRA.

Amphipyra, Ochsenheimer, Schmett. Eur. iv. p. 70 (1816); Treitschke, Schmett. Eur. v. (2), p. 276 (1825); Guenée, Spec. Gén. Lépid. Noct. ii. p. 411 (1852).

In this genus the antennæ are simple; the palpi long, ascending, recurved, and approximating; the abdomen flattened, with the extremity pointed; the legs thick, with strong spurs. The wings are rather broad, indented, or slightly denticulated; the fore-wings are oblong, with the hind margin only slightly curved. The larvæ are green, with distinct lines, and the penultimate segment often humped; they live exposed on trees and low plants. The pupæ are enclosed in cocoons of silk or rubbish on the surface of the ground.

THE MOUSE MOTH. AMPHIPYRA TRAGOPOGONIS.

Noctua tragopogonis, Clerck, Icones, pl. i, fig. 5 (1759); Linnæus, Faun. Suec. p. 316 (1761); Esper, Schmett. iv. (2) 1, p. 622, Taf. 170, figs. 1, 2 (1794?); Hübner, Eur. Schmett. iv. fig. 40 (1799?).

Noctua tetra (nec Fabr.), Haworth, Lepid. Brit. ii. p. 164, no. 12 (1809).

Amphipyra tragopogonis, Treitschke, Schmett. Eur. v. (1) p. 277 (1825); Kirby, Eur. Butterflies and Moths, p. 186 (1880); Buckler, Larvæ of Brit. Lepid. vi. pl. 103, fig. 3–3 b (1895).

Pyrophila tragopogonis, Stephens, Ill. Brit. Ent. Haust. ii. p. 165 (1829).

Pyrophila tetra, Stephens, Ill. Brit. Ent. Haust. ii. p. 165 (1829).

This Moth is common throughout the greater part of Europe, and Northern and Western Asia. It expands from an inch and a quarter to an inch and a half.

The head, thorax, and fore-wings are dark brown, dusted with numerous fine grey atoms, which give the whole insect a bronzy gloss. The antennæ are long and of a brown colour. The abdomen is paler, and the legs are dark brown, tinged with white.

The Mouse Moth.

The fore-wings are nearly devoid of markings, with only a few slight indications of the usual transverse lines. There is a black dot in the position of the orbicular stigma, and two black dots in the place of the reniform stigma. These serve readily to distinguish the insect. Towards the uniform dark fringes the colour becomes paler. The hind-wings are brownish-yellow, with the base whitish or reddish, and a faint lunule. The fringes are bordered with a fine dark double line filled in with lighter.

The larva, which is full grown in May or June, lives on *Tragopogon pratense*, *Serratula*, spinach, dock, larkspur, and other low plants. It is smooth and green, with five longitudinal white lines of about equal breadth, which converge at the anal extremity. Below the lowest lateral line are two obliquely placed white dots, and there are also some minute white points on each segment between the lines, each bearing a fine hair. The pupa is dark brown, and the cocoon is rather dense. The moth appears in May and June.

FAMILY TOXOCAMPIDÆ.

GENUS OPHIUSA.

Ophiusa, Ochsenheimer, Schmett. Eur. iv. p. 93 (1816); Treitschke, Schmett. Eur. v. (3), p. 288 (1826; *nec Guenée*).

Ophiussa, Hübner, Verz. bek. Schmett. p. 266 (1822 ?).

Toxocampa, Guenée, Ann. Soc. Ent. France, x. p. 75 (1841); id. Spec. Gén. Lépid. Noct. ii. p. 423 (1852).

The species of this genus are easily recognized by the comparatively long and slender body, the conspicuous black or brown collar, and the rather broad, brown, obtuse wings, with the reniform stigma distinctly marked on the fore-wings, and the hind-wings without markings. The legs are rather long, with strong spurs.

The larvæ are long, smooth, and velvety, tapering at the ends, and with sixteen legs, but the first two pairs of pro-legs are rather shorter than the others. They feed on low-growing leguminous plants.

The pupæ are conical, and are enclosed in cocoons among the bushes on which the larvæ feed.

THE SCARCE BLACK-NECK MOTH. OPHIUSA CRACCÆ.

Noctua craccæ, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 94, no. 3 (1776); Hübner, Beitr. Gesch. Schmett. i. (3), p. 30, Taf. 4, fig. W (1788); id. Eur. Schmett. iv. figs. 320, 669, 670 (1804 ?).

Ophiusa craccæ, Treitschke, Schmett. Eur. v. (3), p. 295 (1826).

Toxocampa craccæ, Kirby, Eur. Butterflies and Moths, p. 277, pl. 40, fig. 10 (1881); Buckler, Larvæ of Brit. Lepid. vi. p. 117, pl. 104, figs. 2, 2a (1895).

This moth has a wide range, extending through Central and Southern Europe and Northern and Western Asia, but is

everywhere local, and is very rare in Britain. It expands from an inch and a half to an inch and three-quarters.

The head is grey with a black collar, and the thorax grey, passing into brownish, with scattered black dots. The legs and abdomen are yellowish-grey, the latter with a rather long anal tuft. The antennæ are brown, with white scales.

The Scarce Black-necked Moth.

The fore-wings are of a delicate bluish-grey colour, with a reddish shine. The first transverse line consists of black zig-zags, generally interrupted. There are slight traces of a half-line and of a central shade, rising from dark marks on the costa. The reniform stigma consists of several black spots arranged in a crescent, the interspaces being filled in with brown. The second transverse line is whitish, and the marginal area is first light and then dark brown, beyond which is a whitish sub-marginal line. The fringes are unicolorous, bordered with a whitish line, in front of which are small black dots, and minute lunules. The nervures are pale yellowish, and the whole of the surface of the wings is dusted with black atoms. The hind-wings are yellowish-grey, with paler nervures and yellow-bordered fringes.

The larva lives on the tufted vetch (*Vicia cracca*) and the wood vetch (*V. sylvatica*), in June and July. When seen from the side it appears of uniform width, but, when looked at from above, it appears to taper to both extremities. It is light brown with a dark brown dorsal stripe, widest on the

middle segments, and on the eleventh. There are also several dark brown sinuous lines on the sides. The anal extremity is bifid. It loops in walking. The moth appears in July or August.

FAMILY STILBIIDÆ.

GENUS STILBIA.

Stilbia, Stephens, Ill. Brit. Ent. Haust. iii. p. 124 (1830); Guenée, Spec. Gén. Lépid. Noct. ii. p. 433 (1852).

The few species of this genus are plainly coloured, with long antennæ, and short palpi, proboscis and thorax, and a rather slender abdomen, about as long as the hind-wings. The fore-wings are long and narrow, and the hind-wings are broad, and folded closely to the body beneath the fore-wings. The larvæ are stout and cylindrical, feeding on grass in open places in woods, and dropping down at the least alarm.

THE ANOMALOUS MOTH. STILBIA ANOMALA.

Phytometra anomala, Haworth, Trans. Ent. Soc Lond. i. p. 336 (1812).

Geometra hybridata, Hübner, Eur. Schmett. v. figs. 497, 498 (1814?).

Caradrina stagnicola, Treitschke, Schmett. Eur. v. (2), p. 258 (1825).

Stilbia anomalata, Stephens, Ill. Brit. Ent. Haust. iii. p. 125 (1830); Curtis, Brit. Ent. xiv. pl. 631 (1837).

Stilbia anomala, Kirby, Eur. Butterflies and Moths, p. 164 (1880); Buckler, Larvæ of Brit. Lepid. vi. p. 118, pl. 104, figs. 3–3 e (1895).

The Anomalous Moth is a native of England, France, and Western Germany. It expands from an inch to an inch and a half.

The head and collar are dark grey, the thorax black and the

antennæ grey. The abdomen is entirely white, and the legs greyish-white, ringed with blackish beneath. The fore-wings are lead-coloured, with a tinge of brownish, and a few black spaces. The two transverse lines are darker than the ground-colour; the first is dentated, and the second consists partly of indistinct lunules. Along the hind margin the surface is almost black to below the stigmata. Both the orbicular and reniform stigmata are indistinct, bordered with black and white, and streaked with brown within. The former is oblique and very long. The space between the stigmata is the blackest part of the wing, and that below them the lightest.

The Anomalous Moth.

The claviform stigma is represented by a light streak. The marginal area has a light brown shade, and two fine sagittate spots near the apex. The fringes are unicolorous, long, and somewhat dentated. The wings have a strong metallic gloss. The hind-wings are white, suffused with brownish, with the fringes of the same colour, long, and bordered by a brown line.

The larva feeds on grass. It is either greenish-yellow, with white dorsal and sub-dorsal lines edged with darker green, and a white spiracular line edged above with smoky or light brown, or with two purplish-brown lines enclosing a yellow dorsal line, a yellow sub-dorsal line, finely bordered with darker brown, and a greyish-white spiracular stripe, edged above with smoky. In both varieties the spiracles are black, those on the second and twelfth segments being the largest. The pupa is short, ochre-

yellow, with a darker stripe on the dorsal surface. The moth appears in August and September.

IV. NOCTUÆ EXTENSÆ.

This Division, like the last, is separated by Guenée into three families of moderate extent; but they are all unrepresented in England. They are briefly tabulated as follows:—

A.—Abdomen of the male conical, smooth, or very finely crested. Legs long and thick ... ... *Polydesmidæ.*

B.—Abdomen broad, flattened, and strongly crested in both sexes. All the wings with similar markings. *Homopteridæ.*

C.—Abdomen neither flattened, downy, nor crested. Hind-wings always more or less differently coloured to the fore-wings, and often marked with very distinct lines beneath ... ... *Hypogrammidæ.*

A representative species of each of these families has been figured.

FAMILY POLYDESMIDÆ.

GENUS PANTYDIA.

Pantydia, Guénee, Spec. Gén. Lépid. Noct. ii. p. 436 (1852).

The antennæ are pubescent and crenulated in the male, and simple in the female. The palpi are raised, the second joint scaly, and the third shorter, slender, and filiform. The proboscis is short and slender, and the abdomen is smooth, with parallel sides, and is truncated at the tip in the male, and suddenly pointed in the female. The front legs are very woolly, and the middle tibiæ are set with thick tufts of woolly hair. The wings are dull-coloured, the fore-wings with the sub-marginal line well-marked, the hind-wings set with hairs on the disc above, and all the wings bordered with brown below. The three first sub-median nervules rise from the same point.

PANTYDIA SPARSA.

(*Plate CXXX., Fig.* 3.)

Pantydia sparsa, Guenée, Spec. Gén. Lépid. Noct. ii. p. 437 (1852); Walker, List Lepid. Ins. Brit. Mus. xiii. p. 1038, no. 1 (1857).

This is an Australian Moth, which measures rather less than an inch and a half in expanse.

The fore-wings are light grey, slightly tinted with greenish, and marked with short black striæ. The sub-terminal line is slender, and nearly straight; it is yellow, slightly bordered with reddish, preceded by small cuneiform black marks on each nervure, and followed by larger ones, marked with reddish at the base, and interrupted in the middle of the wing. The reniform stigma is indicated by a few black atoms. There is a row of small terminal dots between each two nervures.

The hind-wings are grey, paler towards the hind margin. The under side is grey, with terminal dots, and a well-marked black sub-terminal line. The second joint of the palpi is brown, with the extremity white.

FAMILY HOMOPTERIDÆ.

GENUS NEPHELINA.

Erebus (*Omopterus*), Guérin, Icon. R. Anim. ii. pl. 89, fig. 3 (larva), (1829); iii. p. 522 (1844).

Homoptera, Guenée, Spec. Gén. Lépid. iii. p. 8 (1852); Walker, List Lepid. Ins. Brit. Mus. xiii. p. 1052 (1857), *nom. præocc.*

The antennæ are rather long, ciliated, and verticillate in the male, but short and simple in the female. The palpi are ascending, and the proboscis is of moderate length. The body is stout, and, as well as the legs, is very hairy; there

is a large crest on the first segment of the abdomen, and small ones on those following. The fore- and hind-wings are similarly marked, and the hind margins are slightly denticulated.

The larvæ are long and smooth, with a bifid hump on the penultimate segment, and with sixteen legs, but the first pair of pro-legs is rudimentary. The pupæ are obtuse in front, and conical and pointed behind, with a bluish-white or violet efflorescence.

This genus includes a considerable number of brown or fawn-coloured species, with darker lines and markings. Most of the species are American; but one or two East Indian species are referred to the genus.

NEPHELINA EDUSA.

(*Plate CXXX., Fig.* 4.)

Noctua edusa, Drury, Ill. Exot. Ent. ii. pl. 24, fig 4 (1773).
Erebus (*Omoptereus*) *putrescens*, Guérin-Méneville, Icon. Régne Anin. ii. pl. 89, fig. 3, larva (1829), iii. p. 522 (1844).
Homoptera edusa, Guenée, Spec. Gén. Lépid. Noct. i i. p. 14 (1852).

This Moth, which is not uncommon in the United States, expands rather more than two inches. It is of a light chestnut brown, irrorated with darker; and with some whitish markings towards the base of the fore-wings. There is a large white or bluish-white blotch towards the hind margin near the tip, and another near the hinder angle of the fore-wings, and another occupying the greater part of the hind margin of the hind-wings. At the base of the abdomen is an ash-coloured spot.

The larva is flesh-coloured, with interrupted festooned blackish lines, with two orange spots on the back. It lives on "Golden Rod," and probably on oak. The pupa is entirely covered with a bluish efflorescence.

FAMILY HYPOGRAMMIDÆ.

GENUS ANTHOCITTA.

Anthocitta, Hübner, Verz. bek. Schmett. p. 259 (1822 ?).
Hypogramma, Guenée, Spec. Gén. Lépid. Noct. iii. p. 34 (1852); Walker, List Lepid. Ins. Brit. Mus. xiii. p. 1095 (1857).

The antennæ are simple, very slightly ciliated in the male. The palpi are long, slender, bare, and up-curved, with the third joint pointed, and nearly as long as the second. The proboscis is short, and the abdomen smooth and conical. The legs are rather long, nearly smooth, with a pencil of hairs at the base of the intermediate tibiæ in the male. The wings are entire, marbled with black and white, and with a white patch towards the tip of the hind-wings. Median nervure four-branched, all the branches rising close together at some distance from the base.

ANTHOCITTA SUBLUCIDA.

(*Plate CXXX., Fig.* 5.)

Hypogramma sublucida, Walker, List Lepid. Ins. Brit. Mus. xiii. p. 1097, no. 5 (1857).

This Moth is a native of Brazil. "Brown. Body cinereous beneath. Abdomen cinereous brown. Fore-wings with irregular transverse black undulating lines, and with a few black patches; a whitish band beyond the middle, white beneath, and corresponding to the tips of the hind-wings. Hind-wings with snow-white tips; under side cinereous from the base to the middle, where there are two slight brown bands. Length of the body, nine lines; of the wings, twenty-two lines" (*Walker*).

V. NOCTUÆ LIMBATÆ.

To this Division belong the largest of the European *Noctuæ*. Although the larvæ are provided with sixteen legs, they loop

somewhat in walking. Of the five families into which this section is divided, two are represented in Europe. They are tabulated as follows :—

A.—Size small or moderate. Antennæ generally short, or of moderate length.

a. Joints of the palpi distinct. Hind-wings with the disc or the base white and diaphanous, or less thickly scaled than the rest.

§ Thorax or abdomen crested ... ... *Catephidæ.*

§§ Thorax and abdomen smooth ... ... *Bolinidæ.*

b. Palpi stout, prominent, with indistinct joints. Hind-wings yellow, with a black border ... ... *Hypocalidæ.*

B.—Size generally large. Antennæ long. Abdomen smooth, tufted at the base.

a. Palpi rather slender, the third joint moderately long, not spatulate. Hind-wings large, and generally brightly coloured. All the wings distinctly banded beneath ... ... *Catocalidæ.*

b. Palpi thick, the third joint long and spatulate. Fore-wings pointed. Proboscis very strong. Legs spiny. *Ophideridæ.*

The last family will be noticed later, under the Division *Serpentinæ.*

FAMILY CATEPHIDÆ.

With the exception of the species of the genus *Cocytodes*, Guenée, which are Indian Moths with brown and pointed fore-wings, three inches or more in expanse, and dark hind-wings with blue markings, the Moths of this family are comparatively small, with black and white hind-wings. Most of the species are natives of the Old World, and one or two species are found in Europe, but very rarely indeed in England.

GENUS ÆDIA.

Catephia, pt. Ochsenheimer, Schmett. Eur. iv. p. 94 (1816); Treitschke, Schmett. Eur. v. (3), p. 320 (1826); *nec Hübner, restr.*

Ædia, pt. Hübner, Verz. bek. Schmett. p. 260 (1822?).

Anophia, Guenée, Ann. Soc. Ent. France x. p. 81 (1841); id. Spec. Gén. Lépid. Noct. iii. p. 45 (1852); Walker, List Lepid. Ins. Brit. Mus. xiii. p. 1126 (1857).

The antennæ, palpi, and proboscis are all short, the antennæ filiform, the palpi ascending, and the proboscis stout. The thorax is convex and woolly, with the collar raised. The abdomen is crested and tufted, and the legs are rather short. The fore-wings are oblong, and the hind-wings rounded, with spotted fringes, and a large white spot in the middle.

The larvæ are long and cylindrical, with the penultimate segment swollen. They live exposed on *Convolvulaceæ*. The pupæ are enclosed in cocoons, on the surface of the ground.

This is a small genus found in Europe, and in other parts of the Old World. An African species is here figured.

ÆDIA DISCISTRIGA.

(*Plate CXXX., Fig.* 6.)

Anophia discistriga, Walker, List Lepid. Ins. Brit. Mus. xiii. p 1128, no. 3 (1857).

This species is a native of Natal. "Brown, cinereous beneath Second joint of the palpi whitish at the tip; third joint full half the length of the second. Thorax with whitish bands Abdomen cinereous. Fore-wings partly whitish, with black transverse irregular lines, and with the borders of the orbicular and reniform spots also black; a white streak in the disc behind the reniform spot; under side whitish for more than

half the length from the base, with two brown spots. Hind-wings white towards the base, and with the cilia partly white. Length of the body, six lines and a half; of the wings, fifteen lines" (*Walker*).

FAMILY BOLINIDÆ.

These are moderate-sized Moths, with oblong fore-wings generally marked with pale transverse or oblique lines, and rounded hind-wings more or less marked with white or yellow. The markings are usually sharply defined. One or two species are South European, but the greater number are exotic, and chiefly North American.

GENUS SYNEDA.

Syneda, Guenée, Spec. Gén. Lépid. Noct. iii. p. 71 (1852); Walker, List Lepid. Ins. Brit. Mus. xiii. p. 1167 (1857).

The antennæ are short and filiform, but slightly thickened in the male. The palpi are short, thick, and ascending, with the last joint expanded. The thorax is densely scaled, and the abdomen rather slender. The wings are entire and rounded, with long fringes, and sharply-defined markings, the fore- and hind-wings being differently coloured.

The larvæ are stout, smooth, and cylindrical, with sixteen legs, and feed on low plants. The pupæ are pointed at the extremity.

SYNEDA SOCIA.

(*Plate CXXX.*, *Fig.* 7.)

Syneda socia, Behr, Trans. Amer. Ent. Soc. vi. p. 27 (1870).

This is a pretty Californian species, which expands from an inch and a quarter to nearly an inch and three-quarters. The fore-wings are brown, with the lines black; the half-line is curved, and sometimes preceded by a grey spot at the base; the first line is twice strongly angulated inwards, and the central

area is yellowish-grey; there is a pale streak at the end of the cell, bordered on both sides with brown; and beyond this the second line makes a very acute V, and then a W, turning inwards and then downwards at a right angle below the streak to the inner margin. The marginal area is grey, darker towards the fringes, which are preceded by a festooned black sub-terminal line. The hind-wings are orange, crossed by an irregular Y-shaped mark, curving round by the anal angle to the inner margin. The fringes are grey, and are preceded by a festooned black line, on which stand two large black blotches.

FAMILY HYPOCALIDÆ.

This is a small family of exotic Moths, with oblong fore-wings, and black and yellow hind-wings. They have much resemblance to some of our smaller European species of *Triphæna*. The palpi are large, contiguous, compressed and scaly, and the abdomen is black, with yellow markings, and slightly crested at the base. The wings are subdentate.

The larva has sixteen legs, and is thick and cylindrical.

GENUS HYPOCALA.

Parthenos, pt. Hübner, Verz. bek. Schmett. p. 278 (1822?) *nom. præocc.*

Hypocala, Guenée, Spec. Gén. Lépid. Noct. iii. p. 73 (1852); Walker, List Lepid. Ins. Brit. Mus. xiii. p. 1173 (1857).

It is unnecessary to say more of this genus in addition t the particulars given above.

HYPOCALA SUBSATURATA.

(*Plate CXXX., Fig.* 8.)

Hypocala subsaturata, Guenée, Spec. Gén. Lépid. Noct. iii. p. 75 (1852).

This species, which is one of the larger members of the

genus, inhabits Northern India, and measures an inch and three-quarters across the wings. Fore-wings purplish-grey, with more or less distinct brown or reddish transverse lines and stigmata, the sub-terminal line slightly marked with buff on the lower half. Hind-wings brown towards the base, and blackish towards the hind margin; the hind and inner margins mostly grey or yellow, and two diverging orange stripes running from the base near the inner margin, and merging at two-thirds of the length of the wing into a transverse orange band, connected with or disconnected from a large oval spot in the middle of the wing; between this and the inner half of the hind margin are two more yellow spots, one large, detached from the border, and one small, resting on the border near the anal angle. The head and thorax are grey, and the abdomen yellow, with black transverse bands, the last segment being wholly black above, except at the base, and followed by a whitish apical tuft tipped with black.

FAMILY CATOCALIDÆ.

This family includes a considerable number of large and handsome species, which are most numerous in Europe and North America, though they have many representatives in other parts of the world. The antennæ are long and simple, the thorax and abdomen are crested, and the wings are broad and sub-dentate, the fore-wings being brown or grey, with darker lines and markings, and the hind-wings are black, generally more or less banded with red, yellow, or blue. The under surface of all the wings is banded with black and white, even in those species (chiefly American) in which the hind-wings are wholly black above, except the white fringes.

The larvæ live on trees, and loop their bodies in walking, though they have sixteen legs. They are long, tapering at the

ends, and are rather flattened, and spotted with black below. The pupæ are covered with a greyish bloom, and are enclosed in hard cocoons, generally in the chinks of the bark of trees.

GENUS CATOCALA.

Noctua, pt. Linnæus, Syst. Nat. (ed. x.), i. p. 508 (1758); Cuvier, Tabl. Elém. d'Hist. Nat. p. 597 (1799); Lamarck, Syst. Anim. sans Vertèbres, p. 286 (1801).

Catocala, Schrank, Fauna Boica, ii. (2), p. 158 (1802); Ochsenheimer, Schmett. Eur. iv. p. 94 (1816); Hübner, Verz. bek. Schmett. p. 276 (1822?); Treitschke, Schmett. Eur. v. (3), p. 328 (1826); Guenée, Spec. Gén. Lépid. Noct. iii. p. 80 (1852).

Hemigeometra, Haworth, Lepid. Brit. p. 267 (1809).

The Red Underwings and the Clifden Nonpareil are among the largest and handsomest of our British Moths. When at rest, they sit on walls or tree-trunks, with the fore-wings extended in a triangular form over the hind-wings, in which position they are not easily distinguishable from their surroundings. Some of the species fly by day as well as in the evening.

The types of *Noctua*, as given by Cuvier, belong to the third section of the *Noctuæ* of Linnæus, and are his *Noctua pacta*, *chrysitis*, *gamma*, and *verbasci*. The type of Lamarck is *N. sponsa* (Linn.), a species not distantly related to *N. pacta*, and, as already pointed out (*anteà*, p. 46), Latreille's type of *Noctua* was *Triphæna fimbria* (Linn.). Yet none of the above-mentioned species can be taken as the type of *Noctua*, which was fixed by Poda in 1761 as *N. quadra*, Linn. (our *Œonistis quadra*, cf. vol. iii. p. 162).

THE CLIFDEN NONPAREIL. CATOCALA FRAXINI.

(*Plate CXXXI., Fig.* 2.)

Noctua fraxini, Linnæus, Syst. Nat. (ed. x.), p. 512, no. 89 (1758); id. Faun. Suec. p. 310 (1761); id. Mus. Ludov. Ulr. p. 387 (1764); Esper, Schmett. iv. (1), pp. 132, 363, Taf. 101, figs. 1–4 (1788?); Taf. 125 c, fig. 1 (1790?); Hübner, Eur. Schmett. iv. fig. 327 (1804?).

Hemigeometra fraxini, Haworth, Lepid. Brit. p. 267, no. 1 (1809).

Catocala fraxini, Treitschke, Schmett. Eur. v. (3) p. 329 (1826); Stephens, Ill. Brit. Ent. Haust. iii. p. 131 (1830); Kirby, Eur. Butterflies and Moths, p. 269, pl. 41, figs. 3–3 b (1881); Buckler, Larvæ of Brit. Lepid. vi. p. 119, pl. 104, figs. 4–4 a (1895).

The Clifden Nonpareil, or Blue Underwing, is one of the largest Moths found in this country, the expansion of the wings sometimes reaching four inches. Its range extends through Central and Eastern Europe and Siberia.

The head and thorax are light grey varied with darker grey and yellowish. The abdomen is dark ashy-grey, ringed with white, with raised tufts on the anterior segments. The body and legs are white beneath. The antennæ are brownish-grey. The fore-wings are light grey, more or less dusted with brownish and yellow. There are several whitish transverse lines, bordered with brown. There is a half-line near the base, and then comes the first transverse line, which consists of curves and crescents. In the central area only the reniform stigma can be distinguished as a faint dark mark. Below this is a whitish or pale yellow diamond-shaped spot, and the inner side of it is also edged with paler. The second transverse line is whitish, bordered with brown and yellowish, and is very zig-zag; and beyond it is a brownish-grey sub-marginal line,

outside which the wings have a somewhat bluish tint. The fringes are dentated, spotted with grey and white, and frequently varied with yellow; and are bordered by a row of small crescent-shaped spots, having the concavity directed outwards. The hind-wings are black, with a broad greyish-blue central band, and narrow white hind margins. The fringes are white, bordered by a fine waved black line.

The larva most commonly lives on poplars, but will also live on ash (*Fraxinus*), beech, birch, elm, oak, and other trees. The transformations of all the Underwings are very similar, so we will give those of the present species in full, as typical of the others as well.

The eggs are laid in the autumn, and remain undeveloped until the following May. It is likely that some larvæ hatch before the winter, and hibernate, as they are sometimes met with rather advanced in development at the end of May.

The egg is black, with white reticulated markings, and with a very broad, somewhat interrupted, band round the middle. A few hours before the larva emerges, a slight movement may be detected, and several small air-bubbles appear, probably caused by a minute puncture made by the enclosed larva in commencing to break its way out. On first emerging, the young larva is yellowish, and blackish spots and short setiform hairs can be detected by a lens. It is able to move about quickly, and rests on the hinder legs with the body held erect. The egg changes colour after the emergence of the larva, and becomes uniform white and translucent. It is not eaten by the larva.

After the first moult the larva becomes greener, and twelve black dots appear on the back. After the second moult, the black dots become scattered over the whole surface, but are only distinctly visible under a lens. These spots become more distinct, and the colour greener, upon the third moult. After the fourth moult, which takes place five days after the third,

the spots increase, and the colour approaches a light grey. Up to this time it consumes the cast-off skin, with the exception of the horny covering of the head. After the fifth moult the larva becomes darker, and it grows rapidly. This time it does not generally eat the cast skin, and looks for other food at once, though some specimens will consume the slough.

The sixth moult is the last, when the full-grown larva is about three inches in length, and rather slender in proportion. It varies considerably in colour, and is sometimes uniform ashy-grey, and sometimes nearly white, or varied with darker. Some specimens are light flesh colour, and others are pale brown. The whole of the surface is covered with distinct black atoms, but there are no other markings. On the back of the ninth segment is a small hump, which is black in dark specimens, and generally dark blue in the paler ones, this colour disappearing on the sides. Near this spot the colour is paler, and is sometimes suffused with bluish. The sides have white fleshy fringes. The head is large in proportion to the slender anterior segments; it is flat in front, yellowish, with a dark brown border, and a slight notch above. The belly is either white or bluish, with dark blue or brown spots. The front pair of pro-legs is much shorter than the others, which gives the larva a somewhat looping gait.

Like other larvæ of the genus, the larva of this species is very active, and if touched will lash about like a stranded fish. It rests by day, in chinks of bark, or on a stout branch, and feeds at night. Between the end of July and the middle of August it prepares a large loose cocoon of strong threads between leaves or in a wide chink of the bark, and, after a week, it changes to a large, slender, plum-coloured pupa, with a blue bloom like a plum. The moth appears after three weeks, usually at night. By day it rests on trees and fences, but is very shy and difficult to catch.

It is a rare insect in this country, and indigenous specimens in good condition are always regarded as a valuable addition to the cabinet. It was first figured by Wilkes as a British insect, and was said by him to have been found at Clifden, in Buckinghamshire; whence the English name which he assigned to it, and by which it is generally known by British collectors. Though so rare, it has been taken almost anywhere in England; and a year or two ago, a specimen was found in Hyde Park.

THE RED UNDERWING. CATOCALA NUPTA.

(*Plate CXXXI., Fig.* 1.)

Noctua nupta, Linnæus, Syst. Nat. (ed. xii.), i. (2), p. 841, no. 119 (1767); Esper, Schmett. iv. (1), pp. 119, 364, Taf. 97, figs. A, B, 1–5 (1788?); Taf. 125 c, fig. 4 (1790?); Hübner, Eur. Schmett. iv. figs. 329, 330 (1804?).

Hemigeometra nupta, Haworth, Lepid. Brit. p. 268, no. 2 (1809).

Catocala nupta, Treitschke, Schmett. Eur. v. (3), p. 337 (1826); Stephens, Ill. Brit. Ent. Haust. iii. p. 132 (1830); Kirby, Eur. Butterflies and Moths, p. 269, pl. 41, fig. 4 (1881); Buckler, Larvæ of Brit. Lepid. vi. p. 121, pl. 104, figs. 5–5 c (1895).

The Red Underwing expands about three inches across the wings. It is found throughout Central and Eastern Europe, Asia Minor, and Siberia.

The head and the slightly crested thorax are light grey, dusted with yellowish and brown. The collar is striped with darker. The abdomen is ashy-grey, with an anal tuft of the same colour in the male, and with white hair on the sides and tip. The antennæ are grey, and the legs white. The body is white beneath.

1. Catocala nupta.
2. Catocala fraxini.

The fore-wings are light grey, with darker markings. The whole surface, with the exception of a light transverse band in the central area, is covered with brown and yellowish atoms. The half-line and the first transverse line are broad and whitish, bordered with yellowish-brown. Then comes the light transverse band already mentioned, in which a white spot marks the position of the orbicular stigma. Near this is the crescent-shaped reniform stigma, with the concavity outwards, enclosed and centred with brown and yellow, with a pale yellow diamond-shaped spot attached to it beneath, as in *C. fraxini*. The second transverse line is well marked, and takes a sinuous course, bulging out in the form of an M opposite the reniform stigma, and then forming rather irregular zig-zags to the inner margin. It is yellowish on its inner side, with brown borders. From this line to the fringes the surface is mottled. The fringes are ashy-grey, dentated, and intersected by two dark lines, and bordered by a row of detached lunules. The hind-wings are deep red, with two black bands. The narrower of these bands curves parallel to the hind margin, and ends at a distance from the inner margin, or is continued very faintly. The marginal band is wide, and is twice dentated on its inner side. The fringes are white, slightly suffused with brown.

The larva lives on willows, sallows, and poplars. It is usually brownish-grey, with yellow spots and interrupted lines. There are dark brown lines running obliquely over the segments, which are often abbreviated, and expanded in the middle, but are often continued and narrowed. The entire surface is covered with small depressions and elevations, each of the latter bearing a short stiff hair, and on the sides are whitish fringes. On the ninth segment is a fleshy flattened hump. The belly is white or reddish, with large patches of dark brown.

The pupa is reddish-brown and is covered with a purple bloom. It is enclosed in a loose cocoon between leaves, or in a crevice of the bark.

The moth is of frequent occurrence in the southern parts of England, and is not rare even in the more northern counties. Its time of appearance corresponds pretty closely with that of *C. fraxini*. It often flies by day as well as at night.

CATOCALA PACTA.

Noctua pacta, Linnæus, Syst. Nat. (ed. x.), i. p. 512, no. 86 (1758); id. Faun. Suec. p. 310 (1761); Hübner, Eur. Schmett. fig. 332 (1804?).

Noctua pacta suecica, Esper, Schmett. iv. (1), p. 365, Taf. 99 B, figs. 1, 2 (1788?).

Catocala pacta, Treitschke, Schmett. Eur. v. (3), p. 352 (1826); Kirby, Eur. Butterflies and Moths, p. 270 (1881).

This Moth is a native of Northern and Eastern Europe and Siberia. It expands only from two inches to two inches and a quarter, and is one of the smallest of the Red Underwings.

The head and thorax are pale ashy-grey, varied with whitish hairs, with the collar and tegulæ bordered with brown, and the crest of the thorax also brown. The abdomen is blood-red, with a grey anal tuft in the male. The antennæ are light brown, and the legs are whitish-grey, suffused with reddish. The body is white beneath. The fore-wings are pale ashy-grey, with brown markings bordered with white. There is a half-line, and a first transverse line, the latter of which curves towards the inner margin. The reniform stigma is formed of a brownish lunule, edged with darker, with a brown transverse streak in front. Below the reniform stigma, and touching the second transverse line is a long brown-ringed claviform stigma. The second transverse line and the sub-marginal zig-zag line,

1. *Catocala neogama.*
2. " " ,*larva.*
3. *Catocala amasia.*

1. Catocala nupta
2 "
3. Catocala sponsa larva

which stands close to it, border a brown band. From this to the fringes the ground-colour is pale ashy-grey. The fringes are dark brownish, and very slightly dentated. In front of them is a row of detached brown dots. The hind-wings are pale red, with the black central band curving uninterruptedly, but terminating at a distance from the inner margin. The marginal band is broad externally, and narrows as it passes inwards. The fringes are white, and dotted with brown.

The larva feeds on willow. It is ashy or reddish-grey, shagreened on the sides with delicate transverse folds, generally with a faint M-shaped mark on the back of each segment. The tubercles are yellowish, and there is a blackish or brownish red elevation on the ninth segment, which is sometimes dusted with orange. On the twelfth segment there is also a dark brown bifid elevation. The spiracles are white, bordered with black, and there are short grey lateral fringes. The belly is pale grey with black spots. The head is flat, grey narrowly bordered with black, with two small brown or orange-yellow dots above. It is found in May. The pupa is slender, brown with a blue efflorescence. The moth appears in August.

CATOCALA NEOGAMA.

(*Plate CXXXII., Fig.* 1; *larva, Fig.* 2.)

Phalæna neogama, Abbot & Smith, Lepid. Georg. ii. p. 175 pl. 68 (1797).

Catocala neogama, Westwood in Jardine's Nat. Libr. Exot. Moths, p. 202, pl. 26, figs. 1, 2 (1841); Guenée, Spec. Gén. Lépid. Noct. iii. p. 96 (1852); Walker, List Lepid. Ins. Brit. Mus. xiii. p. 1202, no. 45 (1857).

This species is a native of North America. It expands a little over three inches.

The head and thorax are grey, the latter with dark trans-

verse lines in front. The fore-wings are yellowish-grey, clouded with ashy-green, brown, and whitish, and marked with sinuous black lines, most of them running obliquely across the wings. These represent the half-line, two transverse lines, and the sub-marginal line. The central area is pale, and contains a grey reniform stigma, centred with brown. There is a double row of dark spots on the hind-margin. The hind-wings are deep ochre-yellow, with two black bands, neither of which extends as far as the inner margin. The outer is the broader, and the inner is constricted in the middle of its length. Beyond the outer band the wings are yellow, with yellow fringes. Both the fore- and hind-wings are distinctly dentated. The abdomen is yellow, like the hind-wings.

The female is more clouded than the male, with a trace of reddish.

The larva feeds on the Black American Walnut (*Juglans nigra*), and, like its European allies, when it has done feeding, it descends from the leaves to the trunk of the tree, and stretches itself along the bark, to which it bears so much resemblance in colour and texture that it is scarcely distinguishable from it. It is greyish-brown, or reddish-brown, with a black dorsal line, marked with a white spot on each segment, and a sinuous black line above the spiracles. The head and legs are concolorous.

CATOCALA AMASIA.

(*Plate CXXXII., Fig.* 3.)

Phalæna amasia, Abbot & Smith, Lepid. Georg. ii. pl. 90 (1797).
Catocala amasia, Westwood in Jardine's Nat. Libr. Exot. Moths, p. 205, pl. 26, fig. 3 (1841); Guenée, Spec. Gén. Lépid. Noct. iii. p. 103 (1852); Walker, List Lepid. Ins. Brit. Mus. xiii. p. 1204, no. 50 (1857).

This is also a North American species, but it is considerably smaller than the last, the wings expanding hardly more than two inches.

The head and thorax are light grey, and the abdomen yellow. The fore-wings are ashy-grey, mottled with white, and marked with dark spots and transverse streaks. The central area is white, with a brown reniform stigma, centred with black. The half-line, two transverse lines, and sub-marginal line are all brown and dentated. In front of the sub-marginal line is a row of zig-zag spots. The hind-wings are light yellow, slightly tinged with reddish, with two curved black bands; the inner narrow and ceasing at some distance from the inner margin. The outer band is broader, and is widely interrupted near the anal angle, but is then continued to the inner margin.

The larva is grey, with dark lines along the sides. It feeds on various kinds of American oaks. Abbot found it also on the Bead Tree or Pride of China (*Melia azedarack*). He observed that it spun among the leaves in the beginning of May, and that the moths emerged about the end of the same month. He adds that the moth is often found sitting on the trunks of large oaks in Georgia and Virginia. The pupa is of a delicate lilac tint.

VI. NOCTUÆ PATULÆ.

In this Division, which includes the largest *Noctuæ* known, the antennæ are simple, the palpi ascending, with the second joint compressed, and the third long and linear. The proboscis is stout, and the eyes large and prominent. The abdomen is conical, moderately long, and stout. The wings are large, broad, and generally dentated, and the fore- and hind-wing, are more or less similar in markings, and are usually grey

reddish, brown, or black, and are sometimes ornamented with ocellated spots.

The larvæ have sixteen legs, the first pair of pro-legs sometimes rudimentary.

Guenée divides this tribe into four Families, as follows :—

A.—Wings with transverse lines, and the stigmata, when present, of the usual form. ... ... *Erebidæ.*

B.—Reniform stigma forming an ocellated spot, or a spiral. *Ommatophoridæ.*

C.—Wings tawny or reddish beneath, with black lines or bands. *Hypopyridæ.*

D.—Wings angulated or falcate, with the sub-terminal line nearly straight, and the front legs very hairy in the male. *Bendidæ.*

FAMILY EREBIDÆ.

The greater number of species of this rather extensive Family are found in tropical America, though it has representatives in Africa, India, and Australia. The fore-wings are frequently long, and more or less pointed at the tip, and the hind-wings are rounded and scalloped. In some genera, however, the fore-wings are broad, and scarcely longer than the hind-wings, the hind margin being hardly oblique. The dark brown or blackish species of this Family are not uncommonly shot with purple, which is likewise the case with many *Lepidoptera* of similar colours, as is well seen in several European *Satyrinæ.*

The larvæ are stout and cylindrical, and the pupæ are enclosed in loose cocoons, on or under the surface of the ground.

We will now notice examples of some of the more interesting genera of this Family.

1.

2.

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1. *Pcosina leontia.*
2. *Lelis magna.*

1. Pessana lecontei
2. Lebis marginea

GENUS PEOSINA.

Peosina, Guenée, Spec. Gén. Lépid. Noct. iii. p. 131 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1242 (1858).

The species of this genus are among the smallest of the family, and inhabit the West Indies and South America. The fore-wings are narrower than the hind-wings, and twice as long; they are usually streaked with white or yellowish, and there is a conspicuous white patch on the outer side of the hind margin of the hind-wings. The antennæ are long, and ciliated in the males, and the abdomen is as long as the hind-wings.

PEOSINA LEONTIA.

(*Plate CXXXIII., Fig.* 1.)

Noctua leontia, Stoll, Suppl. Cram. pl. 34, fig. 6 (1790).
Peosina leontia, Guenée, Spec. Gén. Lépid. Noct. iii. p. 132 (1852).

This species is a native of South America. It expands two inches.

All the wings are dark brown. The fore-wings have the hind margins and the hinder angle slightly rounded, with a series of more or less distinct creamy white spots extending longitudinally from the base to the middle of the wings. The hind-wings have a large patch of pure white covering the apex and half the hind margin, including the fringes.

GENUS LETIS.

Letis, Hübner, Verz. bek. Schmett. p. 274 (1822?); Guenée, Spec. Gén. Lépid. Noct. iii. p. 145 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1263 (1857).

This genus includes Tropical American species of considerable size, with long and moderately broad fore-wings, pointed

at the tips, and with the hind margin oblique and dentated, and broad dentated hind-wings. They are brown, grey, or blackish, with sharply defined lines and stigmata. The species are rather numerous, and the pupæ are subterranean.

LETIS MAGNA.

(*Plate CXXXIII., Fig.* 2.)

Noctua ——, Zschach, Mus. Lesk. p. 110, no. 2916 (1788).
Noctua magna, Gmelin, Syst. Nat. i. (5), p. 2544 (1791).
Letis aptissima, Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1272, no. 21 (1858).

Walker's description of his *L. aptissima* is as follows:— "Dark ferruginous. Thorax, with two slight black bands. Abdomen blackish ferruginous. Wings with the transverse lines black, angulose, few, distinct; middle band fawn-coloured exteriorly, where it contains a zig-zag black line; sub-marginal band black, bordered with fawn-colour, macular, and widely interrupted on the fore part of the fore-wings; sub-marginal lunules black, distinct. Fore-wings with the orbicular and reniform spots black, the former nearly round, with a ferruginous mark in the middle, the latter somewhat D-shaped. Length of the body, twelve lines; of the wings, thirty-six lines."

It is a native of Trinidad.

GENUS THYSANIA.

Thysania, Dalman, Kongl. Vet. Akad. Stockholm, 1824, p. 407; Guenée, Spec. Gén. Lépid. Noct. iii. p. 163 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1286 (1858).

This genus is easily recognisable by the very long grey dentated wings, with blackish lines and markings. The antennæ

Thysania agrippina.

are long and simple, and the palpi ascending. The few species known inhabit tropical America and the West Indies, and that which we here describe and figure is the largest of all the *Noctuæ*; and, indeed, one of the largest Moths known.

THE GREAT OWL MOTH. THYSANIA AGRIPPINA.

(*Plate CXXXIV.*)

Noctua strix, Fabricius (*nec Linn.*), Syst. Ent. p. 591, no. 2 (1775).

Noctua agrippina, Cramer, Pap. Exot. i. pl. 87, fig A, pl. 88, fig A, (1776).

Syrnia strix, Hübner, Samml. Exot. Schmett. ii. Taf. 162, 163 (1824?).

Thysania agrippina, Guenée, Spec. Gén. Lépid. Noct. iii. p. 164 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1287, no. 2 (1858).

This enormous Moth, which is not uncommon in many parts of South America, expands from seven to eight inches between the tips of the wings. The wings are creamy white, much dentated, and crossed by numerous more or less regular zig-zag black and brown lines, most sharply marked on the hind-wings. On the fore-wings the stigmata are placed near together, the orbicular stigma is annular, and the reniform stigma very large, and filled up with blackish. The under surface is violet-black, with white spots and markings. The abdomen is white, bordered with black, and tipped with reddish. The larva, which feeds on the india-rubber tree in April, is dark green, with a broad black transverse band on each segment above, and a white sub-dorsal stripe. The head is yellow. There is a row of tufts of hair on the back, and a short horn, resembling that of a *Sphinx* larva, on the penultimate segment. When about to become a pupa the larva turns red. Madame Merian's

specimen formed a large wood-coloured cocoon on May 3, and the moth emerged on June 7.

GENUS EREBUS.

Erebus, Latreille, Consid. Générales, p. 365 (1810); Guenée, Spec. Gén. Lépid. Noct. iii. p. 166 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1289 (1858.)

This is another genus confined to tropical America and the West Indies, and including only one or two large and bulky species. The antennæ are long and rather thick, and the body very stout, but the abdomen is much shorter than the hind-wings. The wings are dark brown, with black lines and markings, and are very broad, with the hind-margins dentated. The fore-wings are triangular, rather pointed at the tip, with the hind-margin oblique; the reniform stigma is represented by an ocellated spot, and towards the anal angle of the hind-wings is a peculiar mark, curved and rounded above, and trifid below. The few species known of this genus are very similar, and have been regarded by many authors as simply varieties of one species.

EREBUS AGARISTA.

(*Plate CXXXV.*)

Attacus agarista, Cramer, Pap. Exot. ii. pl. 170, figs. A, B (1777).

Ascalapha ornata odora, Hübner (*nec Linn.*), Samml. Exot. Schmett. i. Taf. 195, 196 (1806 ?).

Erebus odora, var. B. *agarista*, Guenée, Spec. Gén. Lépid. Noct. iii. p. 168 (1852).

This fine South American Moth varies much in size, some specimens expanding only three inches and a half, while others measure more than six inches. It is closely allied to *Erebus odora* (Linn.), and is perhaps not sufficiently distinct. The

Erebus agarista

male is brown, slightly dusted with grey, with many zig-zag darker lines, of which the most distinct are the first transverse line and the sub-terminal lines. The orbicular stigma consists of a small and rather indistinct brown spot; the reniform stigma is black, and somewhat dusted with blue below, where it throws off a projection like the stalk of a one-sided mushroom. It is enclosed by an inner tawny and an outer brown outline. There are two sub-terminal lines, rather faintly indicated, and spotted with buff outside. The hind-wings have fewer lines, but towards the anal angle is a large black outline, rounded above, and tridentate beneath; within, it is purplish-brown, lighter above; the prongs are bordered by buff arches, the outermost filled up with blackish, and the innermost dusted with buff. The female is much paler, owing to its being more strongly dusted with grey, and there is a moderately broad grey or bluish-white band on all the wings, on which stands the black zig-zag second transverse line.

FAMILY OMMATOPHORIDÆ.

This family, like the last, includes species of considerable size, though most of them are much smaller than the *Erebidæ*. They are dark-coloured moths, generally with transverse white markings, and the reniform stigma of the fore-wings is represented by a conspicuous outline.

GENUS CRISHNA.

Patula, Guenée, Spec. Gén. Lépid. Noct. iii. p. 177 (1852)
Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1299 (1858), *nom præocc.*

This genus includes two or three closely-allied species or varieties, which inhabit India, Burma, China, Ceylon, Africa and Madagascar. They have broad dentated wings, with the

hind margin of the fore-wings rounded instead of oblique, and with a very large central ocellus. The under surface is conspicuously spotted with white, and the front tibiæ in the males are furnished with a very large expansile tuft of soft hair, a character found in many of the *Quadrifidæ*, and even in our own *Catocala fraxini*, but which often escapes observation because the tuft is not generally expanded; and as the genus requires a new name, I have called it *Crishna*, in allusion to the dark colour of the moths.

CRISHNA MACROPS.

(*Plates CXXXVI., CXXXVII.*)

Attacus macrops, Linnæus, Syst. Nat. iii. App. Anim. p. 225 (1768); Sparrman, Amœn. Acad. vii. p. 503, note k (1769); Sulzer, Gesch. Ins. Taf. 22, fig. 2 (1776); Cramer, Pap. Exot. ii. pl. 171, figs. A, B (1777).

Noctua bubo, Fabricius, Syst. Ent. p. 591, no. 3 (1775).

Patula macrops, Guenée, Spec. Gén. Lépid. Noct. iii. p. 177 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1300, no. 1 (1858); Moore, Lepid. Ceylon, iii. p. 145, pl. 164, fig. 5 (1885).

Nyctipao macrops, Hampson, Faun. Brit. Ind. Moths, ii. p. 459 (1894).

Var. (?) CRISHNA BOOPIS.

Patula boopis, Guenée, Spec. Gén. Lépid. Noct. iii. p. 178 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1301, no. 2 (1858).

Var. (?) CRISHNA WALKERI.

Erebus bubo, Boisduval, Faune Madag. p. 110 (1833).

Patula walkeri, Butler, Ann. Nat. Hist. (4) xvi. p. 406 (1875).

Crishna macreps (upper side.)

This remarkable species, and its varieties or sub-species, have a wide range, extending throughout the whole of Africa and Madagascar, as well as India, Ceylon, and Burma. It expands from five inches to five inches and a half.

The wings are much dentated, chocolate-brown, with a purplish lustre, with darker zig-zag stripes, and spots on both fore- and hind-wings. The fore-wings have a very large and conspicuous ochre-yellow ocellus beyond the end of the cell, circled with black, and containing a large comma-shaped black spot in its outer half. It is traversed on its inner part by a white line, and is marked on the lower part with three white dusted streaks; these white marks appear bright blue in certain lights. There are six transverse lines, the first being the half line, and the third and fourth are interrupted by the ocellus, whilst the fifth is curved round its outer border, and is here closely approximated to the sixth, beyond which is a row of sub-marginal spots. The hind-wings have three dark lines, the outermost corresponding to the sub-marginal spots of the fore-wings.

The under side is paler than the upper, especially at the base, with a double row of white sub-marginal spots, the innermost row being much the largest. When the tibial tufts are fully expanded, as in the specimen figured, they are extremely conspicuous.

GENUS NYCTIPAO.

Nyctipao, Hübner, Verz. bek. Schmett. p. 271 (1822?); Guenée, Spec. Gén. Lépid. Noct. iii. p. 181 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1303 (1858); Hampson, Faun. Brit. Ind. Moths, ii. p. 458 (1894).

This genus includes a number of East Indian species of considerable size, with longer and narrower wings than the species of *Crishna*. They are dark brown or blackish, with

distinctly dentated wings, a large ocellus on the fore-wings, and unusually conspicuous curved or zig-zag white or pale markings.

NYCTIPAO CREPUSCULARIS.

(*Plate CXXXVIII.*)

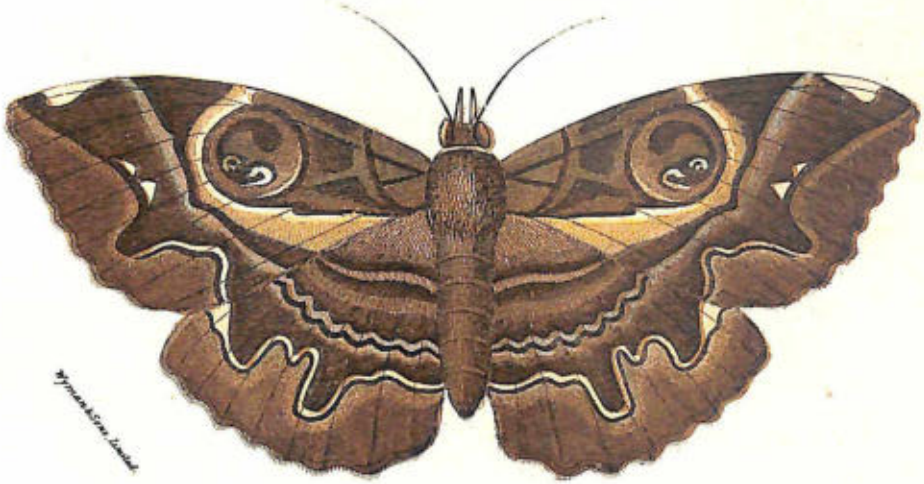
Attacus crepuscularis, Linnæus, Syst. Nat. (ed. x.), i. p. 509, no. 65 (1758); id. Mus. Ludov. Ulricæ, p. 378 (1764); Clerck, Icones, pl. 53, figs. 1–4 (1764); Drury, Ill. Exot. Ent. i. pl. 20, figs. 1, 2 (1773); Cramer, Pap. Exot. ii. pl. 159, fig. A (1777).

Erebus crepuscularis, Duncan in Jardine's Nat. Libr. Exot. Moths, p. 196, pl. 25, fig. 1 (1841).

Nyctipao crepuscularis, Guenée, Spec. Gén. Lépid. Noct. iii. p. 182 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1304, no. 3 (1858); Moore, Lepid. Ceylon, iii. p. 148, pl. 165, figs. 1, 1 a (1885); Hampson, Faun. Brit. Ind. Moths, ii. p. 461 (1894).

This richly marked Moth is found throughout India and Ceylon, Burma, China and Japan, the Indo-Malayan Islands, and the Philippines. It expands from four inches to four inches and a half.

The wings are broad and much dentated, dark brown with the abdomen paler. An ochre-yellow band crosses the wings obliquely, and is intersected on the hind-wings by a brown line, running on the fore-wings on the outer side of the ocellus, where it becomes attenuated and finally lost in a white band, which commences at the costa, and meets it at an angle. Another ochreous line, but narrower, commences at the junction of the middle and outer thirds of the costa, and takes a straighter course across the wings, ending on the inner margin of the hind-wings. Opposite the ocellus it meets the first line at an acute angle, but soon leaves it, and is continued nearly



Nyctipao crepuscularis.

parallel with it. There is a very irregular, much dentated and frequently interrupted, black-bordered, sub-marginal line, commencing close to the apex of the fore-wings, and traversing both fore- and hind-wings. Just within the commencement of this line, on the costa of the fore-wings, is a triangular white spot. The fore-wings have a large ocellus. The inner portion of this consists of a deep ochreous mark, shaped like an inverted comma, but bifid below and externally, and separated from the rusty-brown main portion of the ocellus by a black border. The whole of the ocellus is ringed with black, with a paler line within the black. On it are a few bluish scales.

The female is brown, less varied with yellow, and the ochreous band is less distinct. The fine transverse line is white, and is bordered, especially on the hind-wings, with purplish-white scales.

GENUS CYLIGRAMMA.

Cyligramma, Boisduval, Faune Madag. p. 109 (1833); Guenée, Spec. Gén. Lépid. Noct. iii. p. 185 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1308 (1858).

This genus replaces *Nyctipao* in Africa and Madagascar, and considerably resembles it, but the species are generally smaller, the body is much more slender, and the fore-wings are scarcely dentated. The abdomen is pointed, and rather short and slender, and the eyes are very large and nearly contiguous in the male.

CYLIGRAMMA GEMMANS.

(*Plate CXXXIX., Fig.* 1.)

Nyctipao gemmans, Guenée, Spec. Gén. Lépid. Noct. iii. p. 182 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1304, no. 1 (1858); Hampson, Faun. Brit. Ind. Moths, ii. p. 461 (1894).

This is a North Indian species, but it forms a transition to the African genus *Cyligramma*, to which I refer it. The common African *C. latona* (Cramer), which most resembles it, has narrower and more pointed wings; the pale band is narrow, straight, oblique, and surmounted on the fore-wings by a detached cross-bar; and the dark transverse lines are zig-zag.

C. gemmans is blackish brown, with two darker transverse lines; the first is distinct on the hind wings, and the second curves outward on the fore-wings to form the outer border of the large ocellus. The inner part of the ocellus consists of a black outline, rounded towards the base, and marked with an upper buff and a lower blue line; while outwardly it is tridentate, the upper indentation zig-zag, and the lower one broad, shallow, and filled up with black, slightly dusted with blue. Beneath the ocellus is a pale brown stripe, followed by a darker one, and then by a broad yellowish-white band, curving regularly round all the wings, and followed by some more or less distinct pale speckles. The ground-colour of the marginal area is paler than that of the centre of the wings.

CYLIGRAMMA DISTURBANS.

(*Plate CXXXIX., Fig.* 2.)

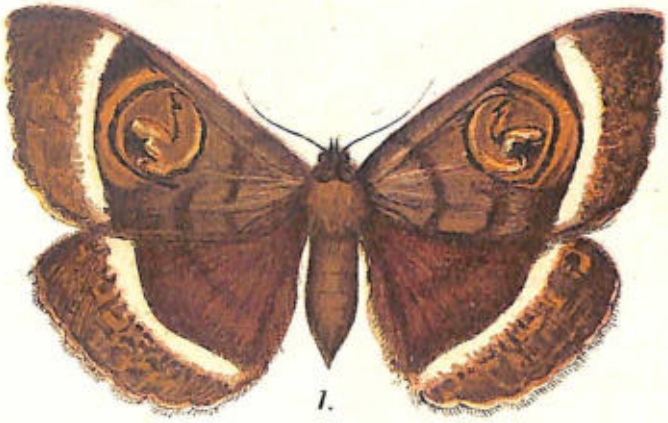
Nyctipao disturbans, Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1307, no. 9 (1858).

Walker gives no locality for this species; but it has since been received from Madagascar.

The following is his original description :—

"**Female.**—Ferruginous, somewhat paler beneath. Wings hardly denticulated, with a straight, oblique, exterior, yellow band, which is for the most part speckled with ferruginous, and is mostly wholly ferruginous along the exterior border, which

1. Cyligramma gemmans.
2. Cyligramma Australiana.



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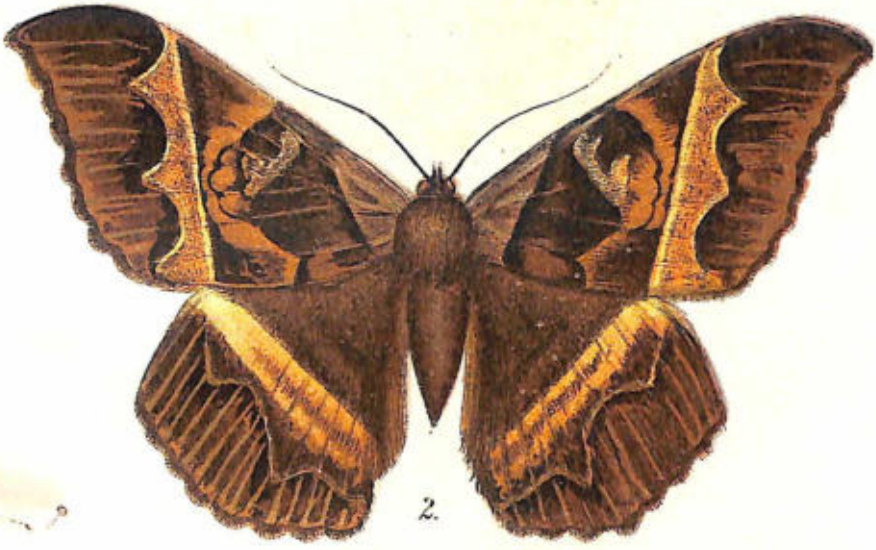

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1. *Cyligramma gemmans.*
2. *Cyligramma disturbans.*

is dilated into two large angles in each wing, and along which the surface is blackish; marginal lunules black; under side with the yellow band more regular, and accompanied by yellow cuneate spots along its exterior border. Fore-wings with an interior broad blackish band, which is dilated into a great angle on the exterior side, and whose disc is partly ferruginous; it is contiguous to the ocellus, which is black, slightly lined with yellow, is somewhat oblique and narrow, and has on the hind-side its pupil truncated, and its border open.

"Length of the body, twelve lines; of the wings, thirty-six lines."

FAMILY HYPOPYRIDÆ.

The species of this Family have rather short and broad, entire wings, with the fore- and hind-wings nearly similarly coloured, brown, grey, or blackish, with distinct lines, and a more or less spiral ocellus on the fore-wings. Most of the species are East Indian, but one or two are African or Australian.

GENUS SPIRAMIA.

Spirama, Guenée, Spec. Gén. Lépid. Noct. iii. p. 194 (1852); Hampson, Faun. Brit. Ind. Moths, ii. p. 552 (1894).

Spiramia, Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1318 (1858).

This genus is represented in India, China, Java, &c., by numerous closely allied forms, many of which are regarded by some authors as referable to one or two variable species, a question which cannot be decided with certainty until their metamorphoses have been studied. They vary in colour from pale ochreous to nearly black; but are easily recognisable by the peculiar spiral form of the ocellus on the fore-wings.

SPIRAMIA RECESSA.

(*Plate CXL., Fig.* 1.)

Spiramia recessa, Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1322, no. 7 (1858).

This species is a native of Australia.

"**Male.**—Brown; more fawn-colour beneath. Palpi at the base, and femora, with red hairs. Head and fore-part of the thorax blackish-brown. Abdomen bright red, with black connected abbreviated sub-triangular bands. Wings slightly paler on the exterior part, where the transverse lines are more distinct, and especially so in the hind-wings, whose sub-marginal lines are denticulated. Fore-wings with the ocellus rather narrower than that of *S. retorta* (Linn.), with a black border, which is mostly enclosed in two testaceous lines, its excavated part with a white marginal line; the exterior lines nearly contiguous to the ocellus, and, as usual, retracted in front; an irregular diffuse discal dark brown band, interrupted by the ocellus. Length of the body, ten lines; of the wings, twenty-six lines" (*Walker*).

FAMILY BENDIDÆ.

The *Bendidæ* are East Indian or South American species of moderate size, with the fore- and hind-wings nearly similarly coloured. The wings are generally more or less angulated, and the fore-wings pointed. The eye-spot, which is so conspicuous in the preceding families, is small or obsolete.

GENUS HULODES.

Hulodes, Guenée, Spec. Gén. Lépid. Noct. iii. p. 207 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1334 (1858).

SPIRAMIA RECESSA.

(*Plate CXL., Fig.* 1.)

Spiramia recessa, Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1322, no. 7 (1858).

This species is a native of Australia.

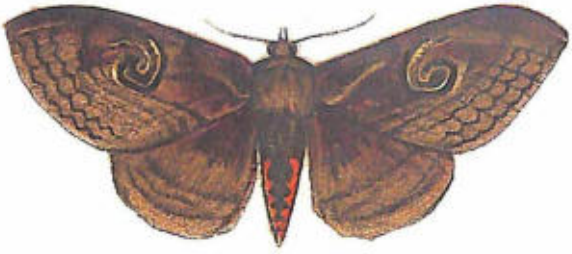
"**Male.**—Brown; more fawn-colour beneath. Palpi at the base, and femora, with red hairs. Head and fore-part of the thorax blackish-brown. Abdomen bright red, with black connected abbreviated sub-triangular bands. Wings slightly paler on the exterior part, where the transverse lines are more distinct, and especially so in the hind-wings, whose sub-marginal lines are denticulated. Fore-wings with the ocellus rather narrower than that of *S. retorta* (Linn.), with a black border, which is mostly enclosed in two testaceous lines, its excavated part with a white marginal line; the exterior lines nearly contiguous to the ocellus, and, as usual, retracted in front; an irregular diffuse discal dark brown band, interrupted by the ocellus. Length of the body, ten lines; of the wings, twenty-six lines" (*Walker*).

FAMILY BENDIDÆ.

The *Bendidæ* are East Indian or South American species of moderate size, with the fore- and hind-wings nearly similarly coloured. The wings are generally more or less angulated, and the fore-wings pointed. The eye-spot, which is so conspicuous in the preceding families, is small or obsolete.

GENUS HULODES.

Hulodes, Guenée, Spec. Gén. Lépid. Noct. iii. p. 207 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1334 (1858).



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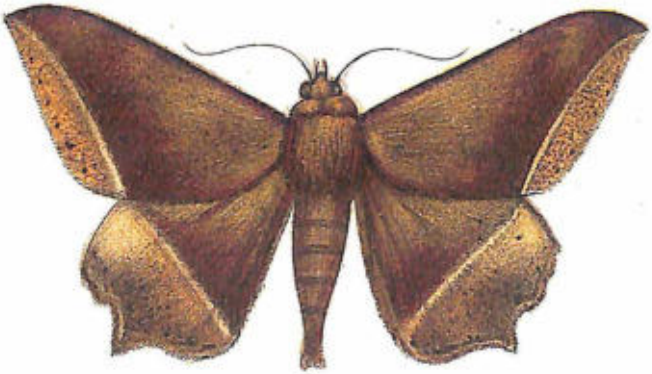

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1. *Spiramia recessa.*
2. *Hulodes caranea.*
3. *Remigia demonstrans.*
4. *Zethes insularis.*

3

1. *Sparmia* [illegible]
2. *Ihitodes* [illegible]
3. *Remigia* [illegible]
4. *Lethea* [illegible]

Hylodes, Hampson, Faun. Brit. Ind. Moths, ii. p. 462 (1894), *nom. præocc.*

This genus includes the largest species of the family. They are dull-coloured moths, with shaggy hair, the costa of the fore-wings arched before the tip, and the hind margins more or less denticulated or excavated.

The larva has sixteen legs, with the first pair of pro-legs rudimentary.

HULODES CARANEA.

(*Plate CXL., Fig.* 2.)

Noctua caranea, Cramer, Pap. Exot. iii. pl. 269, figs. E, F (1780).

Hulodes caranea, Guenée, Spec. Gén. Lépid. Noct. iii. p. 208 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1335, no 1 (1858); Moore, Lepid. Ceylon, iii. p. 155, pl. 166, figs. 3, 3 a; pl. 167, fig. 6 (1885).

Hylodes caranea, Hampson, Faun. Brit. Ind. Moths, ii. p. 462, fig. 260 (1894).

This species is found throughout India, Ceylon, and the Indo-Malayan Islands generally. It expands from two inches and three-quarters to three inches and a quarter.

It is light umber-brown, with sparsely scattered dark brown scales. The wings have a pale grey marginal border, in the male extending from the apex of the fore-wings to the anal angle of the hind-wings; with a straight, well-defined edge, and bordered by a slender brownish line. The female has two dark brown sub-marginal lines, the inner one being very broad.

According to Thwaites and Moore the larva feeds on Acanthads. It is olive-green above, paler beneath, with greyish-white blotches, and a band of confluent blackish speckles on the back and sides.

VII. NOCTUÆ SERPENTINÆ.

This Division includes moths of moderate or comparatively large size, with ascending palpi, rarely spatulate, the abdomen conical in the male, and not crested. The wings are thick and broad, with well-defined markings, but not exhibiting the "Noctua"-pattern very distinctly. The hind-wings are generally differently coloured to the fore-wings, and are quadrifid, the four median nervules rising almost together.

The larvæ have from twelve to sixteen legs, and are naked, and feed openly on trees and plants. The pupæ are enclosed in cocoons, and are generally not subterranean.

The Family *Ophideridæ*, placed by Guenée in the *Limbatæ* (cf. *antea*, p. 133), is regarded by Mr. Moore as allied to the *Lagopteridæ*, and will consequently precede them in our arrangement. The following somewhat discordant families are included by Guenée in the *Serpentinæ*.

A.—Larvæ with long pro-legs, the first pairs shorter or wanting. Moths of large or moderate size, marked with simple lines, the fore-wings velvety, and pointed at the tip. *Ophiusidæ* (= *Lagopteridæ*, Kirby).

B.—Larvæ slender, with twelve legs. Moths with slender legs, short palpi, and generally with ciliated antennæ. *Euclididæ*.

C.—Larvæ with from twelve to fourteen legs, and marked with distinct lines. The moths are slender, with simple antennæ, and the wings pulverulent below. *Poaphilidæ*.

D.—Larvæ with sixteen legs of equal length. The moths have long antennæ, the last joint being distinct and slender; compressed and very pilose legs; and broad wings, the hind-wings often more or less hairy beneath. ... ... *Remigiidæ*.

Of these Families that of the *Lagopteridæ* is the largest and most important, including more species than all the rest together. Families A., B. and C. are represented in Europe by a very few species.

FAMILY OPHIDERIDÆ.

The *Ophideridæ* are large and usually brightly-coloured moths, with stout antennæ, and long, obliquely-ascending, palpi, with the third joint often spatulate. The proboscis is short, but very strong, and the thorax and the base of the abdomen are pilose, but not crested. The wings are long and thick, with pointed fore-wings tufted with hair at the base, and dentated hind-wings. They may be divided into two well-marked Sub-families.

SUB-FAMILY I. OPHIDERINÆ.

These are moths with brown or green fore-wings, marked with distinct lines, and with the inner margin projecting near the base and at the hinder angle, and deeply concave between. The hind-wings are yellow or orange, with black marginal and central markings.

The larvæ are stout and naked, with the first pair of pro-legs rudimentary. They are frequently humped, and are not unlike those of *Notodontidæ*, a family to which the shape of the fore-wings gives the moths some resemblance. The pupa is formed between leaves.

This Sub-family is not very numerous in species, but is fairly well represented in the tropics of both hemispheres. They are very destructive to oranges in Australia, by sucking the juice with their proboscis, though it is perhaps not quite positively ascertained whether they actually puncture the fruit, as has been asserted, or whether they only avail themselves of

some accidental abrasion. The Indian species and their transformations have been well described and figured by Mr. F. Moore in the "Transactions" of the Zoological Society for 1881.

GENUS OTHREIS.

Othreis, Hübner, Verz. bek. Schmett. p. 264 (1822?); Moore, Trans. Zool. Soc. Lond. xi. p. 264 (1881).
Corycia, Hübner, Verz. bek. Schmett. p. 265 (1822?)

This genus includes several species with brown fore-wings, lined or mottled with darker, and orange-yellow hind-wings, bordered with black on the hind margin, but not to the anal angle. The incisions on the black border are spotted with yellow, and there is a thick black curved mark towards the anal angle.

OTHREIS SMARAGDIPICTA.

(*Plate CXLI., Fig.* 2.)

Ophideres smaragdipicta, Walker, List Lepid. Ins. Brit. Mus. xiii. p. 1229, no. 24 (1857).
Othreis smaragdipicta, Moore, Trans. Zool. Soc. Lond. xi. p. 68 (1881).

This insect is a native of Borneo and the Malay Peninsula.

"Ferruginous, varied with black. Abdomen luteous. Fore-wings with a purplish tinge, with emerald-green marks along the costa, with an interrupted emerald-green sub-marginal band, and with a brighter green, irregular, angular, whitish-bordered, discal stripe; reniform spot elongated, narrow in the middle, bordered with black. Hind-wings bright luteous, with a short, broad, curved, black, discal band, and with a broad black border, which is abbreviated and slightly interrupted towards the interior angle. Length of the body, thirteen lines; of the wings, thirty lines" (*Walker*).

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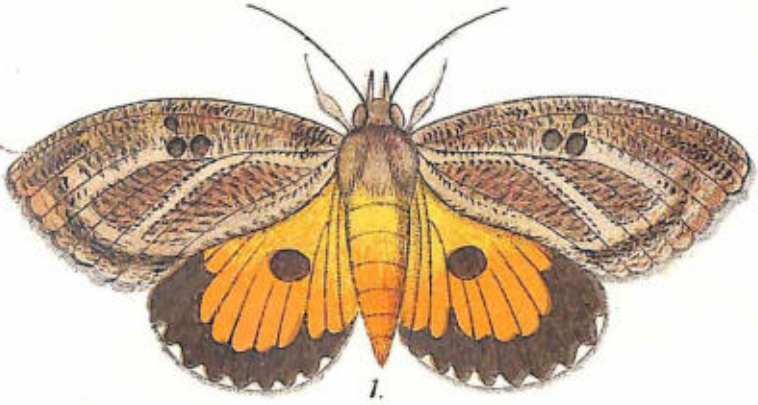
1. *Argadesa materna.*
2. *Othreis smaragdipicta.*
3. *Graphugona regina.*



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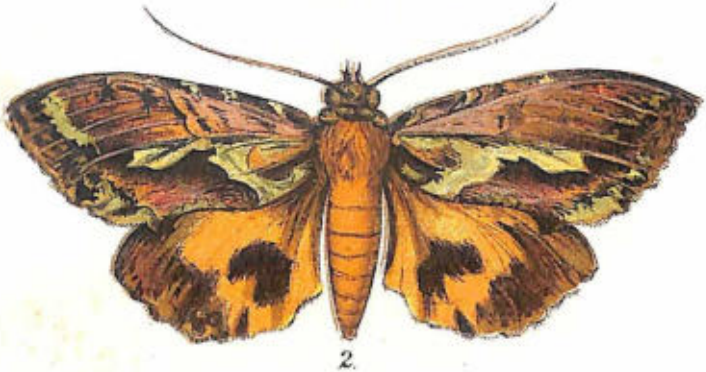

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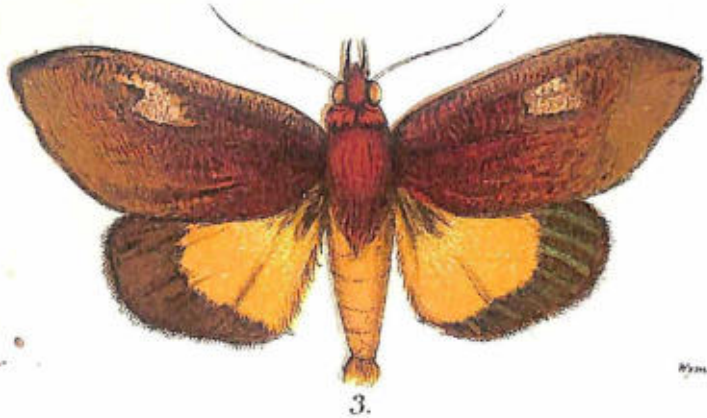

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Wyman & Sons Limited

1. *Argadesa materna.*
2. *Othreis smaragdipicta.*
3. *Graphigona regina.*

GENUS ARGADESA.

Argadesa, Moore, Trans. Zool. Soc. Lond. xi. p. 74 (1881).

"Fore-wing in male and female with the exterior margin oblique, and scalloped throughout its length; palpi shorter, and the third joint slender" (*Moore*). The typical species is, however, more easily recognised by the hind-wings, which are bordered with black to the anal angle (the incisions being yellow), and marked with an oval black spot.

ARGADESA MATERNA.

(*Plate CXLI., Fig.* 1.)

Noctua materna, Linnæus, Syst. Nat. i (2), p 840, no. 117 (1767); Drury, Ill. Exot. Ent. ii. pl. 13, fig. 4 (1773); Cramer, Pap. Exot. ii. pl. 174, fig. B (1777); iii. pl. 267, fig. E (1780).

Noctua hybrida, Fabricius, Syst. Ent. p. 593, no. 11 (1775).

Ophideres materna, Boisduval, Faune Madag. p. 100 (1833); Guenée, Spec. Gén. Lépid. Noct. iii. p. 113 (1852); Walker, List Lepid. Ins. Brit. Mus. xiii. p. 1221, no. 9 (1857); Hampson, Faun. Brit. Ind. Moths, ii. p. 561 (1894).

Triphæna materna, Westwood in Jardine's Nat. Lib. Exot. Moths, p. 201, pl. 25, fig. 2 (1841).

Argadesa materna, Moore, Trans. Zool. Soc. Lond. xi. p. 74, pl. 12, figs 4, 4 a–d (transf.), pl. xiv. figs. 3, 3 a (1881); id. Lepid. Ceylon, iii. p 133, pl. 161, fig. 2 (1885).

This Moth has a range extending through India and Ceylon as far as Burma, and including Java and the Andaman Islands. It expands from two inches and a half to three inches and three-quarters.

The antennæ are setiform, and the palpi yellow, tipped with blue; the head is also tinged with blue. The fore-wings are light brown, mottled with grey and green, glossy, and changing colour in different lights. The hind-wings are orange-yellow, each with a round, black central spot, and a rather narrow black marginal band, dentated on the inner side, and marked with about eight white spots on the fringes. The thorax is olive-green, and the abdomen orange-yellow.

The larva, which is about two inches and a half long, lives on the leaves of the Amoordah Beeloo, and a number of other trees. It is reddish-brown, darker at the extremities, and tending to olive-brown on the middle segments. There are brownish dorsal and sub-dorsal lines, the latter interrupted on the fifth and on the sixth segments by an eye-spot, which is yellow in its upper, and purplish in its lower half, and centred with pale violet. The back and sides are irregularly mottled with pale violet and yellow, and on the twelfth segment is a vermillion-coloured projection spotted with pale violet, and with a broad yellow stripe on each side. The stigmata are violet, and the legs are reddish-brown tipped with black. The head is vermillion red.

The pupa is formed between the leaves, which are woven together with coarse yellow silk.

GENUS GRAPHIGONA.

Graphigona, Walker, List Lepid. Ins. Brit. Mus. xiii. p 1230 (1858).

This is a small South American genus, sufficiently distinguished by the broad margin of the fore-wings being straight and oblique, and the inner margin slightly angulated near the base, and then running to the hinder angle in a very long and shallow curve.

GRAPHIGONA REGINA.

(*Plate CXLI., Fig.* 3.)

Ophideres regina, Guenée, Spec. Gén. Lépid. Noct. iii. p. 118 (1852).

Graphigona regina, Walker, List Lepid. Ins. Brit. Mus. xiii. p. 1230, no. 1 (1858).

This is a South American species. It expands about three inches and a half. The fore-wings are rich dark brown with fine purplish striæ, and a central lunule of the same colour, marked outside by a large indistinct red spot. The hind-wings are bright orange, with a few black hairs at the base, and a black marginal band suffused with purple, decreasing towards the anal angle. The fringes are black. The abdomen is orange-coloured, with blackish hairs at the base, and the extremity grey.

The head and collar are ferruginous.

SUB-FAMILY II. PHYLLODINÆ.

The species of this Sub-family are confined to the Tropics of the Old World, and though less numerous than the *Ophiderinæ*, are divided into better marked genera. The hind margins are not dentated, and, as well as the inner margin of the fore-wings, are straight, or rounded, though the tip of the fore-wings is often more or less pointed. The two principal genera, not here figured, are East Indian, and the wings are shorter and broader than in *Miniodes*, or *Phyllodes*.[1] They are dark brown insects, but *Ischyja*, Hübner (*Potamophora*, Guenée), has a short blue band on the upper side of the hind-wings; and *Lygniodes*, Guenée, is glossed with blue above, and is whitish beneath.

The type of this genus is a much stouter and more robust insect than *Miniodes*, with the palpi stouter, and the abdomen, which extends considerably beyond the hind-wings, and the base of the hind-wings, densely clothed with hair. The fore-wings are very broad, and rather pointed; they have somewhat of a leaf-like pattern, and the inner margin is strongly convex. The antennæ are simple, and the legs without spines.

I have been obliged to form a new genus for the beautiful species described below, which has heretofore been referred to two others, from both of which its structural characters entirely separate it.

GLORIANA ORNATA.

(*Plate CXLIII.*)

Phyllodes ornata, Moore, Descr. Ind. Lepid. Atkinson, ii. p. 166 (1882).

Miniodes ornata, Hampson, Faun. Brit. Ind. ii. p. 556, fig. 315 (1894).

This Moth is a native of India. It expands from four inches to five inches and a half. The head and thorax are reddish-brown, and the abdomen blue-black. The fore-wings are chestnut-brown, thickly striated with dark brown, with about five dusky transverse lines, and a blackish longitudinal streak extending from the end of the cell to a little below the apex. At the point where the transverse lines cross the streak they also change their direction at an angle, and run nearly parallel to the hind margin for the remainder of their course. Two pure white spots are conspicuous at the end of the cell; these are bordered with black, and the lower and larger one is somewhat triangular in shape. The hind-wings are blue-black, with a broad ochre-yellow marginal band, which narrows and ceases at some distance from the anal angle. The cilia are dark brown.

GENUS PHYLLODES.

Ischyja, pt. Hübner, Verz. bek. Schmett. p. 205 (1822?).
Phyllodes, Boisduval, Voy. Astrolabe, Lépid. p. 246 (1832); Guenée, Spec. Gén. Lépid. Noct. iii. p. 120 (1852); Walker, List Lepid. Ins. Brit. Mus. xiii. p. 1232 (1857); Hampson, Faun. Brit. Ind. Moths, ii. p. 557 (1894).

This genus has simple antennæ, short palpi, with the second joint compressed, and the third joint small, and a long smooth rather tapering abdomen. The legs are long, slender, and naked, with the tibiæ strongly spined. The fore-wings are long, moderately broad, and pointed at the tips, before which the costa is strongly arched; they are brown, with leaf-like markings. The hind-wings are oval, and strongly rounded, and are black, or blue-black, with a large round white or rose-coloured spot towards the anal angle, or else are bordered or banded with yellow.

The species are not numerous, but are met with in India, Burma, Ceylon, Java, Amboina, New Guinea, &c. The larva has sixteen legs, but is a half-looper; it has no protuberances, and the pupa is beautifully marked with bronze.

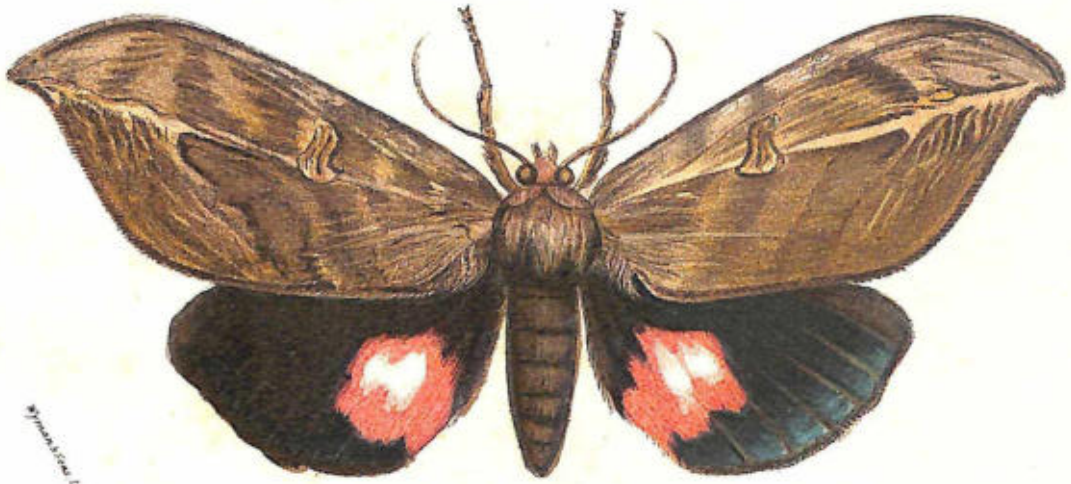
PHYLLODES MALIGERA.

(*Plate CXLIV.*)

Phyllodes maligera, Butler, Ent. Monthly Mag. xx. p. 138 (1883); Moore, Lepid. Ceylon, iii. p. 137, pl. 163, figs. 2, 2 a (1885).

This fine Moth is a native of Ceylon, and expands upwards of five inches. The fore-wings, which have the costa much arched, and the tip strongly falcate, are of a purplish-grey, as is also the head and thorax. The orbicular stigma is very small,

Phyllodes indigera



Phyllodes maligera.

orange, with a black centre, and the reniform stigma is very large, constricted in the middle, and broader below than above. A white black-bordered line runs obliquely from the tip to the middle of the wing; and below it, the marginal area is broadly yellowish-grey. The hind-wings and abdomen are blue-black, the tip of the former with a whitish mark; and near the anal angle is a very large rose-coloured spot, containing a double, and rather irregular, white spot.

FAMILY LAGOPTERIDÆ.

This Family, which corresponds to the *Ophiusidæ* of Guenée, originally included some genera with long wings and abdomen, which have some resemblance to the *Sphingidæ* or *Notodontidæ*, to which last family some of them (such as *Crinodes*, Herrich-Schäffer) probably belong. Otherwise, the family is very compact, and includes a large number of species with rather short and broad wings, the fore-wings having the costa arched, and the tip rather pointed, and the four sub-median nervules of the hind-wings of equal thickness, and rising almost at the same point. The fore-wings are generally brown, grey, reddish, or yellowish, and the hind-wings are often marked with white or bluish-white, but are sometimes yellow.

The larvæ are smooth and slender, with the first pairs of pro-legs more or less imperfectly developed. They feed openly on plants, and the pupæ are enclosed in cocoons, and are not subterranean.

GENUS LAGOPTERA.

Lagoptera, Guenée, Spec. Gén. Lépid. Noct. iii. p. 223 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1350 (1858); Hampson, Faun. Brit. Ind. Moths, ii. p. 505 (1895).

Lagoptera was employed by Guenée to include several Indian species, but has now been restricted by Sir George

Hampson to the beautiful Moth described below, which has a very stout body, clothed, as is also the inner margin in the male, with long hair; and the abdomen is also heavily tufted at the extremity. The markings of the moth are so conspicuous that it cannot be mistaken for any other species.

LAGOPTERA JUNO.

(*Plate CXLII., Fig.* 2.)

Noctua juno, Dalman, Anal. Ent. p. 52 (1823).
Ophideres elegans, Van der Hoeven, Nat. Tijdschr. vii. p. 280, pl. 5, figs. 6 a, b (1840).
Lagoptera multicolor, Guenée, Spec. Gén. Lépid. Noct. iii. p. 226 (1852).
Lagoptera elegans, Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1352, no. 4 (1858).
Lagoptera juno, Hampson, Faun. Brit. Ind. Moths, ii. p. 508, fig. 281 (1894).

This Moth is a native of China and Japan, Java and Northern India. It expands from about three inches to three inches and a quarter.

The fore-wings are reddish-brown, with four fine transverse lines; the three inner lines are brown, and the fourth, which is submarginal, curving from the apex to the inner margin near the hinder angle, is pale yellow. The reniform stigma is black, bordered with yellowish, and is incomplete. There are some black dots marked with white on the hind margin. The hind-wings are pale red on the marginal area and grey at the base, with two broad black median bands, separated from one another by a much narrower pale bluish band. The abdomen is red, and the thorax is of the same colour as the fore-wings.

GENUS NANTESIA.

Ascalapha, Hübner, Tentamen, p. 2 (1822?), *nom. præocc.*
Ophiodes, Guenée, Ann. Soc. Ent. France, x. p. 77 (1841); id. Spec. Gén. Lépid. Noct. iii. p. 227 (1852), *nom. præocc.*

The antennæ are ciliated in the male, and simple in the female, and the palpi are ascending and approximating, with the second joint clothed with scales. The body is stout, the collar is raised, and the abdomen is not longer than the hind-wings. The wings are moderately long and broad, with the "Noctua"-pattern distinctly indicated; the tip is but slightly pointed. The hind-wings are brown or yellow, sometimes with a black mark. The larvæ have the first two pairs of pro-legs shorter than the others, and a bifid tubercle on the back of the penultimate segment.

The only species which extends as far north as Temperate Europe is the following.

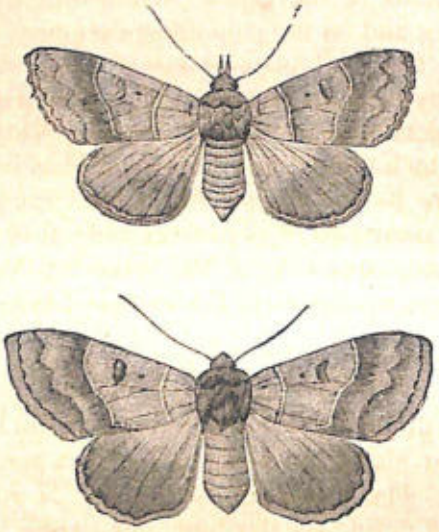
THE LUNAR DOUBLE STRIPE. NANTESIA LUNARIS.

Noctua lunaris, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 94, no. 1 (1776); Hübner, Eur. Schmett. iv. fig. 322 (1804?).
Noctua augur, Esper, Schmett. iv. (1), p. 67, Taf. 87, figs. 4–6, Taf. 88, fig. 1 (1787?).
Noctua meretrix, Fabricius, Spec. Ins. App. p. 507 (1781?).
Ophiusa lunaris, Treitschke, Schmett. Eur. v. (3), p. 302 (1826).
Pseudophia lunaris, Kirby, Eur. Butterflies and Moths, p. 275, pl. 40, figs. 8–8 c (1881).

This Moth is found throughout Central and Southern Europe and Northern Africa, but is a great rarity in the

British Isles. It expands from two inches to two inches and a quarter.

The head, thorax, and fore-wings vary from greenish-grey to deep reddish-brown or dark brown, and the abdomen is paler, with a dark anal tuft. The antennæ are yellowish, with darker tips in the male, and whitish-grey or brownish-grey in the female.



The Lunar Double Stripe.

The basal area of the fore-wings is the lightest, with a brown dot at the base. The two transverse lines are yellowish, bordered with brown, and are curved, and nearer together at the inner margin than on the costa. In the place of the orbicular stigma is a dark brown dot, and the reniform stigma is small and lunular. The sub-marginal line is yellowish and much dentated. In front of the dentated unicolorous fringes is a row of blackish dots. The hind-wings are yellowish-

brown towards the base, with a broad dark brown marginal band, and light brown fringes, bounded by a dark sinuated line.

The larva feeds on oak and aspen. The pro-legs increase gradually in length from the first to the last pair. The head is flat and rather large, orange-coloured, with yellow lines. Before the last moult, the larva is dark green with white dots, and a red line just above the legs. On the fifth segment are two raised red dots, and on the penultimate segment are two raised red points. The anal plate is rather long. After the last moult, the body is reddish-brown, with a very pale lateral line, and the red spots become orange-coloured. Varieties are also met with in which the colour is greyer, or blackish.

It undergoes its metamorphosis in the ground, in a slight cocoon partly composed of dry leaves and moss. The moths do not generally appear until the following May, but some appear the same autumn from the earliest larvæ. The moths fly by day.

FAMILY EUCLIDIIDÆ.

This is a small Family of moths, remarkable for their clear and sharply-defined markings, which sometimes resemble geometrical figures. The European species are of small size, and fly in meadows during the day-time, like the Skippers.

GENUS EUCLIDIA.

Euclidia, Hübner, Tentamen, p. 2 (1810?); Ochsenheimer, Schmett. Eur. iv. p. 96 (1816); Treitschke, Schmett. Eur. v. (3), p. 388 (1826); Guenée, Spec. Gén. Lépid. Noct. iii. p. 290 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1457 (1858).

These are small brown moths, with the abdomen as long as the hind-wings, moderately stout, and slightly crested at the

base. The wings are oblong and entire, and the insects are not very unlike *Hesperiidæ* in appearance and habits, the resemblance, however, being more pronounced in the species figured than in *E. glyphica*, (Linn.), a lighter-coloured moth, which is the type of the genus. The larvæ are long and slender, and are provided with twelve legs.

THE MOTHER SHIPTON MOTH. EUCLIDIA MI.

Noctua mi, Clerck, Icones, pl. 9, fig. 5 (1759); Linnæus, Faun. Suec. p. 309 (1761); Esper, Schmett. iv. (1) p. 76, Taf. 89, figs. 3, 4 (1787?); Hübner, Beitr. Schmett. i. (3) p. 19, Taf. 2, fig. N (1788); id. Eur. Schmett. iv. fig. 346 (1804?).
Phytometra mi, Haworth, Lepid. Brit. p. 265, no. 32 (1809).
Euclidia mi, Treitschke, Schmett. Eur. v. (3), p. 395 (1826); Stephens, Ill. Brit. Ent. Haust. iii. p. 139 (1831); Kirby, Eur. Butterflies and Moths, p. 272, pl. 40, fig. 6 (1881); Buckler, Larvæ of Brit. Lepid. vi. p. 130, pl. 105, figs. 3–3 b (1895).

The Mother Shipton Moth.

This Moth is common throughout the greater part of Europe as well as Northern and Western Asia. It expands about an inch and a quarter.

The head and thorax are brownish-grey, varied with white hairs, and with white tegulæ. The antennæ are ringed with black and grey. The abdomen is grey, with a few yellowish hairs and white incisions.

The fore-wings are brownish-grey, with the central area almost completely filled by a peculiar dark brown spot, bordered with white. These borders are formed by the two transverse lines, the first of which is oblique, whilst the second has two large projections, and runs very irregularly. In the basal area a large black dot, bordered with white, stands near the inner margin, and in the central area are placed the orbicular and reniform stigmata, the latter as a white dash, often with a white longitudinal streak on its outer side. The sub-marginal line is white, and curved inwards near the middle, and the fringes are grey and white. The hind-wings are pale yellow in the male, and bright yellow in the female, with a black central band, which is connected with the base by black streaks; and there is a broad black marginal band spotted with yellow. The fringes are grey and white externally, but entirely white on the inner part.

The larva feeds on *Medicago falcata*, and various species of clover. It is slender, pink or lemon-yellow, with a fine chocolate-brown double dorsal line, followed by several other longitudinal stripes of the same colour. The spiracles stand out blackish on the pale ground. The larvæ feed at night, remaining flat upon the stalks of the food plant during the day.

The pupa is purplish-brown, with darker incisions and spiracles, with a violet bloom. It is enclosed in a cocoon, in which portions of the food plant are woven.

The moth is double-brooded.

FAMILY POAPHILIDÆ.

This Family is of limited extent, and is chiefly American. One genus only is European, and with one exception these species are confined to the extreme south of Europe. They fly in dry meadows in the daytime, like the *Euclidiidæ*.

GENUS PHYTOMETRA.

Phytometra, Haworth, Lepid. Brit. p. 254 (1809); Stephens Ill. Brit. Ent. Haust. ii. p. 121 (1830); Guenée, Spec. Gén. Lépid. Noct. iii. p. 297 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1466 (1858).

Prothymia, Hübner, Verz. bek. Schmett. p. 282 (1822?).

In its larval characters this genus comes nearer to the last family than to the American genera with which Guenée associates it. The types of Haworth's genus *Phytometra* were probably intended to be species of *Plusia*, but *Plusia* may have the priority; and as *Phytometra viridaria* does not contradict the characters which Haworth assigned to his genus (as is the case with many of the species which he included in it), it seems better to retain Haworth's name as restricted by Stephens, though Hübner's later name, *Prothymia*, was unitypical, which *Phytometra* certainly was not.

THE SMALL PURPLE-BARRED. PHYTOMETRA VIRIDARIA.

Geometra viridaria, Clerck, Icones, pl. 9, fig. 12 (1759).

Phalæna laccata, Scopoli, Ent. Carn. p. 363, no. 503 (1763).

Noctua spadiceata, Hufnagel, Berl. Mag. iii. no. 87 (1767).

Phalæna purpurata, Fabricius, Syst. Ent. p. 637, no. 91 (1775).

Noctua ænea, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 85, no. 6 (1776); Hübner, Beitr. Schmett. i. (3), p. 10, Taf. 1, fig. D (1788); id. Eur. Schmett. iv. fig. 350 (1804?).

Noctua latruncula, Esper, Schmett. iv. (2) 1, p. 557, Taf. 163, fig. 2 (1792?).

Phytometra ænea, Haworth, Lepid. Brit. p. 266, no. 34 (1809); Stephens, Ill. Brit. Ent. Haust. iii. p. 121 (1830);

Buckler, Larvæ of Brit. Lepid. vi. p. 134, pl. 105, figs. 5–5 c (1895).

Anthophila ænea, Treitschke, Schmett. Eur. v. (3), p. 274 (1826).

Prothymia viridaria, Kirby, Eur. Butterflies and Moths, p. 280 (1881).

The Small Purple-Barred Moth.

This little Moth is common throughout the greater part of Europe, as well as Northern and Western Asia. It expands about three-quarters of an inch.

The body is shining bronzy-green or brownish-grey, with rusty-brown filiform antennæ, and grey legs dotted with black. The fore-wings are shining bronzy-green or greyish-brown, with a purplish-red line along the costa. In the centre of the wings is a pale spot, beyond which is a purplish-red transverse band, which gradually fades into the ground-colour externally. There is a light green sub-marginal line, and beyond it, in front of the fringes, is a second red band broader than the first, and marked with seven rather indistinct small grey dots. In many specimens the outer half of the fore-wings is entirely red, only two fine green transverse lines remaining visible, whilst the inner half is green dusted with red. Sometimes the first red band is intersected by a fine green line. In the grey variety either all the markings are faint, or the bands are darker, with pale borders. The hind-wings are usually bronzy-green, with a dull red band in the centre, and a second red band in front of the fringes, and the tips white. In some varieties the markings are suffused, or the hind-wings may be entirely brownish-grey.

The larva feeds on *Polygala vulgaris*. It is velvety-green, with a fine darker green dorsal line, and three lateral lines of the same colour. The spiracles are yellowish, with a pale line below them, which becomes whitish on the last four segments. It is covered with fine bristles.

The pupa is cylindrical, slender, bright reddish-brown, with olive-brown head and wing-cases. It is enclosed in a cocoon composed of tough pale-grey silk interwoven with portions of the food plant. The moth is found from May to August and the larva in August and September.

FAMILY REMIGIIDÆ.

This Family is entirely exotic, and includes moths of moderate size, generally with simple antennæ and ascending palpi. They are remarkable for their very hairy legs, besides which the hind-legs, especially in the males, are usually furnished with compressed oar-like tufts of hair on each side, extending even to the tarsi. The hind-wings are also frequently hairy beneath. They are moths with comparatively stout bodies, and ample, but not very long, wings, and are usually marked with distinct lines.

GENUS REMIGIA.

Remigia, Guenée, Spec. Gén. Lépid. Noct. iii. p. 313 (1852); Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1493 (1858); Hampson, Faun. Brit. Ind. Moths, ii. p. 525 (1894).

This genus, as used by Guenée and Walker, includes a number of species found in both hemispheres, and some have a wide range throughout the Indo-Malayan and Ethiopian regions. The following species differs from the types of *Remigia* in having the hind tarsi much less hairy.

REMIGIA DEMONSTRANS.

(*Plate CXL., Fig.* 3.)

Remigia demonstrans, Walker, List Lepid. Ins. Brit. Mus. xiv. p. 1512, no. 26 (1858).

This species is found in the Navigators' Islands. "Cinereous-testaceous. Head and fore part of the thorax somewhat fawn-coloured. Hind tarsi not pilose. Fore-wings speckled with brown, with two diffuse slightly-oblique dark brown bands, the first bounded on the inner side by a straight whitish line, and on the outer side by an undulating black line, the second containing an undulating black line; a row of exterior black dots; exterior border brown. Hind-wings with three brown bands, the second and third connected in front; exterior border and cilia partly brown. Length of the body, eight to nine lines; of the wings, eighteen to twenty lines" (*Walker*).

VIII. NOCTUÆ PSEUDO-DELTOIDÆ.

This Family forms the transition from the preceding families to the *Deltoidæ*. The moths have rather slender bodies, the antennæ are often ciliated, and the palpi are long, ascending and recurved, with the third joint long and linear. The wings are broad, and often more or less angulated; and the fore- and hind-wings are generally similarly marked above, and are also ornamented with distinct markings on the under surface. They are very numerous in the Tropics, and especially in South America, but there is only one European species, *Zethes insularis*, Rambur, which was first discovered in Corsica.

Guenée defines three families, as follows:—

A.—Wings more or less angulated.

a. Last joint of the palpi long, filiform, and upcurved. Abdomen above hairy ... ... *Focillidæ*.

b. Palpi securiform, or recurved above the front. Abdomen nearly smooth ... ... *Amphigoni[i]dæ.*

B.—Wings entire, or simply dentated, or pointed at the tip. *Thermesi[i]dæ.*

FAMILY FOCILLIDÆ.

GENUS ZETHES.

Zethes, Rambur, Ann. Soc. Ent. France. ii. p. 29 (1833); Guenée, Spec. Gén. Lépid. Noct. iii. p. 329 (1852); Walker, List Lepid. Ins. Brit. Mus. xv. p. 1522 (1858).

This genus is widely distributed, though not numerous in species. The wings are rather short and broad.

ZETHES INSULARIS.

(*Plate CXL., Fig.* 4.)

Zethes insularis, Rambur, Ann. Soc. Ent. France, ii. p. 29, pl. 2, fig. 1 (1833); Duponchel, Lépid. France, Suppl. iii. p. 553, pl. 47 (1836); Guenée, Spec. Gén. Lépid. Noct. iii. p. 330 (1852); Kirby, Eur. Butterflies and Moths, p. 273, pl. 57, fig. 1 (1881).

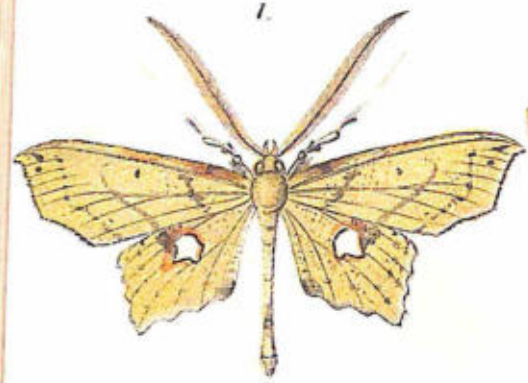
Noctua nattyi, Freyer, Neuere Beitr. Schmett. iii. p. 43, Taf. 222, fig. 2 (1837).

This Moth is a native of Corsica, Greece, Dalmatia, and Asia Minor. It expands about an inch and a quarter.

The fore-wings are brown, dusted with grey, as far as the second line. The half-line is brown, bordered outside with whitish, but is short, and sometimes obsolete. The first transverse line is brown and broad, especially on the costa, and bordered with white on both sides; it runs irregularly to the costa. The second line is white, forming two curves outwards, but converges obliquely towards the first line on the inner margin; the marginal area and a long patch running outwards

1.

2.



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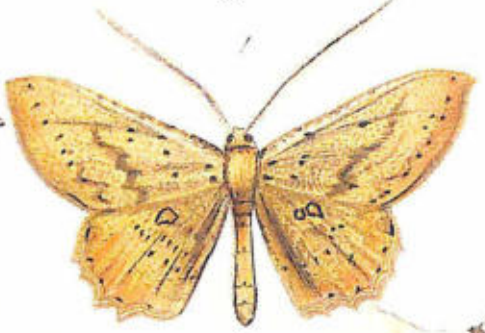

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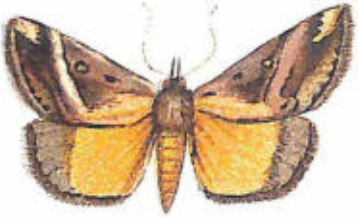

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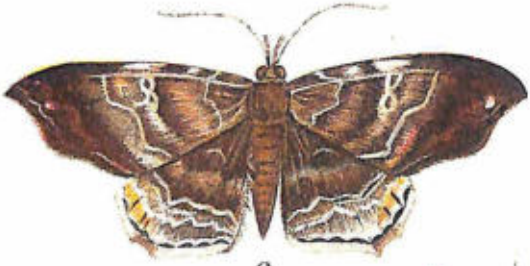

8.

1. *Focilla plusioides.*
2. *Capnodes linipalpis.*
3. *Macroles netria.*
4. *Mecoceras bitactaria.*
5. *Calymma quinqualis.*
6. *Hypena bijugalis.*
7. *Mastigophorus parra.*
8. *Eudystis cynara.*

from the costa to the upper part of the second line are bluish-grey. The sub-terminal line is yellowish, edged within by a black line, and a row of black dots. The hind-wings are lighter brown, with two slightly curved brown lines in the centre, the pale marginal area being bounded by a zig-zag yellowish line. There is an angular tooth on the hind margin of all the wings, and the sub-terminal line is similarly angulated outwards; on the hind-wings this angle contains a brown spot.

GENUS FOCILLA.

Focilla, Guenée, Spec. Gén. Lépid. Noct. iii. p. 333 (1852); Walker, List Lepid. Ins. Brit. Mus. xv. p. 1528 (1858).

This American genus has longer and more pointed fore-wings than *Zethes* (and thus approaches the *Amphigoniidæ*, which have long and rather pointed fore-wings, with a strong projection on the hind margin below the tip), and a strong angular tooth or short tail in the middle of the hind margin on the hind-wings.

FOCILLA PLUSIOIDES.

(*Plate CXLV., Fig.* 1.)

Focilla plusioides, Walker, List Lepid. Ins. Brit. Mus. xv. p. 1532, no. 7 (1858).

This species was taken at Santarem, on the Amazons, by the late H. W. Bates.

"**Male.**—Ferruginous, cinereous beneath. Frontal tuft bordered with white on each side. Pectus whitish. Abdomen cinereous-brown. Wings with a glaucous bloom; transverse lines black and ferruginous, zig-zag, irregular, partly interrupted; sub-marginal points black. Fore-wings with the basal and interior lines broader than the others, and partly with whitish borders, a whitish costal sub-apical patch accompanied by

1 Feralia plusioides
2 Capnodes tenebrosa
3 Myorites nitens
4 Mesocrius bicolorana
5 Calocasia quinquelis
6 Hypena humpalis
7 Metabletus parvi
8 Ophideres cajeta

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white costal marks, and having behind it a broad black oblique streak, which extends to the cilia of the angle of the exterior border; reniform mark mostly ferruginous, variable as to shape, bordered hindward with silvery white. Length of the body, seven lines; of the wings, eighteen lines" (*Walker.*)

FAMILY THERMESIIDÆ.

GENUS CAPNODES.

Capnodes, Guenée, Spec. Gén. Lépid. Noct. iii. p. 374 (1852); Walker, List Lepid. Ins. Brit. Mus. xv. p. 1600 (1858).

The two most important genera of the *Thermesiidæ* are *Thermesia*, Hübner, and *Capnodes*, Guenée, both widely-distributed genera; and several of the species of *Thermesia*, are extremely variable, rendering their separation a matter of considerable difficulty.

CAPNODES FINIPALPIS.

(*Plate CXLV., Fig.* 2.)

Thermesia finipalpis, Walker, List Lepid. Ins. Brit. Mus. xv. p. 1574, no. 23 (1858).

Capnodes maculicosta, Walker, id. xv. p. 1608 (1858); Moore, Lepid. Ceylon, iii. p. 211 (1885).

Capnodes finipalpis, Hampson, Ill. Lepid. Het. Brit. Mus. ix. p. 116, pl. 166, figs. 1, 8 (1893); id. Faun. Brit. Ind. Moths, iii. p. 20, fig. 8 (1895).

This Moth is a native of Ceylon.

The following is Walker's description of his *Capnodes maculicosta*:—

"**Male.** Orange fawn-colour, cinereous beneath. Palpi cinereous, hoary on the inner side; third joint linear, whitish at the tip, somewhat shorter than the second. Abdomen

cinereous. Tarsi with white bands. Wings with the lines diffuse, undulating, blackish, very indistinct; exterior line with elongated white points; marginal points black. Fore-wings with a white costal point near the base, with three white costal sub-apical points, and with two intermediate large white costal spots. Length of the body, eight lines; of the wings, seventeen lines."

The female (*T. finipalpis*, Walk.) is red-lead colour with purplish fringes, and brown spots on the costa.

IX. NOCTUÆ DELTOIDES.

This Division was formerly regarded by many authors (including Guenée) as closely allied to the *Pyrales*, but is now usually included in the *Noctuæ*. The moths are slender-bodied, resembling *Pyrales* or *Tortrices* in form, and have very long palpi, clothed with smooth hair, and extending considerably beyond the head; or securiform and upcurved. The legs are long and slender, and the tibiæ are without spurs, though some of the species are furnished with large expansile tufts of hair on the legs. The wings are broad, and not dentated; the fore-wings are generally more or less triangular. The antennæ of the males are pectinated, dentated, and ciliated, or are simple, with a knot-like expansion in the middle. The larvæ have from twelve to sixteen legs, and the moths fly by night, though many of them are easily disturbed during the daytime.

Guenée divides the *Deltoides* into three families, the *Platydidæ Hypenidæ*, and *Herminiidæ*. To these we have added the *Aventiidæ*, which Guenée regarded as a separate division of the *Lepidoptera*.

FAMILY PLATYDIDÆ.

This is a family including a small number of American and East Indian species of comparatively large size, with ciliated or

pubescent, but not naked, antennæ; long, ascending, and recurved palpi; well-marked ocelli; and long, slender legs, with the front tibiæ more or less thickened. The wings are broad, and more or less angulated; the fore- and hind-wings are similarly marked, and the patterns are reproduced on the under surface.

GENUS EUCLYSTIS.

Euclystis, Hübner, Samml. Exot. Schmett ii. Taf. 223 (1818?); id. Verz. bek. Schmett. p. 341 (1822?).

Macrodes, Guenée, Spec. Gén. Lépid. Delt. et Pyr. p. 12 (1854); Walker, List Lepid. Ins. Brit. Mus. xvi. p. 4 (1858).

This genus is remarkable for its slender body, not longer than the wings, and its large size and broad wings, which give it a somewhat geometriform appearance. The antennæ are long, approximating at the base, and shortly pectinated in the male, each pectination bearing a long recurved cilium; in the female the antennæ are moniliform, sub-quadrate, and furnished with two short cilia.

EUCLYSTIS CYNARA.

(*Plate CXLV., Fig.* 8.)

Geometra cynara, Cramer, Pap. Exot. i. pl. 15, figs. C, D (1775).

Euclystis cynaralis, Hübner, Samml. Exot. Schmett. ii. Taf. 223 (1818?).

Macrodes cynaralis, Guenée, Spec. Gén. Lépid. Delt. et Pyr. p. 13 (1854); Walker, List Lepid. Ins. Brit. Mus. xvi. p. 5 no. 1 (1858).

This Moth is recorded from Surinam, Cayenne, and Para. It expands about two inches and a quarter.

The wings are slightly dentated, with an angular projection

near the middle of the hind-margin. They are blackish, varied with reddish-brown and pale bluish-white, and with double black and white sub-marginal lines. The fore-wings are marked with fine waved zig-zag white lines, and the whole of the central area is white tinged with grey, and contains two unequal and remote white cellular spots, surrounded with grey. The marginal area is spotted with red. The hind-wings are broad, and nearly square; blackish, with the middle of the marginal area bluish-white. There is a central lunule circled with white, and a fine waved line, angulated opposite the cell.

FAMILY HYPENIDÆ.

The antennæ are straight, and pectinated or ciliated, but not nodose or tufted; the palpi are long, pilose, and straight; the front of the head is furnished with a pointed projection; and the legs are long, but without tufts of hair or scales, though the fore-wings are often ornamented with clusters of raised scales. The larvæ are long and slender, with the first pair of pro-legs rudimentary or absent. The pupa is enclosed in a slight cocoon.

GENUS CALYMMA.

Calymma, Hübner, Verz. bek. Schmett. p. 281 (1822?).

Dichromia, Guenée, Spec. Gén. Lépid. Delt. et Pyr. p. 18 (1854); Walker, List Lepid. Ins. xvi. p. 13 (1858); Hampson, Faun. Brit. Ind. Moths, iii. p. 72 (1895), *nec Dichroma, Westwood.*

The long, slender palpi, oblong fore-wings, and rounded yellow hind-wings bordered with black, are sufficient characters to distinguish this small East Indian genus, the type of which is *Noctua orosia*, Cramer.

CALYMMA QUINQUALIS.

(*Plate CXLV., Fig.* 5.)

Dichromia quinqualis, Walker, List Lepid. Ins. Brit. Mus. xvi. p. 15, no 4 (1858).

This Moth is found in Java.

"Male.—Dark brown. Abdomen luteous. Fore-wings with the exterior line fawn-colour, double, undulating, connected with a pale fawn-coloured patch by the interior angle, and with a broad curved, irregular streak of the same hue by the tip; marginal lunules black. Hind-wings luteous, with a broad blackish border, the latter attenuated towards the interior angle, which it does not reach. Length of the body, five lines; of the wings, twelve lines" (*Walker*).

GENUS HYPENA.

Hypena, Schrank, Fauna Boica (2) ii. p. 163 (1802); Treitschke, Schmett. Eur. vii. p. 21 (1829); Guenée, Spec. Gén. Lépid. Delt. et Pyr. p. 21 (1858); Walker, List Lepid. Ins. Brit. Mus. xvi. p. 21 (1858).

This is a very extensive genus, well represented in many parts of the world. The antennæ are long and slender, fasciculated in the male, and slightly ciliated in the female. The palpi are long, thick, and scaly. The wings are generally of dull colours, broad, and more or less pointed at the tips; and are furnished with small tufts of raised scales.

The larvæ, which feed on low plants, are long, cylindrical, and multiform, and the first pair of pro-legs is wanting. The pupæ are enclosed in silken cocoons among leaves or moss.

We have three species of this genus in Britain, which are called "Snouts," in allusion to their long beak-like palpi. There

are a considerable number of species in North America, one of which is here described and figured.

HYPENA BIJUGALIS.

(*Plate CXLV., Fig.* 6.)

Hypena bijugalis, Walker, List Lepid. Ins. Brit. Mus. xvi. p. 32, no. 17 (1858).

This species is found in Nova Scotia.

"Female.—Pale cinereous. Palpi shorter than the thorax; their plumes not extending to the tip of the third joint. Fore-wings blackish-brown for full half the length from the base, except along the interior border; the outline of this dark part is slightly excavated, and bordered with white towards the base on its hind side, and is slightly oblique on its exterior side, where it has an obtuse indented tooth; sub-marginal line composed of diffuse blackish spots; space between it and the exterior border brownish; marginal points black, orbicular mark forming a black dot. Length of the body, five lines; of the wings, twelve lines" (*Walker*).

FAMILY HERMINIIDÆ.

In this Family the antennæ are pubescent, with two longer cilia rising from each joint, and are often curved, or furnished with tufts of hairs or scales. The palpi are generally arched, but their structure differs in the sexes. The front legs are often thickened, and provided with pencils of silky hair, or tufts of woolly or scaly hairs. There is no frontal prominence, and the wings are not furnished with tufts of raised scales.

The larvæ are short and thick, with sixteen legs, and live more or less concealed; and the pupæ likewise vary in habit.

This is a larger family than the last, and contains a much greater variety of well-marked genera. A Cuban species is here figured.

CALYMMA QUINQUALIS.

(*Plate CXLV., Fig.* 5.)

Dichromia quinqualis, Walker, List Lepid. Ins. Brit. Mus. xvi. p. 15, no 4 (1858).

This Moth is found in Java.

"Male.—Dark brown. Abdomen luteous. Fore-wings with the exterior line fawn-colour, double, undulating, connected with a pale fawn-coloured patch by the interior angle, and with a broad curved, irregular streak of the same hue by the tip; marginal lunules black. Hind-wings luteous, with a broad blackish border, the latter attenuated towards the interior angle, which it does not reach. Length of the body, five lines; of the wings, twelve lines" (*Walker*).

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Hypena bijugalis, Walker, List Lepid. Ins. Brit. Mus. xvi. p. 32, no. 17 (1858).

This species is found in Nova Scotia.

"**Female.**—Pale cinereous. Palpi shorter than the thorax; their plumes not extending to the tip of the third joint. Forewings blackish-brown for full half the length from the base, except along the interior border; the outline of this dark part is slightly excavated, and bordered with white towards the base on its hind side, and is slightly oblique on its exterior side, where it has an obtuse indented tooth; submarginal line composed of diffuse blackish spots; space between it and the exterior border brownish; marginal points black, orbicular mark forming a black dot. Length of the body, five lines; of the wings, twelve lines" (*Walker*).

FAMILY HERMINIIDÆ.

In this Family the antennæ are pubescent, with two longer cilia rising from each joint, and are often curved, or furnished with tufts of hairs or scales. The palpi are generally arched, but their structure differs in the sexes. The front legs are often thickened, and provided with pencils of silky hair, or tufts of woolly or scaly hairs. There is no frontal prominence, and the wings are not furnished with tufts of raised scales.

The larvæ are short and thick, with sixteen legs, and live more or less concealed; and the pupæ likewise vary in habit.

This is a larger family than the last, and contains a much greater variety of well-marked genera. A Cuban species is here figured.

GENUS MASTIGOPHORUS.

Mastigophorus, Poey, Cent. Lepid. pl. 8 (1832).
Mastygophora, Guenée, Spec. Gén. Lépid. Delt. et Pyr. p. 93 (1854); Walker, List Lepid. Ins. Brit. Mus. xvi. p. 149 (1858).

This genus is remarkable for the enormous length of the palpi in the male, which are composed of three joints, each as long as the abdomen. The first joint is straight, the second and third recurved over the back, and the last joint is fringed with long hair beneath; there is a conspicuous tuft at the end of the front tibiæ. The median nervure is four-branched on both the fore- and hind-wings, and there is one sub-median nervure on the fore-wings, and two on the hind-wings. In the female, the palpi are much shorter, and resemble those of the genus *Herminia*, Latreille; the second joint is the longest, and the third is slightly recurved. The tuft at the end of the tibiæ is wanting.

MASTIGOPHORUS PARRA

(*Plate CXLV., Fig.* 7.)

Mastigophorus parra, Poey, Cent. Lepid. Cuba, pl. 8 (1832).
Mastygophora parralis, Guenée, Spec. Gén. Lépid. Delt. et Pyr. p. 94 (1854); Walker, List Lepid. Ins. Brit. Mus. xvi. p. 149, no. 1 (1858).

This species is a native of Cuba. It expands about an inch. It is dark brown, with four yellowish lines; the first short, the second curved, bordered with black outside, and followed by a yellowish dash at the end of the cell; beyond this are two more much angulated lines, which, unlike the others, are continued across the hind-wings, where, however, they are nearly straight, the sub-terminal line only being angulated at the anal angle. The under surface of the wings is dusted

with grey, and the tuft of hair at the end of the front tibiæ is black above, and whitish beneath.

The moth is attracted by lights at Havannah, and rests on the walls of the rooms with its wings flat, the hind-wings being half covered by the fore-wings.

FAMILY AVENTIIDÆ.

The single species included in this family is referred by some authors to the *Geometræ*, and by others to the *Deltoides*; but it does not quite agree with either in its characters. The eyes are naked, and ocelli are present. The antennæ are simple, and the palpi are ascending, with the second joint broad and triangular, and the terminal joint very short. The abdomen is rather slender, as long as the hind-wings, and the femora are sparsely hairy. The fore-wings are rather short and broad, with the tip hooked, and a deep concavity below; the hind-wings are rounded. The larva has twelve legs, and is furnished with hairy filaments on the sides; it is rather short and thick, and feeds on lichens. The pupa is enclosed in a slight cocoon.

GENUS LASPEYRIA.

Laspeyria, Germar, Syst. Gloss. Prodr. i. p. 13 (1811).

Aventia, Duponchel, Lépid. France, vii. (2), p. 190 (1829); Lederer, Noct. Eur. p. 208 (1857).

This genus need not be further characterised.

THE BEAUTIFUL HOOK-TIP. LASPEYRIA FLEXULA.

Bombyx flexula, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 64, no. 3 (1776); Hübner, Beitr. Schmett. i. (1), p. 32, Taf. 4, fig. Z (1786); Esper, Schmett. iii. (2), p. 31, Taf. 84, fig. 4 (1789?).

Geometra sinuata, Fabricius, Gen. Ins. p. 287 (1777).

Geometra flexularia, Hübner, Eur. Schmett. v. fig. 19 (1797).
Ennomos flexularia, Treitschke, Schmett. Eur. vi. (1), p. 4 (1827); Stephens, Ill. Brit. Ent. Haust. iii. p. 323 (1831).
Aventia flexularia, Duponchel, Lépid. France, vii. (2), p. 192, pl. 149, fig. 1 (1829).
Aventia flexula, Kirby, Eur. Butterflies and Moths, p. 285, pl. 58, fig. 3 (1881).

The head and antennæ are reddish-grey, the latter pectinated in the male, and simple in the female. The thorax and abdomen are pale grey, dusted with black, and the tegulæ are bordered with reddish.

The fore-wings have hooked tips, and are grey, dusted with ferruginous, and crossed by two yellowish-white transverse lines, bordered with brown, and angulated on the costa. In the central area are two distinct black dots placed obliquely. Sometimes there are also several smaller dots. Then comes a row of indistinct small whitish lunules, concave on the inner side. There is a sharply-defined yellowish line on the hind margin before the fringes. The extreme hind margins are rusty-brown, and so are the fringes, which are dotted with black. All the nervures are whitish. The hind-wings are yellowish-grey, and lighter than the fore-wings, with a straight yellow transverse central line, shaded on both sides with brown. Close to the reddish-brown hind-margin is a yellow line preceded by a row of dots, and between these and the transverse line is a fine white curved line. The fringes are brown, with whitish tips.

The larva feeds on *Lichen stellaris* and *L. parietinus*. It grows slowly, and requires six weeks to attain its full growth. It is slender and grey, varied with green and black. The pupa is ringed with brown and yellow, with brown wing-cases.

The moth is found in Britain and other parts of Europe in July and August.

FAMILY BOLETOBIIDÆ.

This is a small Family which is placed by some authors in the *Geometræ*, and by others in the *Noctuæ*, near the *Aventiidæ*. The antennæ of the male are pectinated and ciliated, with the tip bare, the palpi large and hairy, and the wings festooned, all marked alike. The legs are long, and the hind tibiæ have two pairs of long spurs.

The larvæ are cylindrical, with small bristle-bearing warts, and feed on lichens and fungi, and the pupæ are subterranean. They have twelve legs.

GENUS PARASCOTIA.

Parascotia, Hübner, Verz. bek. Schmett. p. 314 (1822?); Von Heinemann, Schmett. Deutschl. i. p. 699 (1859).

Boletobia, Boisduval, Gen. Ind. Meth. p. 201 (1840); Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 330 (1857); Walker, List Lepid. Ins. Brit. Mus. xxi. p. 497 (1860).

The only European species is the following:

THE WAVED BLACK MOTH. PARASCOTIA FULIGINARIA.

(*Plate CXLVII., Fig.* 1.)

———, Clerck, Icones, pl. 8, fig. 7 (1759).

Geometra fuliginaria, Linnæus, Faun. Suec. p. 327, no. 1247 (1761).

Geometra carbonaria, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 108, no. 5 (1776); Esper, Schmett. v. p. 182, Taf. 32, figs. 3–6 (1794?); Hübner, Eur. Schmett. v. fig. 151 (1803?).

Phalæna lunulata, Fabricius, Gen. Ins. p. 290 (1777).

Phalæna lignaria, Fabricius, Ent. Syst. iii. (2), p. 160, no. 111 (1794).

Gnophos carbonaria, Treitschke, Schmett. Eur. vi. (1), p. 184 (1827).

Fidonia carbonaria, Stephens, Ill. Brit. Ent. Haust. iii. p. 149 (1831).

Boletobia fuliginaria, Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 330 (1857); Kirby, Eur. Butterflies and Moths, p. 285, pl. 58, fig. 4 (1881); Buckler, Larvæ of Brit. Lepid. vii. p. 47 (1897).

The Black Heath Moth is found throughout the greater part of Europe and Siberia, but is rare in Britain. It expands about an inch.

The ground-colour of the whole of the upper side is smoky black. The antennæ are yellow, ringed with black, with black pectinations in the male; but filiform in the female. The abdomen is slender in the male, with yellowish tufts on the sides; and cylindrical in the female.

Three zig-zag yellowish transverse lines cross the fore-wings; the first consists of small curves, the second forms a strong angle on the costa, and then approaches the first. The two lines are shaded with black on the sides next to one another, and bound the central area. In this there is a black lûnule. A third line runs not far from the hind-margin, and between it and the second line, near the inner margin, is a large indistinct yellowish spot. The fringes are bordered with small black lûnules, and are yellowish, streaked with black. The two outer lines are continued on the hind-wings, and the second is sometimes broken up into dots. There is a black central lunule, and an indistinct yellowish patch at the anal angle.

The larva lives on *Lichen parietinus*, *Bryum murale*, &c. It is full-grown about the middle of June or the beginning of July, and is then blue-black with several rows of orange-coloured tubercles, each bearing long black curved hairs, tipped with whitish. It undergoes its transformations in the ground, or on the ground under the food plan[illegible]

The pupa is shining greyish-green.

London coal-cellars are perhaps the most likely localities to search for this rarity.

FAMILY BREPHIDÆ.

Larva.—Long, slender, with sixteen legs, but the first two pairs short and unfit for use; feeding on trees.

Pupa.—Enclosed in a slight cocoon, among moss or bark.

Imago.—Without ocelli; antennæ dentated and pubescent, or ciliated; palpi replaced by a tuft of hairs; proboscis short. Body moderately stout, downy, with the thorax short, and the abdomen linear in the male, and thick and obtuse in the female. Legs slender, tufted, with rudimentary spurs. Fore-wings broad, triangular, thickly and coarsely scaled, with an appendiculate cell, and the sub-marginal nervure forked at the base; hind-wings brightly coloured, provided with a frenulum, and the costal nervure inflated, throwing off, and running parallel with the sub-costal for some distance, the latter only bifurcating near the outer angle; cell closed; lower discoidal nervule running half-way between the upper median nervule, and the upper discoidal nervule; two sub-marginal nervures present. Guenée makes this family, under the name of *Phalænoidæ*, the fifth sub-family of his *Minores*, but many later writers have regarded it as an independent family, which should be separated both from the *Noctuæ*, and from the *Geometræ*.

GENUS BREPHOS.

Hemigeometra, Haworth, Lepid. Brit. p. 267 (1809). *Nec. sect typ.*

Brephos, Hübner, Tentamen, p. 2 (1810); Ochsenheimer, Schmett. Eur. iv. p. 96 (1816); Treitschke, Schmett. Eur. v. (3), p. 378 (1826); Guenée, Spec. Gén. Lépid. Noct. ii. p. 264 (1852).

Archiearis, Hübner, Verz. bek. Schmett. p. 280 (1822 ?).

As this is the only genus of the family, it is unnecessary to characterise it. There are only three species known, all European. Two of them are British; the third, *B. puella* (Esper), is common in South-central Europe, and feeds on aspen.

Concerning the commonest species, *B. parthenias* (Linn.) described below, Guenée writes: "The larvæ live in large trees, and drop themselves down suspended by a thread, like many *Geometræ*. They are found in autumn, chiefly in rather large woods, and the moths fly in the earliest days of spring, or rather at the end of winter, among the still leafless birch trees. Their flight is active and sustained, but the sun is indispensable to rouse them from their torpor, for his rays are scarcely hidden, even for a moment, when the moths at once suspend their flight, to resume it immediately upon his re-appearance. It will be seen that these habits most resemble those of the *Phalænidæ* which fly in company with it in early spring, which is in accordance with the shape and habits of the larvæ."

THE ORANGE UNDERWING. BREPHOS PARTHENIAS.

Noctua parthenias, Linnæus, Faun. Suec. p. 308, no 1160 (1761); Esper, Schmett. iv. (1), p. 53, Taf. 85, figs. 5–8 (1786?); Hübner, Eur. Schmett. iv. pl. 74, figs. 341, 342 (1804?); Knoch, Beitr. Ins. ii. p. 71, pl. 3, fig. 8 (1782).

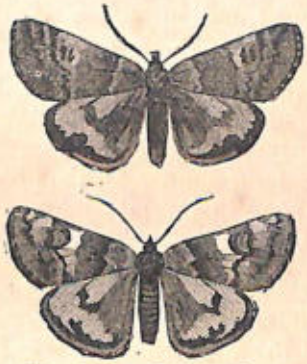
Phalæna fulvata, Pallas, Reise. iii. p. 732, no. 95 (1775).

Brephos parthenias, Treitschke, Schmett. Eur. v. (3), p. 379 (1826); Kirby, Eur. Butterflies and Moths, p. 296, pl. 41, fig. 8 (1881); Buckler, Larvæ of Brit. Lepid. vi. pl. 101, figs. 6–6 b (1895).

Brephos notha, Stephens, Ill. Brit. Ent. Haust. iii. p. 137 (1831), *nec Hübner*.

The Orange Underwing is common in Central and Northern Europe, and in Siberia. It expands from an inch and a quarter to an inch and a half.

The head, thorax, and upper surface of the abdomen are black, with brownish, and occasional white hairs. The body is long and slender, especially in the male, much like that of a *Geometra*. The antennæ of the female are setiform, black ringed with white; in the male they are fusiform, and pectinated. The pectinations are black, like the dorsal surface of the shaft, but appear lighter, as they are surrounded by short brown hairs. The eyes are large and oval. The pectus is clothed with long shaggy grey hair, and so is



The Orange Underwing.

the under surface of the abdomen in the male, but in the female the grey hair is limited to the first segments, the hair on the hinder segments being pale yellow, long and fine.

The fore-wings are marbled with grey and reddish-brown, one colour sometimes predominating, and sometimes the other, and the surface is powdered with black atoms. The first transverse line is black and zig-zag, with an indistinct whitish border towards the base. The central area is at first of the ground-colour, and contains the annular orbicular stigma. Then comes a more or less distinct narrow or broad transverse

band, on which, near the base, stands the black reniform stigma on a bluish patch. The second transverse line and the sub-marginal line enclose a band which is varied with ferruginous, and usually with white on the costa and inner margin. Beyond the sub-marginal line the wings are greyish-brown as far as the striped brown and white fringes. Occasionally the whole of the wings are dusted with brown, and the markings and paler areas are thus rendered indistinct.

The hind-wings are orange, or deep pomegranate-yellow. From the base a large, nearly triangular black spot extends more than half across the wings towards the inner margin, and to the outer angle of this spot is attached a smaller one. In front of the hind margin is a narrow dentated black band, whilst in the orange area there is often a round whitish spot. The fringes are chequered with grey and white.

The above description applies to the male. In the female the fore-wings are usually more varied with white, and have lighter markings, and the yellow or orange of the hind-wings is less intense. The black marginal band of the latter is often broken up into lines and spots, and there is a second costal spot at the apex of the black triangle. Finally the shorter and more cylindrical abdomen, and the difference in the antennæ, will serve at once to distinguish the sexes.

The larva feeds on birch, oak, and beech. It is smooth, and pale green, with yellow longitudinal lines on the back, and a broader yellow stripe on the sides. The head is rather large, and dark green. The first pair of pro-legs are small, and consequently the larva loops a little in walking.

Before its metamorphosis the larva changes its colour, the green becomes paler, and the yellow lines turn to white. It then bores its way into the bark, and covers the opening with a web, or forms a very firm cocoon with leaves, moss, or splinters of wood. The pupa is reddish-brown, and

elongated, with a slight elevation on each segment of the abdomen.

The moth appears in February or March, and flies in the day-time.

GEOMETRÆ.

This is an extremely natural group of Moths, and most of the species belonging to it are easily distinguishable from those of any other group. As a rule they are of moderate size, rarely exceeding two or three inches in expanse, and have slender bodies, and broad, brightly-coloured wings, the hind-wings being nearly as large as the fore-wings, and more or less similarly coloured. In the males the antennæ are often strongly pectinated; but the bodies of the insects are seldom clothed with rough hair, except in certain genera with stout instead of slender bodies. The females of some species, especially those which appear in winter or in early spring, are apterous.

But the most characteristic feature of the *Geometræ* is the structure of the larvæ, which have only ten legs, the first three pairs of pro-legs being absent, or at least imperfectly developed. These larvæ fix themselves by their claspers and pro-legs to a leaf or branch, and then stretch their bodies stiffly out, in which position they often remain for a long time, when they look deceptively like bits of dry stick. When walking, they extend their bodies as far as they can reach, take hold with their front legs, then draw up the hind ones, arching the back as they do so, and then extend their bodies again, thus proceeding by a succession of loops, whence they are called *Geometræ*, or "Land Measurers"; or, in English, "Loopers."

Guenée, in his "Uranides et Phalénites," published in 1857 (vide vol. iv. pp. xxx. 166), divided the Geometræ into twenty-six families, of which seventeen are represented in Britain. Dr. Packard, in his "Monograph of the Geometrid Moths or

Phalænidæ of the United States" (1876; vide vol. iv. p. 205), treats these as sub-families, and reduces the number to eight, one, however, the *Goniacidalinæ*, being new, *i.e.*, founded on American species unknown to Guenée. Mr. Meyrick, in his "Handbook of British Lepidoptera" (vide vol. iv. pp. xxxix 184), and Sir George Hampson, in his "Fauna of British India: Moths," vol. iii. (cf. vol. iv. pp. xxxvi. 198), both published in 1895, further reduce the families or sub-families to five and six respectively; one of the latter, however, the *Orthostixiinæ*, being unrepresented in Britain. On the other hand, most of the German writers recognise only two families, the *Dendrometridæ* and *Phytometridæ*, which Von Heinemann characterises as follows:—

DENDROMETRIDÆ.

Sub-costal nervure of the hind-wings rising from the base, not touching the median, or only for a short distance, and diverging from it long before the end of the discoidal cell.

PHYTOMETRIDÆ.

Sub-costal nervure of the hind-wings rising from the median nervure at, or just before, the end of the discoidal cell.

The *Phytometridæ* include the *Sionidæ*, *Eubolidæ* and *Larentidæ* of Guenée, the remaining families being included under the *Dendrometridæ*. I regard Guenée's arrangement as the most suitable for the purposes of the present work, and propose to follow it, with some slight modifications.

FAMILY URAPTERYDÆ.

This family includes a number of species, with triangular and rather pointed fore-wings, and angulated or sub-caudate hind-wings. They are generally uniform in colour, and marked with transverse or oblique lines. The body is rather woolly, and the abdomen is tufted in the male. The only European

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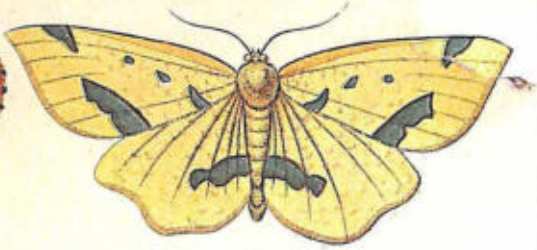

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1. *Lars sambucaria.*
2. *Opisthograptis luteolata.*
3. *Angerona prunaria.*
4. *Angerona (?) sospeta.*
5. *Monoctenia obtusata.*
6. *Pingasa (?) occultaria (under*

species is the largest and most conspicuous of our *Geometræ*, but the foreign genera shade off into the *Ennomidæ*. A synopsis of the *Urapterydæ* was published by Dr. A. G. Butler in vol. 17 of the "Journal of the Linnean Society of London."

GENUS LARS.

Lars, Hübner, Tentamen, p. 2 (1822 ?).

Urapteryx, Leach, Zool. Misc. i. p. 80 (1814); Guenée, Spec. Gén. Lépid. Uran. et. Phal. i. p. 27 (1852).

Ourapteryx, Leach, Edinb. Encycl. ix. p. 134 (1815).

The antennæ are not pectinated, but are sometimes pubescent in the males. The wings are white or yellow, with transverse lines, and one or two sub-ocellated spots at the base of the tail in the hind-wings. Several species are found in the East Indies and in South America; but they have all a strong general resemblance to the European moth.

THE SWALLOW-TAILED MOTH. LARS SAMBUCARIA.

(*Plate CXLVI., Fig.* 1.)

Geometra sambucaria, Linnæus, Syst. Nat. (ed. x), i. p. 519, no. 129 (1858); id. Faun. Suec. p. 322, no. 1222 (1761); id. Mus. Ludov. Ulr. p. 391 (1764); Esper, Schmett. v. p. 51, Taf. 8, figs. 1–8 (1794?); Hübner, Eur. Schmett. v. fig. 28 (1797?).

Urapteryx sambucaria, Leach, Zool. Misc. i. p. 80, pl. 35, fig. 2 (1814); Stephens, Ill. Brit. Ent. Haust. iii. p. 175 (1831); Curtis, Brit. Ent. xi. pl. 508 (1834); Kirby, Eur. Butterflies and Moths, p. 305, pl. 43, fig. 6 (1881).

Acæna sambucaria, Treitschke, Schmett. Eur. vi. (1), p. 85 (1827).

Ourapteryx sambucaria, Buckler, Larvæ of Brit. Lepid. pl. 106, figs. 1, 1a (1897).

The Swallow-tailed Moth is common throughout the greater part of Europe and Northern and Western Asia. It is one of

the largest of the British *Geometræ*, the expanded wings often measuring two inches and a half across. The fore-wings are pointed at the tip, and somewhat falcate, the hind-margin being entire, while the hind-wings are prolonged into a rather acute tail. The colour is delicate sulphur-yellow, shaded at the base of the wings into satiny-white, and deepening towards the hind-margin. The surface is marked with numerous dark evanescent transverse streaks. The fore-wings are crossed by two yellow transverse lines, and the hind-wings by one, which corresponds to the first line of the fore-wings. At the base of the tail are two small blackish spots, the larger of which is centred with reddish. The fringes are ochre-yellow, inclining to reddish-brown.

The larva feeds on the leaves of willow, lime, elder, pear, and various other trees and shrubs. It is dark-brown, dark-grey, or reddish or yellowish-brown, with waved longitudinal darker lines. The head is flat and oval. The pupa is whitish, yellowish-brown, or reddish-brown, with dark brown and grey spots, and is enclosed in a web between leaves.

The moth appears in June and July. It flies at dusk, and is not uncommon in suburban gardens and elsewhere.

FAMILY ENNOMIDÆ.

This is an extensive family of moderate-sized Moths, with the antennæ generally pectinated, at least in the male, and the wings frequently angulated or dentated. The colour is generally of some shade of yellow, more or less varied with darker lines and spots. The larvæ have only ten perfect legs, the three first pairs of pro-legs being usually absent, or imperfectly developed, and not used for walking. The larvæ are often furnished with lateral appendages, or humps on the back. They feed exposed on trees or shrubs, and the pupæ, which are very lively, are formed between leaves

or in the ground. One or two of these larvæ are "cannibals," feeding on other larvæ when they have an opportunity.

GENUS OPISTHOGRAPTIS.

Opisthograptis, Hübner, Verz. bek. Schmett. p. 292 (1822?).
Rumia, Duponchel, Lépid. France, vii. (2), p. 117 (1829); Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 108 (1857).

The antennæ are simple, the palpi short and hairy, and the hind tibiæ are not swollen, but armed with short spurs. The wings are entire, and the fore- and hind-wings are nearly uniformly coloured. The larvæ are remarkable for possessing fourteen legs, having two rudimentary pairs in front of the usual pair of pro-legs; and dorsal and lateral appendages on some of the hinder segments. They feed on trees, and the pupæ are enclosed in strong cocoons attached to the branches.

BRIMSTONE MOTH. OPISTHOGRAPTIS LUTEOLATA.

(*Plate CXLVI., Fig* 2.)

Geometra luteolata, Linnæus, Syst. Nat. (ed. x.), i. p. 525, no. 168 (1758).
Geometra cratægata, Linnæus, Faun. Suec. p. 336 (1761); Hübner, Eur. Schmett. v. fig. 32 (1797).
Enniomos cratægata, Treitschke, Schmett. Eur. vi. (1), p. 41 (1827).
Rumia cratægata, Stephens, Ill. Brit. Ent. Haust. iii. p. 174 (1831); Buckler, Larvæ of Brit. Lepid. vii. pl. 106, fig. 5–5 c (1897).
Rumia luteolata, Kirby, Eur. Butterflies and Moths, p. 305. pl. 44, figs. 2–2 b (1881).

The Brimstone Moth is common throughout Europe, Asia Minor, and Siberia. The wings expand from an inch to an inch and two-thirds.

It is deep sulphur-yellow, with two reddish-brown spots on the costa of the fore-wings towards the base; a third near the middle, produced internally, and having a white mark in the centre; and a rather large one at the apex. Beyond the middle of the wings is a transverse row of faint dusky marks, and two or three others near the base. The hind-wings have a reddish-brown central spot, generally with a white dot in the middle, and several dusky marks. The fringes are spotted with reddish-brown.

The larva feeds on hawthorn, sloe, apple, bramble, &c. It is long and cylindrical, pale brown, with a bluish spot on each side of the neck, and the spiracles on the sixth segment tinged with red. On the back of the sixth segment is a bifid protuberance. The pupa is dark brown.

The Moth is found from April to October or November, there being a succession of broods throughout the fine season of the year.

GENUS ANGERONA.

Angerona, Duponchel, Lépid. France, vii. (2), p. 180 (1829); Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 114 (1852).

The antennæ are pectinated and ciliated in the male, the head small, the palpi short and pointed, and the legs short, the hind tibiæ fusiform, with short spurs, the fore-wings entire, and the hind-wings slightly scolloped. The larva is very long, and the pupa is enclosed in a slight cocoon between leaves.

THE ORANGE MOTH. ANGERONA PRUNARIA.

(*Plate CXLVI., Fig.* 3.)

Geometra prunaria, Linnæus, Syst. Nat. (ed. x.) p. 520, no. 133 (1758); Esper, Schmett. v. p. 91, Taf. 17, figs. 1–7 (1794?); Knoch, Beitr. Ins. ii. pp. 7, 133, Taf. 1, fig. 3, Taf. 7 (1782); Hübner, Eur. Schmett. figs. 122, 123 (1800).

Phalæna sordiata, Fuessly, Schweiz. Ins. p. 41, no. 791 (1775); Capieux, Naturforscher, xv. p. 65, Taf. 3, fig. 15 (1781).

Geometra corylaria, Thunberg, Diss. Ins. Suec. i. p. 4 (1784); Esper, Schmett. v. p. 95, Taf. 18, figs. 1–3 (1794?).

Ennomos prunaria, Treitschke, Schmett. Eur. vi. (1) p. 45 (1827).

Angerona prunaria, Stephens, Ill. Brit. Ent. Haust. iii. p. 172 (1831); Kirby, Eur. Butterflies and Moths, p. 305, pl. 44, figs. 3–3 d (1881); Buckler, Larvæ of Brit. Lepid. vii. pl. 106, figs. 7–7 b (1897).

The Orange Moth is common throughout the greater part of Europe, as well as Northern and Western Asia.

It expands from an inch and three-quarters to two inches. The male is orange, and the female pale yellow. The wings of both sexes are covered with numerous blackish-brown transverse streaks and dots, and there are similar markings also on the legs and under side. In the middle of all the wings is a long brown streak, which is sometimes lost in the surrounding dark markings, but is seldom entirely wanting. The fringes are spotted with brown.

The larva lives on plum, sloe, elm, hazel, plantain, honeysuckle, lilac, &c.

When full-grown it is pale brown, shaded with dusky, or ashy-grey, shaded with brown, with pale tubercles tipped with dark brown, the largest of which, on the ninth segment, are whitish on the sides.

It undergoes its metamorphosis in a slight cocoon between leaves, bound together with threads. The pupa is reddish-brown, with black, or dark brown wing-cases.

The moth appears in June and July. The specimen figured illustrates the curious phenomenon called gynandromorphism, sometimes met with in insects. The right side of this insect

is coloured like the ordinary male of the species, and the left side like the ordinary female.

ANGERONA (?) SOSPETA.

(*Plate CXLVI., Fig.* 4.)

Noctua sospeta, Drury, Ill. Exot. Ent. ii. pl. 22, fig. 3 (1773).

Venilia (?) *sospeta*, Westwood in Jardine's Nat. Libr. Exot. Moths, p. 214, pl. 29, fig. 3 (1841).

Angerona sospetaria, Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 115 (1857).

This Moth is a native of Jamaica. It expands about two inches and a half.

The wings are pale yellow, the fore-wings with several brown spots, which tend to form two very irregular macular bands; on the hind-wings there is also a large transverse brown spot running outwards from the inner margin. The head is pale yellow, and the thorax and abdomen yellow, the former shading into brown posteriorly.

GENUS PHALÆNA.

Phalæna, Linnæus, Syst. Nat. (ed. x.) i. p. 495 (1758); Fabricius, Syst. Ent. p. 619 (1775); Cuvier, Tabl. Elém. d'Hist. Nat. p. 598 (1798); Lamarck, Syst. Anim. sans Vertèbres, p. 286 (1801).

Hygrochroa, Hübner, Verz. bek. Schmett. p. 293 (1822 ?); Meyrick, Handbook Brit. Lepid. p. 283 (1895).

Pericallia, Stephens, Ill. Brit. Ent. Haust. iii. p. 171 (1831); Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 146 (1857), *nom. præocc.*

The antennæ are rather short, but pectinated to the tips, most strongly in the male. The palpi are short, broad, and obtuse. The hind tibiæ are enlarged at the extremity, and the spurs are of equal length. The wings are broad and

brightly coloured, but with no spot or streak in the cells. The larva is short, broad, and pubescent, with long filaments curving backwards on the eighth segment; it feeds on shrubs. The pupa is short, much thickened in the middle, and enclosed in a very loose cocoon.

THE LILAC BEAUTY. PHALÆNA SYRINGARIA.

Geometra syringaria, Linnæus, Syst. Nat. (ed. x.), i. p. 520, no. 132 (1758); Esper, Schmett. v. p. 62, Taf. 11, figs. 3–7 (1795 ?); Hübner, Eur. Schmett. v. fig. 29 (1797 ?).

Ennomos syringaria, Treitschke, Schmett. Eur. vi. (1), p. 52 (1827).

Pericallia syringaria, Stephens, Ill. Brit. Ent. Haust. iii. p. 171 (1831); Kirby, Eur. Butterflies and Moths, p. 301, pl. 49, figs. 2–2 b (1881); Buckler, Larvæ of Brit. Lepid. vii. pl. 107, figs. 3–3 b (1897).

The Lilac Beauty.

This species inhabits most parts of Northern and Central Europe and Northern Asia. It expands from an inch and a half to an inch and three-quarters.

The fore-wings have a pale violet triangular spot on the costa close to the base, from which a transverse line of the same colour runs towards the inner margin. On this line are two more or less distinct black points on the costa. Towards the apex of the wings is an olive-green spot bordered with white

On the inner side of the triangle is a black dot, from which runs a ferruginous line, which is continued on the hind-wings, and is bordered by a fine pale violet line. Beyond this is a large yellow spot in the centre of the wings, which extends as far as the hind margin. The fringes are ferruginous. The hind-wings have similar markings, but the violet line has several black dots on the lower half. The margins of all the wings are irregularly dentated.

The larva feeds on jasmine, willow, privet, lilac, &c. It is somewhat stout, with a small head, and is buff or reddish-brown, shaded with grey. There are two smooth, reddish-yellow, fleshy tubercles on the sixth segment, and two smaller black ones on the seventh, besides the horns on the eighth segment. The pupa is shining dark brown, shaded with darker, and with yellowish spots on the head and thorax. It is generally suspended. The moth is found in May, and again in July and August.

GENUS GEOMETRA.

Geometra, Linnæus, Syst. Nat. (ed. x.), i. p. 519 (1758); Haworth, Lepid. Brit. p. 271 (1809); Stephens, Ill. Brit. Ent. Haust. iii. p. 163 (1831); *nec* Leach, Edinb. Encycl. ix. p. 134 (1815).

Eugonia, Hübner, Verz. bek. Schmett. p. 291 (1822 ?) *nom. præocc.*

Ennomos, Treitschke, Schmett. Eur. vi. (1), p. 3 (1825); Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 173 (1857).

The antennæ are strongly pectinated in the male, and dentated in the female; the body is stout and woolly, and the abdomen tufted; and the wings are dentated, with a strong tooth in the middle of the hind margin.

The larvæ are long and tuberculate, and feed on trees; the pupæ are enclosed by a few threads between leaves.

This genus, with its stout body and dentated wings, represents a somewhat different group of the family to which it belongs than the other species which are here noticed.

It is curious that neither of the types assigned to *Geometra* by Leach are admissible; for *Plagodis dolabraria* was not described by Linnæus till 1767; and *Eutrapela lunaria*, Denis & Schiffermüller, was not a Linnean species; but Stephens, while excluding *P. dolabraria*, employed *Geometra* to include *E. lunaria*, and various allied species, including *G. alniaria*, a Linnean species of 1758, which therefore becomes the type. The French Entomologists selected the green *Geometra papilionaria*, Linn., as the type of *Geometra*; but three generic names had already been assigned to this species: *Terpne* and *Holothalassis* of Hübner, and *Hipparchus* of Leach, the first of which will stand.

THE CANARY-SHOULDERED THORN. GEOMETRA ALNIARIA.

Geometra alniaria, Linnæus, Syst. Nat. (ed. x.) i. p. 519, no. 131 (1758); id. Faun. Suec. p. 32, no. 1230 (1761); *nec Den. & Schiff.*

Geometra canaria, Hübner, Beitr. Schmett. ii. (4), p. 99, pl. 4, fig. Y (1. 2) (1790); Esper, Schmett. v. p. 100, Taf. 19, figs. 2, 3 (1795?); Stephens, Ill. Brit. Ent. Haust. iii. p. 165 (1831).

Geometra tiliaria, Borkhausen, Eur. Schmett. v. p. 87 (1794); Hübner, Eur. Schmett. v. fig. 23 (1797?); Stephens, Ill. Brit. Ent. Haust. iii. p. 164 (1831).

Ennomos tiliaria, Treitschke, Schmett. Eur. vi. (2), p. 295 (1827); Buckler, Larvæ of Brit. Lepid. vii. p. 4, pl. 108, figs. 4, 4 *a* (1897).

Eugonia alniaria, Kirby, Eur. Butterflies and Moths, p. 299 (1881).

This species is found throughout Temperate Europe.

It expands from an inch and a half to an inch and three-quarters.

The head and thorax are clothed with bright canary-yellow hair, and the wings are yellow, speckled with rusty brown, with two nearly parallel, slightly curved, brown transverse lines. Between these, near the costa, is a rusty-coloured comma-shaped mark. The fringes are dark rust-colour, varied with yellowish. The hind-wings have a brown lunule, and the second line is sometimes continued on them.

The Canary-Shouldered Thorn.

The larva feeds on birch, lime, elder, oak, and fruit trees. It is slender, dark brown, shaded alternately with lighter and darker, and moderately marbled with whitish. On the seventh segment are four transverse tubercles, and the sixth and ninth have transverse dorsal ridges. The last segment ends in three points directed backwards, the middle one being the smallest.

The pupa is light brown, with whitish incisions.

FAMILY ŒNOCHROMIIDÆ.

This Family was established by Guenée to include a few genera of Exotic Moths, chiefly Australian, of rather large size. The antennæ are thick, and the flagellum pectinated in the males, except at the tip. The palpi and proboscis are thick, the body is stout, the thorax is woolly, and the abdomen smooth. The legs are short and thick, with very short spurs

on the hind tibiæ. The wings are rather long, and marked with oblique lines; the fore-wings are rather pointed at the base.

To the seven genera which Guenée placed in this Family Walker added eight, some of which, however, are now referred to the *Bombyces*. Later authors have added other genera, some of which hardly appear to belong here. A species belonging to one of Guenée's genera is here figured.

GENUS MONOCTENIA.

Monoctenia, Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 183 " (1857).

Antennæ long, pectinated in the male and dentated in the female on one side only; the abdomen depressed in the male, and pointed in the female. The hind margins of the wings are rather convex above the middle.

MONOCTENIA OBTUSATA.

(*Plate CXLVI., Fig.* 5.)

Monoctenia obtusata, Walker, List Lepid. Ins. Brit. Mus. xxi. p. 279, no. 2 (1860).

This Moth is a native of Australia.

"Pale cinereous. Head and legs reddish, varied with testaceous. Abdomen minutely black-speckled; anterior segments with a blackish point on each side. Wings irregularly brown-speckled, the speckles here and there confluent; under side with an exterior broad, irregular, interrupted, pale ferruginous band. Fore-wings acute, with a few black points; costa very slightly concave exteriorly; exterior border truncated along one-third of the length, very oblique from thence to the interior angle; under side with a large blackish discal patch. Length of the body nine lines; of the wings twenty-four lines" (*Walker*).

FAMILY AMPHIDASYDÆ.

Antennæ pectinated or plumose in the male, and simple in the female; proboscis and palpi very short, or wanting; body very stout and woolly; female frequently apterous, or with rudimentary wings.

Larva long and smooth, with ten legs, living openly on trees. Pupa subterranean.

These moths much resemble *Bombyces* in appearance. They are single brooded, and appear in early Spring, and fly at night.

GENUS ITHYSIA.

Ithysia, Hübner, Verz. bek Schmett. p. 319 (1822?).

Nyssia, Duponchel, Lépid. France, vii (2), p. 283 (1829); Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 198 (1857).

The male has strongly plumose antennæ, and a stout body, while the wings are oblong, entire, and semi-transparent; those of the female are rudimentary. The larva is long and cylindrical, and the pupa subterranean.

THE BELTED BEAUTY. ITHYSIA ZONARIA.

Geometra zonaria, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 100, no. 5 (1776); Esper, Schmett. v. p. 190, Taf. 34, figs. 1–5 (1795?); Hübner, Eur. Schmett. v. fig. 179 (1800?), fig. 511 (1818).

Amphidasis zonaria, Treitschke, Schmett. Eur. vi. (1), p. 251 (1827).

Nyssia zonaria, Stephens, Ill. Brit. Ent. Haust. iv. p. 391 (1835); Curtis, Brit. Ent. xiii. pl. 615 (1836); Buckler, Larvæ of Brit. Lepid. vii. pl. 110, figs. 1–1 *b* (1897).

Biston zonaria, Kirby, Eur. Butterflies and Moths, p. 332, pl. 46, fig. 11 (1882).

The Belted Beauty is found in Western Europe and the Southern portions of Central Europe, and in Asia Minor. It expands from an inch to an inch and a quarter.

The Belted Beauty, Male and Female.

The male is dark brown or blackish, with broad white-bordered tegulæ, and red incisions on the abdomen. The fore-wings have white streaks running from the base, and a dark brown spot between them. Before the hind-margin are two slightly curved white transverse lines. The fringes are light brown, bordered by a narrow white line. The hind-wings are white, with dark brown nervures, and two dark brown transverse bands, the second being bordered with white on the outer side. The fringes are brown, dusted with white.

The female has the abdomen covered with black and white hair, except on the sides, where it is red, and the incisions are also red. The wings are reduced to short stumps.

The larva is full-grown in June. It feeds on *Achillea millefolium*, *Salvia pratensis*, *Lonicera caprifolium*, &c. It is light green, sprinkled with numerous fine yellow dots, and has yellow incisions. On each side is a yellow spiracular line, bordered below with black, and somewhat sinuated. The pupa is dark brown, with a forked terminal point.

FAMILY BOARMIIDÆ.

Antennæ pectinated, at least in the male; palpi short; abdomen slender; legs long, especially the hind tibiæ, which are

often swollen. Wings broad, generally of dull colours, and with similar markings, the hind margins dentated or sinuated. The moths fly at early dusk.

Larvæ with ten legs, and with few prominences; pupæ subterranean, or enclosed in a leaf.

This is a very extensive family, both at home and abroad. Some are common garden insects, like *Cymatophora rhomboidaria* (Den. & Schiff.), and *C. repandata* (Linn.), while other species frequent woods. We have figured two interesting foreign species in preference to British ones.

GENUS PINGASA.

Pingasa, Moore, Lepid. Ceylon, iii. p. 419 (1887).

Hypochroma, Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 472 (1857); Walker, List Lepid. Ins. Brit. Mus. xxi. p. 427 (1860), *nom. præocc.*

Pseudoterpna, pt. Hampson, Faun. Brit. Ind. Moths, iii. p. 472 (1895), *nec Hübner.*

The antennæ are pectinated in the male, but simple at the extremity. The palpi are rather long, broad, and hairy, with the third joint long and filiform; the body is comparatively stout, as long as the hind-wings, and crested. The wings are short, but very broad, more or less denticulated, and with distinct markings beneath, especially towards the hind margin.

The larvæ of *P. crenaria*, Guenée, a Ceylonese species, is described by Mr. Moore as "with ten legs, looped, thickish, olive-green, with purple-brown oblique lateral lines, and a longitudinal sub-lateral line. Pupa pale purplish-brown, with blackish speckles and segmental marks."

Hypochroma of Guenée is a genus largely represented in the Tropics of the Old World, but the name cannot be retained,

having been previously used by Herrich-Schäffer for another genus of *Geometræ*. Several sections are comprised under this genus, which are separated by some authors. I have figured the underside of one of the commonest and most beautiful of the Australian species, which considerably resembles Mr. Moore's genus *Pingasa*, under which I place it provisionally.

PINGASA OCCULTARIA.

(*Plate CXLVI., Fig.* 6.)

Phalæna occultaria, Donovan, Ins. New Holland, pl. 36, fig. 4 (1805).

Boarmia occultaria, Boisduval, Voy. Astrolabe, Lépid. p. 257, no. 1 (1832).

Hypochroma occultaria, Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 281 (1857).

This Moth is a native of Australia and Tasmania. It expands about an inch and three-quarters.

The wings are dentated, ashy-grey, finely dusted with black, with the usual lines well marked, slender, black, and strongly dentated, the sub-marginal line forming a large tooth. There is a black dash at the end of the cell on all the wings. The under side is pure white, with a blood-red line before the hind-margin, which is entire and angulated on the hind-wings, but, on the fore-wings, is reduced to two spots bordered with white behind, with the marginal area blackish.

GENUS BRONCHELIA.

Bronchelia, Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 286 (1857); Walker, List Lepid. Ins. Brit. Mus. xxi. p. 460 (1860).

The species included in this genus are all Tropical American, and are among the largest of the family, though not unlike our

European *Boarmiidæ* in colour and markings. The antennæ are strongly pectinated for two-thirds of their length in the male, and ciliated in the female. The palpi are thick and ascending, with the third joint expanded. The abdomen of the male is long and slightly conical, and in the female depressed and obtuse. The hind tibiæ are more or less swollen, with the last pair of spurs very short. The wings are broad and strongly dentated.

The larvæ are short and thick, with the fourth segment swollen, and the abdomen terminating in two small points; the head is small and round. They feed on trees.

BRONCHELIA SCOLOPACEA.

(*Plate CXLVII., Fig.* 2.)

Noctua scolopacea, Drury, Ill. Exot. Ent. ii. pl. 22, fig. 1 (1773); Cramer, Pap. Exot. ii. pl. 174, fig. D (1777).

Alcis scolopacea, Duncan, Nat. Libr. Exot. Moths, p. 218, pl. 27, fig. 2 (1841).

Bronchelia scolopacea, Walker, List Lepid. Ins. Brit. Mus. xxi. p. 453, no. 7 (1860).

This species is a native of Jamaica. It expands about three inches and a half.

The ground colour is brownish-grey. The wings are crossed by a number of waved blackish transverse lines, partly bordered with light brown and ash-colour. Between the lines the ground-colour is thickly speckled with dark brown. On the under side, the colour inclines to light greyish-yellow, and the greater part of the outer half of the fore-wings is marked with faint dark brown lines and streaks; and the hind-wings are slightly clouded with dark brown towards the tips. All the wings are deeply dentated.

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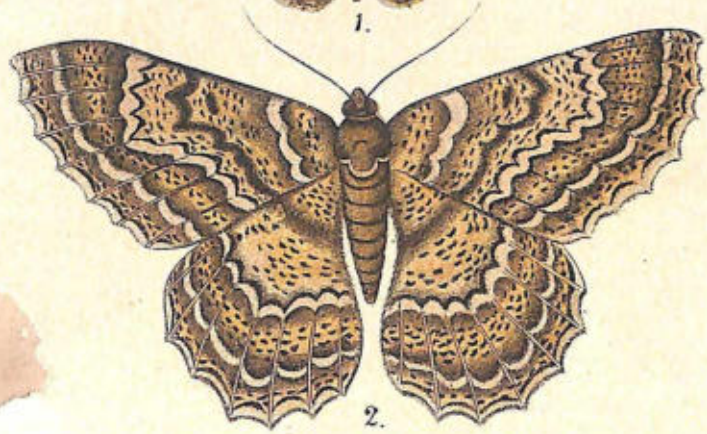

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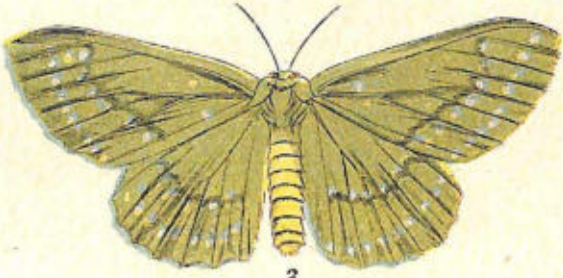

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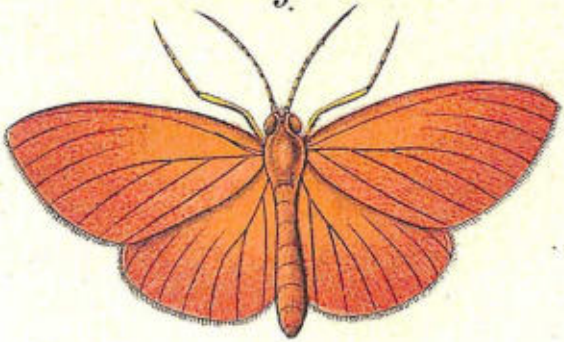

4.

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1. *Parascotia fuliginaria.*
2. *Bronchelia scolopacea.*
3. *Terpne papilionaria.*
4. *Eumelea rosalia.*

FAMILY BOLETOBIIDÆ.

This family has already been noticed under *Deltoides* (*anteà*, p. 193), to which Guenée himself suggested that it might not inappropriately be referred.

FAMILY CHLOROCHROMIDÆ.

Guenée called this family *Geometridæ*, but this name cannot be retained, because the true types of *Geometra*, Linnæus, belong to Guenée's family *Ennomidæ*. I have therefore chosen Duponchel's very appropriate name of *Chlorochromidæ*.

The antennæ are generally more or less pectinated in the male; the palpi and proboscis are slender; the abdomen sometimes crested; and the hind tibiæ sometimes provided with a single pair of spurs. The wings are generally rounded and entire (rarely dentated or angulated), smoothly scaled, and of a green colour, with transverse lines.

The larvæ are more or less rugose, with two small points on the head, neck, and at the extremity of the abdomen. The pupæ are spun between leaves with threads.

GENUS TERPNE.

Geometra, pt. Linnæus, Syst. Nat. (ed. x.) i. p. 519 (1758); Treitschke, Schmett. Eur. vi. (i), p. 100 (1827); Boisduval, Gen. Ind. Meth. p. 179 (1840); Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 343 (1857); Walker, List Lepid. Ins. Brit. Mus. xxii. p. 506 (1861), *nec Leach & Stephens, restr.*

Terpne, Hübner, Tentamen, p. 2 (1810?).

Holothalassis, Hübner, Verz. bek. Schmett. p. 285 (1822).

Hipparchus, Leach, Edinb. Encycl. ix. p. 134 (1815); Stephens, Ill. Brit. Ent. Haust. iii. p. 177 (1831).

The antennæ are pectinated in the male, and ciliated in the female; the palpi are approximating, the abdomen long and smooth, and the legs scaly, the hind tibiæ being furnished with two pairs of spurs. The wings are broad, and the hind-wings slightly dentated.

The larvæ are pubescent, rugose, and granulose, with a small head, and live on trees. The pupæ are rugose, and enclosed in transparent cocoons among moss.

THE LARGE EMERALD. TERPNE PAPILIONARIA.

(*Plate CXLVII., Fig.* 3.)

Geometra papilionaria, Linnæus, Syst. Nat. (ed. x.) i. p. 522, no. 151 (1758); id. Faun. Suec. p. 326 (1761); Esper, Schmett. v. p. 40. Taf. 6, figs 1–4 (1795?); Hübner, Eur. Schmett. v. fig. 6 (1797); Treitschke, Schmett. Eur. vi. (1), p. 103 (1827); Kirby, Eur. Butterflies and Moths, p. 335, pl. 47, fig. 3 (1882); Buckler, Larvæ of Brit. Lepid. vii. pl. 114, figs. 4–4 *d* (1897).

Hipparchus papilionarius, Stephens, Ill. Brit. Ent. Haust. iii. p. 178 (1831).

The Large Emerald Moth is found throughout Europe and Northern Asia. It expands from two inches to two inches and a half.

It is bright green, with a white band on the fore-wings, composed of lunules bordered with deeper green. A second band more distinct than the first, and also composed of lunules, runs beyond the central area. In the central area, not far from the costa, is a dark green lunule. The second transverse line is continued on the hind-wings, and there is also a slight central lunule.

The larva feeds on birch, beech, elm, &c. It is green, with a yellow lateral line, and a brownish-yellow head. On the

third, sixth, seventh, eighth, ninth and thirteenth segments, there are pairs of conical elevations of a reddish-brown or rose-colour.

The pupa is pale brownish or reddish above, and greenish-yellow beneath, and is enclosed in a translucent white cocoon.

The moth appears from May to August.

FAMILY MECOCERIDÆ.

Antennæ very long, with long, fine, close pectinations in the male; palpi scaly, longer than the head; proboscis long and spiral. Body rather slender; abdomen laterally carinated in the male, and fusiform in the female. Legs slender, long and bare; tarsi long; hind tibiæ with two pairs of rather distant spurs. Wings ample; rather delicate.

Larva with ten legs, very long and slender; pupa placed on the surface of the ground.

This is a small, but very curious, American family, including only a few species.

GENUS MACROTES.

Ametris, pt. Hübner, Verz. bek. Schmett. p. 303 (1822?); Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 387 (1857); Walker, List Lepid. Ins. Brit. Mus. xvi. p. 6 (1858).

Macrotes, Westwood, in Jardine's Nat. Libr. Exot. Moths, p. 212 (1841).

The antennæ are very long, and bipectinated and strongly ciliated to the tips in the male; the palpi are very long, compressed, and scaly, and the legs are very long and slender. The abdomen is very long and slender, and the wings are oblong, dentated, and angulated, with a large transparent spot in the middle of the fore-wings.

MACROTES NETRIX.

(*Plate CXLV., Fig.* 3.)

Geometra netrix, Cramer, Pap. Exot. ii. pl. 151, Fig. E (1777).
Phalæna netrix, Sepp, Surin. Vlind. i. p. 69, pl. 31 (1848).
Macrotes netrix, Westwood in Jardine's Nat. Libr. Exot. Moths, p. 212, pl. 29, fig. 2 (1841).
Ametris netricaria, Guenée, Spec. Gén. Lépid. Uran. et Phal. p. 388, pl. 15, fig. 1 (1857).

This curious Moth, which expands two and a quarter inches in expanse, is bright green when alive, but soon fades to dull green or olive. The costa and hind margin are narrowly reddish, and there is a sub-marginal row of reddish dots. In the middle of the hind-wings is a large transparent spot, bordered with black and red.

The larva is very long and slender; the head and legs are black, and there are two white dots at the back of the head, which is edged behind with orange; the pro-legs are orange; the back is dotted with white, and there is a slender interrupted stigmatic line. It feeds on a species of *Ficus* (?). The larva rests in the usual position assumed by the larvæ of *Geometræ*, and drops down by a silken thread, when touched. The pupa is green, very long and slender, and is said to rest on the surface of the ground without a cocoon.

This insect is found in a great part of South America, and in the West Indies.

GENUS MECOCERAS.

Mecoceras, Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 388 (1857); Walker, List Lepid. Ins. Brit. Mus. xxii. p. 606 (1861).

This genus differs from the last in the wings being rounded, and the hind-wings dentated, and in the antennæ of the male being less broadly pectinated, and simple at the extremity.

MECOCERAS BITACTARIA.

(*Plate CXLV., Fig.* 2.)

Mecoceras bitactaria, Walker, List Lepid. Ins. Brit. Mus. xxii. p. 607, no. 2 (1861).

This species is a native of Jamaica.

"Dull pale cinereous yellow, with a greenish tinge. Head and palpi ferruginous red; vertex white; front with two yellow points; second and third joints with yellow tips. Abdomen with a row of black points. Wings minutely black-speckled, with a middle nebulous incomplete brown band, and with an exterior line of black points; marginal points ferruginous red, much more attenuated in the fore-wings than in the hind-wings. Fore-wings subfalcate, with a line of black points near the base, and with a black discal dot. Hind-wings dentate, with two white connected red-bordered discal spots; a red apical spot, towards which the points are larger, and more distinctly white-bordered. Length of the body, from eight to ten lines; of the wings, from twenty to twenty-four lines."—*Walker.*

FAMILY PALYADÆ.

Antennæ long and slender, rarely pectinated or ciliated. Palpi and proboscis well-developed, the former broad, scaly, and ascending, Abdomen and legs long and slender; hind tibiæ not swollen, and furnished with two pairs of spurs. Wings ample, smooth, entire.

This is another small Tropical family, represented in both hemispheres.

GENUS EUMELEA.

Eumelea, Duncan, Nat. Libr. Exot. Moths, p. 215 (1841); Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 391 (1857);

Walker, List Lepid. Ins. Brit. Mus. xxii, p. 609 (1861)
Hampson, Faun. Brit. Ind. Moths, iii, p. 320 (1895).

This genus is easily recognised by its very long simple antennæ, very long and slender legs, with the hind femora and tibiæ of the male set with bristles, and its very long tarsi. The wings are rounded, and red or yellow; and most of the described forms are probably only colour-varieties of one species.

EUMELEA ROSALIA.

(*Plate CXLVII., Fig.* 4.)

Geometra rosalia, Cramer, Pap. Exot. iv. pl. 368, fig. F (1781).

Ametris punicearia, Hübner, Verz. bek. Schmett. p. 303, no. 2924 (1822 ?).

Eumelea rosalia, Duncan, in Jardine's Nat. Libr. Exot. Moths, p. 215, pl. 29, fig. 4 (1841); Hampson, Faun. Brit. Ind. Moths, iii. p. 320, fig. 155 (1895).

Eumelea rosaliata, Guenée, Spec. Gén. Lépid. Uran. et Phal. p. 392 (1857).

This moth, and its numerous varieties or sub-species, is found throughout the Indo-Malayan region. They expand from two inches to two inches and a quarter; and the wings are rose-coloured, more or less blotched and mottled with yellow, sometimes one colour predominating, and sometimes the other.

FAMILY EPHYRIDÆ.

These are rather small Moths, with the antennæ of the male pectinated for three-fourths of their length; and with long legs, the hind tibiæ being armed with one pair of spurs. The wings, which are extended in repose, are generally greenish, white, or pale reddish, with an ocellated spot in the centre of each.

The larvæ are long and cylindrical, with a large head, and feed on trees. The pupæ are green or testaceous, and are suspended from a leaf by the tail, or attached by a thread round the middle, like those of Butterflies, which they also resemble in shape; the front of the body being almost square, and the extremity conical.

GENUS CYCLOPHORA.

Cyclophora, Hübner, Tentamen, p. 2 (1810?); Moore, Lepid. Ceylon, iii. p. 441 (1887).

Leucophthalmia, Hübner, Verz. bek. Schmett. p. 302 (1822?); Meyrick, Handb. Brit. Lepid. p. 244 (1895).

Ephyra, Duponchel, Lépid. France, viii. (1), p. 20 (1830); Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 405 (1852); Walker, List Lepid. Ins. Brit. Mus. xxii. p. 624 (1861), *nom. præocc.*

Zonosoma, Lederer, Verhandl. zool.-bot. Ges. Wien. iii. p. 174 (1853).

This is the principal genus of the family. It is well represented in most parts of the world, and there are several British species.

THE DINGY MOCHA. CYCLOPHORA ORBICULARIA.

Geometra orbicularia, Hübner, Eur. Schmett. v. fig. 60 (1798?).

Cabera orbicularia, Treitschke, Schmett. Eur. vi. (1), p. 364 (1827).

Ephyra orbicularia, Stephens, Ill. Brit. Ent. Haust. iii. p. 199 (1831); Buckler, Larvæ of Brit. Lepid. vii. p. 65, pl. 115, figs. 9–9 *b* (1897).

Zonosoma orbicularia, Kirby, Eur. Butterflies and Moths, p. 355 (1882).

This species is found in most parts of Central Europe. It expands about an inch.

The ground colour is pale grey, thickly sprinkled with yellowish-brown and reddish-brown atoms. The usual transverse lines are replaced by rows of brown dots. In the centre of both fore- and hind-wings is a small reddish ring, filled in with white. The hind-wings are nearly square.

The Dingy Mocha.

The larva feeds on sallow. It is bright apple-green, with a light brown head. There is a light greyish dorsal line, finely edged with dark green, as well as two waved greyish sub-dorsal lines, and a white spiracular area sometimes blotched with pink or pale violet, and black spiracles. On each segment from the fifth to the ninth is an oblique smoky spot extending into the spiracular area.

The pupa is greyish-white, with smoky streaks on the wing-cases, and a light grey longitudinal line over the middle of the back, with black dots on each side.

The Moth appears from May to August. It is the rarest species of the genus found in England.

FAMILY IDÆIDÆ.

This is a very extensive family, including Moths of small or moderate size, with the antennæ simple, or finely pectinated in the male; palpi short; proboscis prominent; abdomen smooth; and hind-tibiæ often swollen in the male; often with only one pair of spurs. The wings are generally rather short and

broad, white or yellow, with two transverse lines, and a central spot. The hind-wings are rounded or angulated. The moths are generally called "Waves" by collectors.

The larvæ are slender and cylindrical, feeding concealed on low plants, and the pupæ are brown, and enclosed in fine cocoons.

As the generic name *Acidalia* (Treitschke) is preoccupied, I adopt the name used by Mr. Moore for this family.

GENUS CRASPEDIA.

Craspedia, Hübner, Verz. bek. Schmett. p. 312 (1822 ?).
Idæa, Treitschke, Schmett. Eur. vi. (2), p. 258 (1828).
Acidalia, Duponchel, Lépid. France, viii. (1), p. 70 (1830); Guenée, Spec. Gén. Lépid. Uran. et Phal. i. p. 444 (1857), *nec Treitschke, nec Hübner*.

The type of this genus is one of the most elegant of the British species of this family.

THE LACE BORDER. CRASPEDIA ORNATA.

Phalæna ornata, Scopoli, Ent. Carn. p. 219, no. 545 (1763).
Geometra paludata, Linnæus, Syst. Nat. (ed. xii.) i. (2), p. 873, no. 277 (1767).
Geometra ornataria, Esper, Schmett. v. Taf. 51, fig. 3 (1795 ?); Hübner, Eur. Schmett. v. fig. 70 (1799 ?).
Idæa ornata, Treitschke, Schmett. Eur. vi. (2), p. 283 (1828).
Ptychopoda ornata, Stephens, Ill. Brit. Ent. Haust. iii. p. 307 (1831).
Acidalia ornata, Kirby, Eur. Butterflies and Moths, p. 353 (1882); Buckler, Larvæ of Brit. Lepid. vii. p. 107, pl. 118, figs. 4, 4 a (1897).

The Lace Border is common in most parts of Europe, Western Asia, and Northern Africa. It expands about an inch.

It is snow-white, with a fine brown line near the base on the fore-wings, dotted on the nervures, and followed by a zig-zag shade. Next comes a broad band of white, and beyond this a zig-zag curved line, varied with light brown and bluish-grey spots, and intersected by a sinuated white line. The hind-wings have a black central lunule, and the sub-marginal markings are continued on them. The fringes are chequered with brown and white.

The Lace Border.

The larva lives on mint and wild thyme. It is brownish ochreous, with a fine light grey dorsal line, interrupted on each segment from the fifth to the ninth by an X-shaped mark. There is a dark brown sub-dorsal line, and a pale ochreous spiracular line, bordered below with dusky.

The moth appears in May and June, and again in August. It is a local insect on the chalk in the South of England.

FAMILY MICRONIIDÆ.

This family is entirely exotic, and includes a number of moderate-sized species, with short antennæ, sometimes pectinated in the males, slender palpi, a short abdomen, and short stout legs. The wings are broad, and generally white, flecked with grey, and marked with oblique or transverse darker lines. The cells are very short. The fore-wings are usually pointed, and the hind-wings angulated, often with black spots before the angle.

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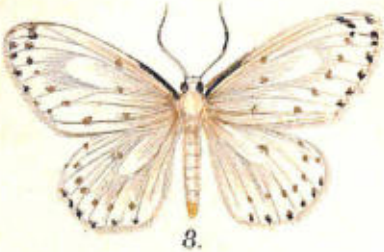

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1. *Acropteris striataria.*
2. *Epidesmia tricolor.*
3. *Rhyparia melanaria.*
4. *Panagthia maculosa.*
5. *Spilote grossulariata.*
6,7 „ „ „ *larva.*
8. *Psilonaxa seriaria.*

The larvæ are little known, but it is said that they resemble those of the *Uraniidæ*, thus justifying Sir George Hampson's removal of them to that family. A typical species is, however, figured here, in order to illustrate Guenée's series of families of *Geometræ*.

GENUS ACROPTERIS.

Acropteris, Hübner, Zutr. Exot. Schmett. iv. p. 36 (1832); Hampson, Faun. Brit. Ind. Moths, iii. p. 114 (1895).

Micronia, pt. Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 22 (1857).

In this genus the fore-wings are rather longer, narrower, and more pointed than in its allies, and the hind-wings have a less pronounced angle, without black spots. The markings diverge obliquely from the tip of the fore-wings.

ACROPTÉRIS STRIATARIA.

(*Plate CXLVIII., Fig.* 1.)

Geometra striataria, Clerck, Icones, pl. 55, fig. 4 (1759); Linnæus, Syst. Nat. (ed. xii.), i. (2), p. 859, no. 197 (1767).

Micronia striataria, Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 28 (1857); Walker, List Lepid. Ins. Brit. Mus. xxiii. p. 818 (1861); Moore, Proc. Zool. Soc. Lond. 1867, p. 646.

Acropteris striataria, Moore, Desc. Ind. Lepid. Atk. p. 257 (1887); Hampson, Faun. Brit. Ind. Moths, iii. p. 115 (1895).

This is an Indian Moth, with rather pointed fore-wings, and angulated hind-wings. It expands about two inches. The wings are white, the fore-wings dotted with black on the costa, and there are several double brown streaks running from the base

of the fore-wings and the inner margin of the hind-wings, and narrowing and converging towards the tip of the fore-wings.

FAMILY EROSIIDÆ.

This family was founded by Mr. F. Moore in his "Lepidoptera of Ceylon" (iii. p. 398). He defines it as follows :—

"Fore-wing either long and narrow, or short and broad, sometimes dentate; hind-wing short, generally broad, dentate, or notched; in some, almost caudate. Both wings in some genera longitudinally convoluted when at rest. Palpi slender, porrect, or incumbent; antennæ short, curly, robust, velvety, crenulated, rarely pectinate in the male.

"Larva with sixteen legs; cylindrical, truncate at the end; with a few short fine hairs. Pupa short, stout; head broad; formed in a slight web."

These moths are included by Guenée in the *Micronitidæ*, while Sir George Hampson refers them to his family *Epiplemidæ*, which he places between the *Uraniidæ* and the *Geometridæ*. They can hardly be true *Geometræ*.

FAMILY CABERIDÆ.

This is a small family resembling the *Idæidæ*, with white, yellowish, or brown wings, with darker transverse lines. The antennæ are generally pectinated, and the hind tibiæ are not swollen, but are always armed with two pairs of spurs in both sexes. The larvæ feed on trees, and the pupæ are contained in cocoons.

GENUS CABERA.

Sphecodes, Hübner, Tentamen, p. 2 (1810) *nom. præocc.*
Deilinia, Hübner, Verz. bek. Schmett. p. 310 (1822?); *too similar to Dilina.*

Cabera, Treitschke, Schmett. Eur. vi. (1), p. 343 (1827); Guenée, Spec. Gén. Lépid. Uran. et. Phal. ii. p. 52 (1857).

Three British species, two of which are very common, belong to this, the typical genus of the family.

THE WHITE WAVE. CABERA PUSARIA.

Geometra pusaria, Linn. Syst. Nat. (ed. x.), i. p. 522, no. 150 (1758); id. Faun Suec. p. 329, no. 1251 (1761); Clerck, Icones, pl. 3, fig. 6 (1759); Esper, Schmett. v. p. 177, Taf. 31, figs. 12–13 (1795?); Hübner, Eur. Schmett. v. fig. 87 (1798?).

Cabera pusaria, Treitschke, Schmett. Eur. vi. (1), p. 344 (1827); Stephens, Ill. Brit. Ent. Haust. iii. p. 196 (1831); Kirby, Eur. Butterflies and Moths, p. 311 (1881); Buckler, Larvæ of Brit. Lepid. vii. pl. 120, figs. 2–2 b (1897).

The White Wave.

The White Wave is common throughout the greater part of Europe and Western Asia. It expands from an inch to an inch and a quarter. It is white with three grey transverse lines across the fore-wings, and two on the hind-wings. The first and third lines are sharply defined, but the second is somewhat less distinct. All the wings are sprinkled with grey dots. The larva feeds on birch, beech, elm, willow, &c., and is found from June to September. It is slender, and varies much in colour, and may be green, yellowish, or brown. On the last segment are two raised projections. Some specimens

have a dorsal row of reddish-brown dots, whilst others have a series of dashes or a line. There is generally a lateral row of small brown dots. The pupa is shining brown. It is enclosed in a slight cocoon in the ground.

FAMILY MACARIIDÆ.

These are rather small moths, with ciliated, but rarely pectinated antennæ, moderately long abdomen and legs, the latter unarmed, but the tibiæ half as long again as the femora, and often swollen. The fore-wings are triangular, pointed, and often concave below the tip; the hind-wings are often dentated or angulated.

The larvæ are short and cylindrical, and feed on trees or shrubs; the pupæ are enclosed in cocoons, on or under the ground.

The moths of this family have considerable mutual resemblance; and though the species are rather numerous, very few are found in Europe.

GENUS MACARIA.

Macaria, Curtis, Brit. Ent. iii. pl. 132 (1826); Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 66 (1857); Walker, List Lepid. Ins. Brit. Mus. xxiii. p. 878 (1861).

Semiothisa, pt. Hübner, Verz. bek. Schmett. p. 298 (1822?).

Curtis' name may be retained for the species which he figured, leaving *Semiothisa*, Hübner, for those in which there is a notch below the tip of the fore-wings.

THE TAWNY-BARRED ANGLE MOTH. MACARIA LITURATA.

Geometra liturata, Clerck, Icones, pl. 6, fig. 6 (1759); Linnæus, Faun. Suec. p. 334 (1761); Hübner, Beitr. Schmett. i. (4), p. 29, Taf. 4, fig. X (1789); Esper, Schmett. v. p. 89, Taf. 16, figs. 7–9 (1795?).

Geometra lituraria, Hübner, Eur. Schmett. v. fig. 54 (1798?); fig. 314 (1802).

Macaria liturata, Curtis, Brit. Ent. iii. pl. 132 (1826); Stephens, Ill. Brit. Ent. Haust. iii. p. 320 (1831); Kirby, Eur. Butterflies and Moths, p. 304 (1881); Buckler, Larvæ of Brit. Lepid. pl. 121, figs. 4–4 b (1897).

Ennomos lituraria, Treitschke, Schmett. Eur. vi. (1) p. 12 (1827).

The Tawny-Barred Angle Moth.

This Moth inhabits the greater part of Europe and Northern and Western Asia. It expands about an inch and a quarter.

The antennæ are light brownish-yellow, slightly pectinated in the male, and simple in the female. The fore-wings are violet-grey, dusted with dark grey. On the costa are three dark brown streaks, from which run zig-zag transverse lines. Then follows an ochre-yellow band shaded with brownish, and often indistinct towards the inner margin, with a ferruginous streak on its outer side at the costa. The hind-wings have a central lunule, and the transverse lines are faintly continued on them.

The larva feeds on the Scotch fir. It is green, with a brown head, and dingy white dorsal and sub-dorsal lines, and a pure white, or pale yellowish spiracular line.

The moth appears in May, and again in July and August.

FAMILY FIDONIIDÆ.

Moderate-sized moths, with pectinated antennæ, hairy head and palpi, the latter prominent, and beak-like; the proboscis short, and the body rather long and slender. The legs are bare and slender, and the hind tibiæ are not swollen. The wings are broad, and generally dusted with dark specks. The larvæ are long and cylindrical, and the pupæ are generally subterranean. The moths fly by day.

This is a Family of considerable extent. Several common European species are heath-frequenting insects.

GENUS EPIDESMIA.

Epidesmia, Westwood in Jardine's Nat. Libr. Exot. Moths p. 220 (1841).

The body is slender; the head small; the antennæ long, slender, and filiform; the palpi nearly three times as long as the head, compressed, slender, attenuated to the tip, and curved downwards; the spiral tongue long. The fore-wings are large, and somewhat triangular, with the apex acute, and slightly falcate. The median nervure of the fore-wings emits three branches, the third of which is connected by a slender nervule with the inner branch of the sub-costal nervure, a simple longitudinal nervule extending from the base of the wing to the extremity, through the middle of this cross vein. The first and second branches of the sub-costal nervure do not reach to the costal margin of the wing, but form small oblong cells. The hind-wings are large, with the hind margin slightly emarginate. The abdomen is slender, but somewhat thickened towards the extremity. The legs are long and slender, and the front coxæ are elongated.

EPIDESMIA TRICOLOR.

(*Plate CXLVIII., Fig.* 2.)

Epidesmia tricolor, Westwood, Jardine's Nat. Libr. Exot. Moths, p. 220 (1841).

Panagra tricolor, Walker, List Lepid. Ins. Brit. Mus. xxiii. p. 992, no. 8 (1861).

This species inhabits New South Wales. It expands two inches and three-quarters.

The wings are brown, the fore-wings with a cream-coloured transverse band just beyond the middle, which inclines somewhat towards the hinder angle; the inner border of this band is slightly concave, but the outer border is angulated just below the middle. The hind-wings have a large central orange patch, which is almost round. The cilia at the hinder angles of all the wings are white. The thorax is brown, and the abdomen cream-coloured.

GENUS BOTYS.

Botys, Latreille, Hist. Nat. Crust. Ins. iii. p. 414 (1802), xiv. p. 229 (1805); id. Consid. Gén. pp. 369, 441 (1810); *nec Treitschke, Guenée.*

Lythria, Hübner, Verz. bek. Schmett. p. 300 (1822?); Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 171 (1857).

The antennæ in the male are short and plumose, and the legs are short and hairy; the hind tibiæ hardly longer than the femora, with two pairs of spurs. The wings are short and velvety.

The larvæ feed on low plants, and the pupæ are subterranean.

THE PURPLE-BARRED YELLOW MOTH. BOTYS PURPURARIA.

Geometra purpuraria, Linnæus, Syst. Nat. (ed. x.), i. p. 522, no. 147 (1758); id. Faun. Suec. p. 329, no. 1254 (1761); Clerck, Icones, pl. 9, fig. 11 (1759); Esper, Schmett. v. p. 173, Taf. 31, figs. 1–6 (1795?); Hübner, Eur. Schmett. v. figs. 138, 139 (1801?).

Geometra purpurata, Linnæus, Faun. Suec. p. 341, no. 1302 (1761).

Aspilates purpuraria, Treitschke, Schmett. Eur. vi. (1), p. 127 (1827); Stephens, Ill. Brit. Ent. Haust. iii. p. 207 (1831).

Lythria purpuraria, Kirby, Eur. Butterflies and Moths, p. 358, pl. 47, fig. 15 (1882); Buckler, Larvæ of Brit. Lepid. vii. p. 144 (1897).

The Purple-Barred Yellow Moth.

This pretty species is common in most parts of Europe and Asia Minor, but is rare in Britain. It expands about an inch.

The fore-wings are olive-green in the male, but are generally more golden yellow in the female, with two deep rose-coloured bands. The first, which is near the base, is curved inwards, and usually ends about the middle, but it may be continued across the wings, especially in the female. The second band is sub-marginal, and runs entirely across the wing. There is frequently a rose-coloured lunule in the central area, which is connected with the outer band. The hind-wings are golden yellow, somewhat suffused with olive-green on the inner margin, and have a narrow rose-coloured marginal line.

The larva feeds on sloe, oak, and *Polygonum*. It is dull green or deep rose-colour, with a broad yellowish-white spiracular stripe, on which stand the white spiracles, which are finely ringed with black. The second segment is nearly black, with yellowish-white dorsal and sub-dorsal lines. Of these the dorsal line is continued uninterrupted to the extremity, but the sub-dorsal lines do not extend far. The belly is bluish-green.

FAMILY EUSCHEMIDÆ.

This Family includes large East Indian moths, which were placed by many authors among the *Bombyces* before their metamorphoses were discovered. They form Guenée's family *Hazidæ*. The antennæ are long, and bi-pectinated in both sexes. The proboscis, palpi, and legs are stout, the hind tibiæ being inflated, channelled, and containing pencils of hairs. The abdomen is moderately stout, and the wings are broad, entire, and brightly coloured, the fore- and hind-wings being frequently similarly coloured.

"Larva with ten legs; when in repose stands erect with the head and anterior segments bent downward; head rather small. Pupa obtuse in front; anal segment terminated with numerous minute hooked bristles. The moth is diurnal in its habits, remaining out in the evening till just after sunset" (*Moore*).

GENUS EUSCHEMA.

Euschema, Hübner, Verz. bek. Schmett. p. 175 (1822?); Walker, List Lepid. Ins. Brit. Mus. ii. p. 404 (1854); Moore, Lepid. Ceylon, iii. p. 422 (1887); Hampson, Faun. Brit. Ind. Moths, iii. p. 467 (1895).

Hazis, Boisduval, Voy. Astrolabe, Lépid. p. 203 (1832); Guénee, Spec. Gén. Lépid. Noct. ii. p. 188 (1857).

Heleona, pt. Swainson, Zool. Illustr. (2), iii. pl. 116 (1833).

This genus is found from India to Australia.

EUSCHEMA DISCALIS.

(*Plate CXLIX.*, *Fig.* 4.)

Euschema discalis, Walker, List Lepid. Ins. Brit. Mus. ii. p. 407, no. 5 (1854).

This Moth is found at Penang.

"Whitish. Disk of the front brown. Palpi towards the tips, proboscis, and antennæ black. Thorax with two blackish-blue bands in front. Pectus and coxæ with yellow hairs. Abdomen pale yellow at the tip and beneath. Fore-wings blackish blue, with three interrupted and irregular white hyaline bands; a large white mark on the hind border corresponding to the white of the hind-wings. Hind-wings towards the base white; including a blackish-blue spot, beyond which they are blackish-blue, and include two macular irregular yellow bands. Length of the body, from eight-and-a-half to nine lines; of the wings, from thirty to thirty-two lines" (*Walker*).

GENUS DYSPHANIA.

Dysphania, Hübner, Verz. bek. Schmett. p. 175 (1822?).
Heleona, pt. Swainson, Zool. Illustr. (2), iii. pl. 116 (1833).

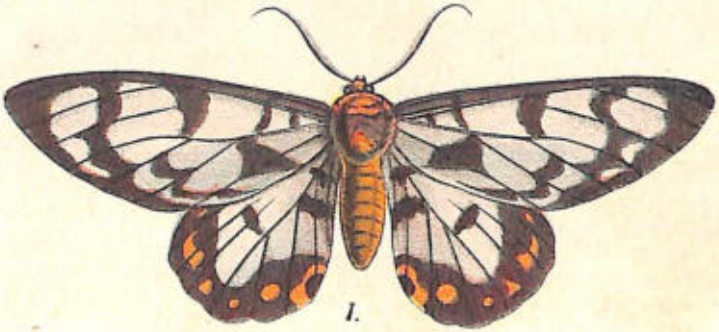
This genus differs from *Euschema* by its longer and narrower wings, and more transparent markings.

DYSPHANIA FENESTRATA.

(*Plate CXLIX.*, *Fig.* 1.)

Heleona fenestrata, Swainson, Zool. Illustr. (2) iii. pl. 116 (1833); Duncan in Jardine's Nat. Libr. Exot. Moths, p. 95, pl. 4, fig. 1 (1841); Walker, List Lepid. Ins. Brit. Mus. ii. p. 339 (1854).

Hazis velitaria, Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 191 (1857).



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1. *Dysphania fenestrata.*
2. *Sangala gloriosa.*
3. *Milionia basalis.*
4. *Euschema discalis.*

This species is a native of Australia. It expands about three inches. The fore-wings are sub-hyaline, pale lilac, with irregularly arranged dark purple spots; and the costa and hind margin are of the same colour. The hind-wings resemble the fore-wings, but have fewer markings on the surface, and have a broad marginal band, through the middle of which runs a row of orange spots, some round, others angular, and one at the anal angle nearly semi-circular. The head and body are orange, and the antennæ black.

GENUS MILIONIA.

Milionia, Walker, List Lepid. Ins. Brit. Mus. ii. p. 364 (1854); Hampson, Faun. Brit. Ind. Moths, iii. p. 312 (1895).

Antennæ slightly pectinated in the male, pilose beneath in both sexes. Palpi short, stout, ascending. Abdomen shorter than the hind-wings, and slightly tufted at the tip in the male. Legs rather stout, hind tibiæ with four spurs of moderate length, and dilated, with a fold containing a pencil of hair. Fore-wings oblong, hind margin curved; much longer than the rounded hind-wings.

A genus of rather large and very richly-coloured East Indian moths. They are velvety black, or deep purplish blue, with broad bands of orange and crimson.

MILIONIA BASALIS.

(*Plate CXLIX., Fig.* 3.)

Milionia basalis, Walker, List Lepid. Ins. Brit. Mus. ii. p. 365, no. 2 (1854).

This species is a native of Java, and is thus described:—"Bright blue. Proboscis and antennæ black. Thorax partly brownish-black. Abdomen brownish-black, with a blue band

on the hind border of each segment. Legs partly black. Wings black, streaked with bright blue towards the base. Fore-wings with an oblique and slightly curved orange band in the middle; its hind end contiguous to the orange band near the tips of the hind-wings in the male; borders of the hind-wings of the male with orange spots. Length of the body, from six to seven lines; of the wings, from twenty-three to twenty-four lines" (*Walker*).

GENUS SANGALA.

Sangala, Walker, List Lepid. Ins. Brit. Mus. ii. p. 384 (1854).

Antennæ pectinated in the male, and serrated in the female. Palpi shorter than the head; third joint pointed, shorter than the second. Body moderately slender, abdomen not longer than the hind-wings. Legs slender, hind tibiæ with two pairs of spurs. Wings broad, entire, black, with brilliant blue or green reflections, and red spots; hind-wings with three sub-median nervures.

A beautiful and easily recognised South American genus.

SANGALA GLORIOSA.

(*Plate CXLIX., Fig.* 2.)

Sangala gloriosa, Walker, List Lepid. Ins. Brit. Mus. ii. p. 384, no. 1 (1854).

This Moth was first described from Bogotà.

"Black. Abdomen bluish-black. Wings with bright deep blue or green reflections. Fore-wings with a large transverse oblong crimson spot near each tip. Length of the body, seven lines; of the wings, twenty lines" (*Walker*).

FAMILY ZERENIDÆ.

This is a family of rather large or moderate-sized moths, with broad wings, and slender downy bodies; and usually spotted with black on both wings and abdomen. The antennæ are simple or pectinated, the palpi short, and the proboscis well developed. The legs are short, and the hind tibiæ often swollen. The larvæ are short and stout, and feed on trees and shrubs; the pupæ are short and obtuse.

This is one of the prettiest and best-known families of the *Geometræ*.

GENUS PANÆTHIA.

Panæthia, Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 196 (1857); Walker, List Lepid. Ins. Brit. Mus. xxiv. p. 1107 (1862).

This genus includes several species from the Malay Islands and Australia.

PANÆTHIA MACULOSA.

(*Plate CXLVIII., Fig.* 4.)

Arycanda maculosa, Walker (MS.).

This Moth, which inhabits Sumatra, measures about two inches and a half across the wings. The insect varies from bluish-grey to dull blue, with numerous black spots and markings on the thorax and wings. The fore-wings have a large spot at the base, five transverse bands, more or less broken up into spots, and a row of oblong longitudinal spots on the hind margin. The hind-wings have four macular bands, the third occupying less than the upper half of the wing; and sub-marginal oval spots, as in the fore-wings. The abdomen is yellow, with the base grey.

GENUS RHYPARIA.

Rhyparia, Hübner, Verz. bek. Schmett. p. 305 (1822 ?); Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 197 (1857); Walker, List Lepid. Ins. Brit. Mus. xxiv. p. 1110 (1862).

A widely-distributed genus, but not very numerous in species. The antennæ are more strongly pectinated than in most genera of the family.

RHYPARIA MELANARIA.

(*Plate CXLVIII., Fig.* 3.)

Geometra melanaria, Linnæus, Syst. Nat. (ed. x.), i. p. 527, no. 138 (1758); id. Faun. Suec. p. 326, no. 1240 (1761); Clerck, Icones, pl. 4, fig. 2 (1759); Esper, Schmett. v. p. 115, Taf. 23, fig. 1 (1795 ?); Hübner, Eur. Schmett. v. fig. 86 (1798 ?).

Zerene melanaria, Treitschke, Schmett. Eur. vi. (2), p. 236 (1828).

Rhyparia melanaria, Kirby, Eur. Butterflies and Moths, p. 316, pl. 45, fig. 7 (1882).

This species is found in most parts of Central and Northern Europe, except the north-west; and in Northern Asia. It expands from an inch and three-quarters to two inches.

The fore-wings are dingy white, something like raw silk, with rows of black spots of different sizes, which are generally arranged more or less as follows:—At the base there are three rows close together, and here the ground-colour is varied with yellow, as is also the costa. In the central area there are again three rows, with a larger spot at the commencement of the first row, usually containing a white pupil. In the marginal area are two rows, with small dots between them. The fringes are chequered with black and white or yellowish, and are bordered with a white line. The hind-wings are rich golden

yellow, with four rows of detached black spots, and the base is sprinkled with black dots. The fringes are black and golden yellow. The larva feeds on *Vaccinium*. It is dark green above, with a dark blue dorsal line, and white sub-dorsal lines, spotted with black; then follows a broad yellow stripe on the upper part of the sides, containing two blue lines, and below this is a blue stripe containing two yellow lines.

GENUS SPILOTE.

Spilote, Hübner, Tentamen, p. 2 (1810?).
Abraxas, Leach, Edinb. Encycl. ix. p. 134 (1819); Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 201 (1857); Walker, List Lepid. Ins. Brit. Mus. xxiv. p. 1114 (1862).
Zerene, pt. Treitschke, Schmett. Eur. vi. (2), p. 217 (1828).

This is one of the most typical genera of the family, and is very numerously represented in Europe and Asia.

THE MAGPIE MOTH. SPILOTE GROSSULARIATA.

(*Plate CXLVIII., Fig.* 5; *larvæ, Figs.* 6, 7.)

Geometra grossulariata, Linnæus, Syst. Nat. (ed. x.), i. p. 525, no. 167 (1758); id. Faun. Suec. p. 331 (1861); Hübner, Eur. Schmett. v. figs. 81, 82 (1798?).
Zerene grossulariata, Treitschke, Schmett. Eur. vi. (2), p. 237 (1828).
Abraxas grossulariata, Stephens, Ill. Brit. Ent. Haust. iii. p. 247 (1831); Kirby, Eur. Butterflies and Moths, p. 314 pl. 45, figs. 5–5 d (1882); Buckler, Larvæ of Brit. Lepid. vii. p. 150, pl. 124, figs. 1–1 d (1897).

The Magpie Moth is common throughout the greater part of Europe and Northern and Western Asia. It expands from an inch and a half to an inch and three-quarters.

The body is yellow, with black spots, and the wings are

white. On the fore-wings are two yellow bands, one near the base and the other beyond the middle, each bordered on both sides by rows of black spots, which may be more or less confluent. There is usually a row of black spots in the central area, and another on the hind margin. The hind-wings have an incomplete central row of spots, sometimes connected by a faint yellow line, and another row on the hind margin. The moth varies considerably, and the black spots may almost disappear, or may be much more heavily marked than usual.

The larva feeds on currant, raspberry, gooseberry, &c. It is creamy white, with transverse black dorsal spots, black spots on the sides, and an orange-coloured spiracular stripe. The body is covered with short fine hairs. The pupa is dark reddish-brown, or nearly black, with orange stripes.

The moth appears in July and August, and is common in almost every garden.

GENUS PSILONAXA.

Psilonaxa, Warren, Proc. Zool. Soc. London, 1893, p. 343.

This genus and its allies include white, black-spotted moths, found in Eastern Europe, and in various parts of Asia.

PSILONAXA SERIARIA.

(*Plate CXLVIII., Fig.* 8.)

Orthostixis lætata, Bremer, Lepid. Ost. Sib. p. 84 (1864), *nec Fabricius.*

Orthostixis seriaria, Motschulsky, Bull. Soc. Nat. Mosc. xxxix. (1) p. 196 (1866).

Zerene taicoumaria, De l'Orza, Lépid. Jap. p. 48 (1869).

Orthostixis bremeraria, Staudinger, Cat. Lepid. Eur. p. 155, no. 2241 (1871).

This Moth inhabits Japan and Amurland, and measures two inches across the wings, which are broad, silky-white, and

rounded, with the costa of the fore-wings considerably arched. There is a double row of black spots, marginal and submarginal, on all the wings, black spots at the end of the cells, and three black spots nearer the base of the fore-wings, which have also a short black line at the base of the costa.

FAMILY LIGIIDÆ.

The antennæ are thick, and usually pectinated; the thorax is short, hairy, and often crested; the legs are stout; and the hind tibiæ furnished with two pairs of spurs in both sexes; and the tarsi are often spiny. The wings are entire; the fore-wings long, and the hind-wings long and unusually narrow, and usually destitute of markings.

This is a small Family, with representatives in different parts of the world. Several species are found in Europe, and one in England. Three South African species are here figured.

GENUS DICHROMA.

Dichroma, Westwood in Jardine's Nat. Libr. Exot. Moths, p. 224 (1841); Walker, List Lepid. Ins. Brit. Mus. xxiv. p. 1145 (1862).

Argyrophora, Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 230 (1857), *nom. præocc.*

The antennæ are slightly pectinated in the male, and simple in the female; the head and palpi are very scaly, and the proboscis is long and convoluted. The legs are long, and the tarsi spiny; the hind tibiæ are long and slender, with rather long spurs. The fore-wings are prettily marked with silvery-white.

DICHROMA EQUESTRALIS.

(*Plate CL., Fig.* 1.)

Dichroma equestralis, Westwood in Jardine's Nat. Libr. Exot.

Moths, p. 224, pl. 30, fig. 1 (1841); Walker, List Lepid. Ins. Brit. Mus. xxiv. p. 1147, no. 6 (1862).

Argyrophora equestrinaria, Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 232 (1857).

This Moth is found at the Cape of Good Hope. It expands a little over an inch.

The head and thorax are pea-green. The fore-wings are also pea-green, with numerous silvery-white, more or less confluent, lines and spots; three of these are close to the base of the wing, and are succeeded by a deeply angulated line. The central area of the wing is marked with from eight to ten white spots, the middle ones being elongated, and corresponding with the position of the branches of the median nervure; then follows an oblique white sub-marginal line, strongly angulated in the middle, running from the apex to the inner margin of the wing, and sending out, on its outer side, eight straight branches which reach to the hind margin of the wing. The head, body, and hind-wings are silvery-white, slightly shaded with brown.

DICHROMA HISTRIONALIS.

(*Plate CL., fig.* 2.)

Dichroma histrionalis, Westwood, in Jardine's Nat. Libr. Exot. Moths, p. 227, pl. 30, fig. 2 (1841); Walker, List Lepid. Ins. Brit. Mus. xxiv. p. 1146, no. 8 (1862).

Argyrophora histrionaria, Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 232 (1857).

This species is also found at the Cape of Good Hope. It expands about an inch.

The head is white, with a fulvous patch on the vertex; the thorax white, varied with fulvous. The fore-wings are of a beautiful golden fulvous tint, adorned with a number of silvery-white marks, which are strongly relieved by being bordered

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1. *Dichroma equestralis.*
2. „ *histrionalis.*
3. „ *arcualis.*

with black scales; the costa of the fore-wings is also white. At the base of the fore-wings are two divergent white bars, the anterior of which is deeply forked; the upper bar of the fork is short, and beyond it is an elongated mark; across the central area of the wings are four obliquely placed oval white spots, the highest of which is double; then follows a white sub-marginal line, interrupted in the middle, with several straight white lines running from it to the hind margin. The hind-wings and abdomen are silvery-white, slightly shaded with brown.

DICHROMA ARCUALIS.

(*Plate CL., Fig.* 3.)

Dichroma arcualis, Westwood in Jardine's Nat. Libr. Exot. Moths, p. 228, pl. 30, fig. 3 (1841); Walker, List Lepid. Ins. Brit. Mus. xxiv. p. 1147, no. 5 (1862).

Argyrophora arcuaria, Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 232 (1857).

This, like the preceeding species, is also a native of the Cape It expands an inch.

The fore-wings are of a rather pale brown, varied with white markings. Close to the base is a strongly furcate mark, the anterior branch of which is dilated; parallel to the inner margin is a slender white line, which is connected near the middle of the wing with a series of white crescentic marks, placed obliquely, and extending upwards as far as the middle of the wing, above which is a clavate spot. Beyond this, and running obliquely to the apex of the wing, is a strongly dentated white line; and there is a festooned sub-marginal line gradually diminishing above, and ceasing before the apex. The hind-wings and abdomen are white, slightly tinged with brown.

FAMILY HYBERNIIDÆ.

Antennæ short, slightly pectinated or ciliated; palpi and proboscis short or rudimentary; body and legs slender; wings entire; fore-wings rather pointed; hind-wings broad, covered by the fore-wings in repose. Female with obsolete or rudimentary wings.

Larva moderately long, smooth and cylindrical; feeding exposed on trees or shrubs. Pupa short, enclosed in an ovoid cocoon, and subterranean.

This is a small Family, chiefly European, the species of which appear at the end of autumn, or in very early spring.

GENUS HYBERNIA.

Hybernia, Latreille, Fam. Nat. p. 477 (1825); Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 249 (1857).

Erannis, Hübner, Verz. bek. Schmett p. 320 (1826?).

This is the typical genus of the family. The male has slightly pectinated antennæ, and the female is with or without rudimentary wings; but the abdomen is not tufted.

THE MOTTLED UMBRE. HYBERNIA DEFOLIARIA.

Geometra defoliaria, Clerck, Icones, pl. 7, fig. 4 (1759); Linnæus, Faun. Suec. p. 326, no. 1238 (1761); Esper, Schmett. v. p. 200, Taf. 36, figs. 1–7 (1795?); Hübner, Eur. Schmett. v. fig. 182 (1800?), fig. 510 (1818).

Fidonia defoliaria, Treitschke, Schmett. Eur. vi. (1), p. 315 (1827).

Hybernia defoliaria, Stephens, Ill. Brit. Ent. Haust. iii. p. 155 (1831); Curtis, Brit. Ent. xv. pl. 703 (1838); Kirby, Eur. Butterflies and Moths, p. 315, pl. 44, fig. 4 (1882); Buckler, Larvæ of Brit. Lepid. vii. pl. 125, figs. 5, 5a (1895).

The Mottled Umbre is common in most parts of Central and Northern Europe. It expands about an inch and three-quarters.

The Mottled Umbre. Male and Female.

The fore-wings are dull yellow, sprinkled with rusty-brown, so heavily at the base as to form a somewhat curved band. The palest portion of the wings is the central area, which contains a distinct black lunule. This area is bounded by a sharply defined dark brown transverse line, deeply indented opposite the lunule, and beyond it is a ferruginous shade or band. The hind-wings are dull yellowish-white, with a small central dot.

The apterous female has a stout ochre-yellow body, with two longitudinal rows of black spots.

The larva feeds on lime, oak, beech, birch, elm, sloe, white-thorn, and various fruit trees. It is reddish-brown, with a broad sulphur-yellow stripe on the sides, on which stands a small reddish-brown streak on each segment. Between each incision is a grey transverse streak.

FAMILY LARENTIIDÆ.

Antennæ simple or slightly pectinated; proboscis well developed, abdomen often belted or spotted in the incisions. Legs slender, naked, not swollen; front tibiæ half as long as

the femora; hind tibiæ with two pairs of spurs. Wings usually entire, rarely dentated, fore-wings triangular, hind-wings rounded; the fore-wings usually marked with numerous zig-zag lines; the hind-wings nearly without markings.

Larva cylindrical, with a small head; pupa enclosed in a cocoon.

This is a very large Family, but most of the species are of small or moderate size. Among them we find various anomalies. One or two genera have apterous females, and appear in winter, or early spring, like the *Hyberniidæ;* others have large lobes on the hind-wings, giving them the appearance of having six wings instead of four. Most of the larger species are called "Carpets" by collectors, on account of their festooned markings; and these usually rest with the fore-wings covering the hind ones. Many of the smaller species are very similar, and mostly of dull colours, and rest with their wings expanded, and these are known as "Pugs."

The two species of this family figured illustrate the style of markings of the lighter and darker "Carpets" respectively.

GENUS MESOLEUCA.

Mesoleuca, Hübner, Verz. bek. Schmett. p. 326 (1826?).
Melanthia, Duponchel, Lépid. France, viii. (1), p. 252 (1830). Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 380 (1852).

THE BEAUTIFUL CARPET. MESOLEUCA ALBICILLATA.

(*Plate CLI., Fig.* 1.)

Geometra albicillata, Linnæus, Syst. Nat. (ed. x.), i. p. 527, no. 181 (1758); id. Faun. Suec. p. 335, no. 1278 (1761); Clerck, Icones, pl. i. fig. 12 (1759); Hübner. Eur. Schmett. v. fig. 76 (1798?)
Zerene albicillata, Treitschke, Schmett. Eur. vi. (2) p. 228 (1828).

Xerene albicillata, Stephens, Ill. Brit. Ent. Haust. iii. p. 249 (1831).

Larentia albicillata, Kirby, Eur. Butterflies & Moths, p. 381, pl. 50, figs. 15–15 b (1882)

This species is found in Northern and Central Europe and Northern Asia. It expands about an inch and a quarter.

The fore-wings are white, and the base chocolate-brown, with two steel-blue transverse lines. In the central area is a small brown dot. Beyond the middle of the costa is a broad angular brown spot; this forms the commencement of a sub-marginal band, which is intersected by white or brownish lines, most distinct towards the hind margins. The marginal band is suffused with bluish-grey, with a white zig-zag line passing through the middle. The fringes are brown and white. The hind-wings are white, with a small brown central dot, a dotted brown sub-marginal line, and a bluish-grey marginal band intersected with white on its inner half. The fringes are grey and white. The larva lives on raspberry and bramble from July to September. It is green, with a series of red dots on the head, and on the sides of the three succeeding segments. On each segment from the fifth to the tenth is a bright reddish triangular spot on the back near the incisions, the apex pointing towards the head, bordered with dark brown, and with a dark brown tapering streak through the middle. There is a whitish spiracular line.

The pupa is shining chestnut-brown, with dark ochreous brown on the face, wing-cases, back, and incisions. The extremity has two small curved points.

GENUS RHUMAPTERA.

Rheumaptera, Hübner, Tentamen, p. 2 (1810?).

Eulype, Hübner, Verz. bek. Schmett. p. 328 (1826?).

Melanippe, Duponchel, Lépid. France, viii. (1), p. 277 (1830); Guenée, Spec. Gén. Lépid. Uran. et Phal. p. 386 (1857).

THE ARGENT AND SABLE MOTH. RHUMAPTERA HASTATA.

(*Plate CLI., Fig.* 2.)

Geometra hastata, Linnæus, Syst. Nat. (ed. x.), i. p. 527, no. 180 (1758); id. Faun. Suec. p. 335 (1761); Clerck, Icones, pl. 1, fig. 9 (1759); Hübner, Eur. Schmett. v. fig. 256 (1801 ?).

Cidaria hastata, Treitschke, Schmett. Eur. vi. (2), p. 207 (1828).

Melanippe hastata, Stephens, Ill. Brit. Ent. Haust. iii. p. 248 (1831).

Larentia hastata, Kirby, Eur. Butterflies and Moths, p. 380, pl. 48, fig. 8 (1882).

The Argent and Sable Moth is found in Northern and Central Europe, Northern Asia, and America. It expands from an inch and a quarter to an inch and a half.

The wings are white, with black transverse lines composed of more or less confluent spots, arranged as follows:—The base is black, usually intersected by a white line or spots; then comes a black band spotted with white; and on the hind margin is a black band more or less divided by a white zig-zag line. The fringes are chequered with black and white.

The larva feeds on birch and sweet gale. It is dark brown with a black dorsal line, and a series of horseshoe-shaped golden-yellow spots on the sides, connected by dots of the same colour, so as to form a chain.

The pupa is formed between leaves, and is at first shining yellow, but afterwards becomes reddish-brown.

FAMILY EUBOLIIDÆ.

Antennæ simple or pectinated; palpi and proboscis well developed; abdomen moderately long and stout: legs thick;

front tibiæ armed with a horny spine at the extremity; wings entire; fore-wings pointed, with well-marked lines, and a dark apical streak; hind-wings narrower in the male than in the female.

Larva long, with distinct lines, and prominent points on the penultimate segment; living exposed on low plants. Pupa soft, oblong.

A small Family, but well represented in Europe.

GENUS ANAITIS.

Anaitis, Duponchel, Lépid. France, viii. (1) p. 350 (1830); Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 495 (1857.)

This genus includes the largest and handsomest species of the Family, one of which is British.

THE TREBLE BAR. ANAITIS PLAGIATA.

Geometra plagiata, Linnæus, Syst. Nat. (ed. x), i. p. 526, no. 174 (1758); id. Faun. Suec. p. 334, no. 1271 (1761); Clerck, Icones, pl. 6, fig. 1 (1759); Hübner, Eur. Schmett. v. fig. 220 (1802?).

Larentia plagiata, Treitschke, Schmett. Eur. vi. (2), p. 82 (1828).

Anaitis plagiata, Stephens, Ill. Brit. Ent. Haust. iii. p. 243 (1831); Kirby, Eur. Butterflies and Moths, p. 359, pl. 50, fig. 11 (1882).

The Treble Bar is common throughout Europe and Western Asia. It expands about an inch and a quarter.

The fore-wings are pale bluish-grey, with several rusty-brown waved lines. The first is situated near the base, and rises from a spot of the same colour on the costa. This is the first bar. The second bar, which is composed of three lines, passes nearly through the middle of the wings. The third bar, also composed of three lines, commences mid-

way between the second bar and the apex, and is sinuous. In addition to the three bars there are a double pale band between the first and second bars, and two beyond the third bar. The hind-wings are pale grey, suffused with brownish towards the hind margins, with a double central line and a faint discoidal spot.

The Treble Bar.

The larva feeds on St. John's Wort. It is coppery-brown, with a darker dorsal and narrow pale yellow lateral line.

The pupa is brown and long, with a long proboscis-sheath. It lies on the ground or among dry leaves, without a cocoon.

FAMILY SIONIDÆ.

Antennæ generally simple, palpi short and slender; proboscis and legs slender; wings entire, concolorous, with few markings; hind-wings with the costal and sub-costal nervures almost united; median nervules well separated. The moths fly by day.

Larva rather short and cylindrical, feeding on low plants. Pupa subterranean.

A Family of small extent; one species is British (*Baptria atrata* (Linn.), and is called the Chimney Sweep, from its smoky-black colour, the tips of the fore-wings only being narrowly white. A more varied Continental species is here figured.

GENUS ODEZIA.

Odezia, Boisduval, Gen. Ind. Meth. p. 229 (1840); Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 518 (1857).

ODEZIA TIBIALIS.

(*Plate CLI., Fig.* 4.)

Noctua tibiale, Esper, Schmett. iv. (2) i. p. 568, Taf. 164, fig. 2 (1790).

Geometra tibialata, Hübner, Eur. Schmett. v. figs. 210, 211 (1800?).

Psodos tibialata, Treitschke, Schmett. Eur. vi. (2), p. 301 (1828).

Baptria æthiopata, Von Heinemann, Schmett. Deutsch. i. p. 823 (1859) *nec Scopoli.*

Odezia tibiale, Kirby, Eur. Butterflies and Moths, p. 357 (1882).

This Moth is found in the southern parts of Central Europe, and in some districts in North Germany. It expands from an inch to an inch and a quarter.

It is brownish-black, with a cream-coloured band commencing on the middle of the costa of the fore-wings, and running obliquely till it ends in a point near the hinder angle. The hind-wings have an indistinct pale brown median line. The fringes are partly white.

FAMILY HEDYLIDÆ.

Antennæ short, finely pectinated in the male, head prominent; palpi straight, slender; proboscis well developed; body slender, thorax short; abdomen very long; legs short and slender; wings entire, without transverse lines, and hind-wings without markings.

A small South American family. Their large, rounded wings and slender bodies give them some resemblance to butterflies.

GENUS HEDYLE.

Hedyle, Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 521 (1857) ; Walker, List Lepid. Ins. Brit. Mus. xxiv. p. 1463 (1862).

These Moths slightly resemble Butterflies of the sub-family *Ithomiinæ*.

HEDYLE LUCIVITTATA.

(*Plate CLI., Fig.* 5.)

Hedyle lucivittata, Walker, List Lepid. Ins. Brit. Mus. xxvi. p. 1745 (1862)

This species was found by the late H. W. Bates at Ega on the Upper Amazons.

"Cinereous brown, whitish cinereous beneath. Palpi obliquely ascending, not rising higher than the vertex; third joint conical, less than half the length of the second. Antennæ minutely setulose. Abdomen hardly extending beyond the hind-wings. Wings elongate, ample, with a white, broad, discal stripe; under side mostly speckled with cinereous brown, Fore-wings acute, with a large white sub-apical spot; exterior border bent in front, concave towards the costa, straight and very oblique hindward. Length of the body, ten lines; of the wings, twenty-eight lines" (*Walker*).

FAMILY ERATINIDÆ.

Antennæ short, slightly pubescent in the male, and simple in the female. Palpi slender, ascending, pointed. Proboscis well-developed. Body rather stout, not extending to the anal angle of the hind-wings. Legs rather short, not swollen; hind tibiæ with two pairs of spurs. Wings entire; fore-wings triangular, adorned with bright colours; hind-wings long, narrow, and often produced into a long tail.

GENUS ERATINA.

Erateina, Doubleday, Trans. Ent. Soc. Lond. v. p. 111 (1848); Saunders, *op. cit.* (2), v. p. 262 (1860); Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 525 (1857); Walker, List Lepid. Ins. Brit. Mus. xxv. p. 1466 (1862).

This genus is easily recognisable by the long, narrow, subcaudate or caudate wings, which give the Moths a curious resemblance to some of the tailed *Lemoniidæ*.

ERATINA LEPTOCIRCATA.

(*Plate CLI., Fig.* 6.)

Erateina leptocircata, Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 526 (1857); Walker, List Lepid. Ins. Brit. Mus. xxv. p. 1467, no. 1 (1862).

This Moth is a native of New Grenada. It expands about an inch and a half.

The wings are black, with the base cupreous; the fore-wings have a yellow transverse band extending from the middle of the costa nearly to the hinder angle; the hind-wings have a longitudinal band, narrow at first, and sulphur-yellow, but expanding, and shading into red. The hind-wings are produced into a linear tail as long as the wing. At the base of the tail are two black spots on the inner margin; the fringes are yellow.

FAMILY MELANCHRŒIDÆ.

Antennæ strongly pectinated in the male; palpi short, hairy. Legs slender; hind tibiæ with four long spurs. Wings entire, black, with white markings. Body generally more or less clothed with reddish hair, especially beneath. Costal nervure free on all the wings. The larvæ are Loopers.

GENUS MELANCHRŒA.

Melanchroia, Hübner, Verz. bek Schmett. p. 173 (1818?); Walker, List Lepid. Ins. Brit. Mus. ii. p. 384 (1854).

A genus confined to Tropical America. It was generally referred to the *Lithosiidæ* before the larva was known.

MELANCHRŒA ATEREA.

(*Plate CLI., Fig.* 3.)

Geometra aterea, Cramer, Pap. Exot. iv. pl. 370, fig. F (1781).
Zygæna pylotis, Fabricius, Mant. Ins. ii. p. 106, no. 47 (1787).
Melanchroia aterea, Hübner, Exot. Schmett. ii. Taf. 176 (1824?).
Melanchroia pylotis, Walker, List Lepid. Ins. Brit. Mus. p. 389, no. 8 (1854).

This species is widely distributed in South America. It expands about an inch. It is black, with white fringes to all the wings, and the fore-wings have a nearly round white hyaline spot just beyond the middle, close to the costa.

FAMILY EMPLOCIIDÆ

Antennæ bipectinated in the male, and dentated in the female. Palpi short and slender; proboscis well marked. Legs scaly; hind tibiæ with two pairs of spurs. Wings entire, velvety, without transverse lines. Nervures stout, costal nervure of the hind-wings bifid.

These are rather small Tropical American Moths, with black or dark brown wings, marked with large white or yellow spots. They have some resemblance to *Lemoniidæ*, among the Butterflies.

GENUS EMPLOCIA.

Emplocia, Herrich-Schäffer, Aussereurop. Schmett. i. figs. 318, 319 (1855); Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 531 (1857); Walker, List Lepid. Ins. Brit. Mus. xxv. p. 1472 (1862).
Devara, Walker, *op. cit.* vii. p. 1660 (1856).

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1. *Mesolenra ellopicata.*
2. *Ithumeptera lunata.*
3. *Melanolophia [illegible].*
4. *Odezia [illegible].*
5. *Eubolia inornata.*
6. *Eubolia leptocreata.*
7. *Emplocia hesperidaria.*
8. *Asthena pyrhulata.*

A genus confined to Tropical America. It was generally referred to the *Lithosiidæ* before the larva was known.

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(*Plate CLI., Fig.* 3.)

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Melanchroia aterea, Hübner, Exot. Schmett. ii. Taf. 176 (1824?).
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Devara, Walker, *op. cit.* vii. p. 1660 (1856).

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1. *Mesoleuca albicillata.*
2. *Rhumaptera hastata.*
3. *Melanchroea atrea.*
4. *Odezia tibiale.*
5. *Hedyle lucivittata.*
6. *Eratina leptocircata.*
7. *Emplocia hesperidaria.*
8. *Achrosis pyrrhularia.*

EMPLOCIA HESPERIDARIA.

(*Plate CLI., Fig. 7.*)

Emplocia hesperidaria, Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 532 (1857).

This a Brazilian species. It expands about an inch and a half.

The wings are velvety blackish-brown. The fore-wings have an oblique oval, semi-transparent, yellowish-white, spot beyond the middle, near the costa, and an elongated reddish club-shaped spot extending parallel to the inner margin, almost to the hinder angle. The hind-wings are fulvous, with a black marginal band, dentated on the inner side, continued as a fine line along the inner margin. The fringes are tinged with dull white as far as the middle. The abdomen is ochreous, with black dots, and a fine black lateral line.

FAMILY HYPOCHROSIDÆ.

Antennæ bipectinated in both sexes; palpi short, ascending, proboscis stout. Body broad, depressed. Legs stout, with strong spurs. Wings smooth, concolorous; hind-wings much smaller than the fore-wings. Under surface differently coloured from the upper. Costal nervure of fore-wings bifid, or connected with the sub-costal by an oblique nervule. Costal nervure of hind-wings free, and the sub-costal arched.

A small family of East Indian moths.

GENUS ACHROSIS.

Achrosis, Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 539 (1857); Walker, List Lepid. Ins. Brit. Mus. xxv. p. 1476 (1862).

Pagrasa, Walker, *op. cit.* xxiv. p. 1086 (1862).

This genus differs from *Hypochrosis*, Guenée, the type of the family, in having an obtusely-rounded projection on the hind margin of the fore-wings.

ACHROSIS PYRRHULARIA.

(*Plate CLI., Fig.* 8.)

Achrosis pyrrhularia, Guenée, Spec. Gén. Lépid. Uran. et Phal. ii. p. 539 (1857); Walker, List Lepid. Ins. Brit. Mus. xxv. p. 1477, no. 1 (1862).

Pagrasa instabilata, Walker, *op. cit.* xxiv. p. 1086, no. 1 (18[illegible] Butler, Ill. Lepid. Heter. Brit. Mus. vi. p. 82, pl. [illegible] fig. 7 (1886).

Hypochrosis pyrrhularia, Hampson, Faun. Brit. Ind. Moths iii. p. 174 (1895).

This species is a native of India and Java. It expands about an inch and a half.

The wings are rather narrow, and the fore-wings project slightly at the tip, and considerably in the middle of the hind margin. They are strongly irrorated with black on the inner half as far as an angulated pale line, which is bordered outside with black. Towards the tip are two black spots on the costa, outside the first of which is the commencement of another pale line. There are also some black spots towards the hinder angle, and on the thorax, while the abdomen is blackish, belted with paler. The hind-wings are grey, dusted with black towards the inner margin, adjoining which is the commencement of a paler line.

PYRALES.

Antennæ long, sometimes nodose, but never pectinated, eyes naked; palpi usually very long. Fore-wings long and narrow; hind-wings often broad and rounded; the former rarely with less than eleven or twelve nervures, and the latter with

three sub-median, and usually seven other, nervures. Body slender. Legs long, and strongly spurred.

The *Pyrales* include a large series of moths of small size and delicate structure. Guenée's "Deltoides et Pyralites" (1854, cf. vol. iv. pp. xxx. 166), treated only of the typical *Pyrales;* the *Crambi*, which most authors now include in the same main group, being omitted. He divided the former into a number of families, chiefly based on European species. His arrangement was severely criticised by Lederer, who published a shapeless series of papers on the *Pyralidæ*, very fully illustrated, to the "Wiener Entomologische Monatschrift," vol. vii., for many. Lederer established some new families for foreign species, but placed almost the whole of Guenée's series of genera in a single family. Since then, entomologists have more or less combined or rearranged Guenée's families, and various new ones have been proposed for foreign species. In the case of the *Micro-Lepidoptera*, it would be impossible for us to deal with the families so fully as in the case of the *Macro-Lepidoptera*, and we shall therefore only give a selection of some of the more important genera, and indicate the families to which they belong.

GENUS CHRYSAUGE. (*Chrysaugidæ.*)

Chrysauge, Hübner, Samml. Exot. Schmett. ii. pl. 156 (1824?); Walker, List Lepid. Ins. Brit. Mus. ii. p. 367 (1854); Lederer, Wien. Ent. Mon. vii. p. 331 (1863).

These are comparatively large and stout South American moths, with short up-curved palpi, and rather broad black and yellow wings. On the costa of the fore-wings of the male is a rounded prominence, filled with hair beneath.

Walker extended this genus to include the family which we have already discussed under the name of *Cyllopodidæ* (*anteà*, vol. iii. p. 186).

CHRYSAUGE CATENULATA.

(*Plate CLII., Fig.* 1.)

Chrysauge catenulata, Warren, Ann. & Mag. Nat. Hist. (6) vii. p. 423 (1891).

This Moth expands upwards of an inch and a half, and has been received from San Paulo, in Brazil, and from British Guiana. It is bright canary-yellow, with two slender black lines on the fore-wings, the inner one oblique, and the outer one waved, converging on the inner margin; the fore-wings are also bordered by a black line all round, except on the costa, from the base to the second transverse line. Close to the base is another black line. The hind-wings are yellow, with a broad black border, broadest at the tip; and within the border is a black line, more or less detached from it. The body is yellow, but the antennæ and legs are black, and the abdomen is clothed with long grey hair above. In the male, the outer transverse line of the fore-wings rises from a black glandular patch on the costa.

GENUS MAPETA. (*Homalochroidæ.*)

Mapeta, Walker, List Lepid. Ins. xxvii. p. 17 (April, 1863).
Homalochroa, Lederer, Wien. Ent. Mon. vii. p. 332 (Oct. 1863).

This is another South American genus, with longer and narrower wings than the last, and remarkable for its very long and slender palpi.

MAPETA XANTHOMELAS.

Plate CLII., Fig. 2.)

Mapeta xanthomelas, Walker, *op. cit.* (April, 1863).
Homalochroa æstivalis, Lederer, *op. cit.* p. 333, Taf. 6, fig. 3 (Oct. 1863).

This Moth is found in many parts of South America and the West Indies.

"Bright orange. Head whitish, black about the eyes. Antennæ, palpi, and legs black; palpi, femora, and tibiæ whitish beneath. Apical part of the wings beneath and of the fore-wings above whitish, with black-bordered veins, and with a black fringe; hind-wings deep black towards the tips. Length of the body, from six to eight lines; of the wings, from sixteen to twenty lines" (*Walker*).

GENUS SEMNIA. (*Semniidæ.*)

Semnia, Hübner, Zutr. Exot. Schmett. ii. p. 28 (1823); id. Verz. bek. Schmett. p. 353 (1824?); Walker, List Lepid. Ins. Brit. Mus. xix. p. 833 (1859); Lederer, Wien. Ent. Mon. vii. p. 333 (1863).

Another South American genus, resembling the *Deltoidæ* in general appearance, with moderately long palpi, and a plumose tuft in the middle of the antennæ of the male.

SEMNIA AURITALIS.

(*Plate CLII., Fig.* 3.)

Semnia auritalis, Hübner, Zutr. Exot. Schmett. ii. p. 28, figs 361, 362 (1823); Lederer, Wien. Ent. Mon. vii. p. 334, Taf. 6, fig. 4 (1863).

Seomnia auritalis, Walker, List Lepid. Ins. Brit. Mus. xix. p. 834, no. 1 (1859).

This is a Brazilian species. It expands about an inch.

The fore-wings are brown, with a dull leaden lustre, with a large pale yellow spot on the inner margin at the base, which extends more than half way to the costa. The hind-wings are golden-yellow with a black marginal line, broad at the costa, and attenuated towards the hinder angle.

GENUS VITESSA. (*Pyralidæ?*)

Vitessa, Moore, Cat. Lepid. Ins. E. Ind. Co. ii. p. 299 (1858); id. Lepid. Ceylon, iii. p. 255 (1885); Walker, List Lepid. Ins. Brit. Mus. xxxi. p. 219 (1864); Hampson, Faun. Brit. Ind. Moths, iv. p. 145 (1896).

A genus of large and handsome East Indian species, with moderately long palpi, and broad wings. The abdomen is expanded toward the tip, and strongly tufted. The genus is of doubtful position, and should probably be placed in a separate family. It was originally referred to the *Lithosiidæ*, or to the *Hypsidæ*.

VITESSA SURADEVA.

(*Plate CLII., Fig.* 4.)

Vitessa suradeva, Moore, Cat. Lepid. Ins. E. Ind. Co. ii. p. 299, no. 687, pl. vii. A, fig. 7 (1858); Hampson, Faun. Brit. Ind. Moths, iv. p. 146, fig. 83 (1896).

This Moth is a native of Northern India. It expands from about two inches and a half to two inches and three-quarters.

Mr. Moore's description runs as follows:—"White. Fore-wings yellow at the base, with four basal spots disposed in two transverse rows, a patch across the middle of the wing, which encloses a white spot, and broadly along the veins to the exterior margin glossy black; hind-wings with anterior margin narrowly, and outer margin broadly, black. Antennæ, third joint of palpi, and spots on the thorax, black; head, thorax, a large abdominal tuft, first and second joints of the palpi, and femur of anterior legs beneath yellow; abdomen white, with black bands, that at the extremity being broad. Legs black, spotted with white; cilia glaucous."

GENUS CARDAMYLA. (*Pyralidæ ?*)

Cardamyla, Walker, List Lepid. Ins. Brit. Mus. xvii. p. 282 (1859); Lederer, Wien. Ent. Mon. vii. p. 335 (1863).

A large and handsome Australian genus, somewhat resembling *Vitessa*, but with broader wings, short upcurved palpi, and the abdomen tufted at the tip, but not expanded.

CARDAMYLA CARINENTALIS.

(*Plate CLII., Fig.* 5.)

Cardamyla carinentalis, Walker, *op. cit.* p. 282, no. 1 (1859); Lederer, *op. cit.* p. 335, Taf. 6, fig. 9 (1863).

This is an Australian Moth.

"Black. Head and thorax luteous, partly black. Abdomen with luteous and white bands, the latter colour predominating beneath; apical tuft pale testaceous, with black plumes towards the base. Legs with white bands; femora with luteous stripes; fore coxæ with white lines. Fore-wings with whitish veins, and with three undulating whitish lines; first line basal; second and third widely separated; a pale green intermediate band, abbreviated by the costa, including a nearly round black spot; under side orange, with one discal and two costal black spots; exterior part black, including a curved orange line. Hind-wings bright orange, with a black hindward spot and a black marginal band, which is widened in front. Length of the body, from six lines and a half to seven lines; of the wings, from sixteen to seventeen lines" (*Walker*).

GENUS METAXMESTE. (*Hercynidæ.*)

Metaxmeste, Hübner, Verz. bek. Schmett. p. 352 (1822 ?).
Hercyna, Treitschke, Schmett. Eur. vii. p. 179 (1829); Guenée, Spec. Gén. Lépid. Delt. et Pyr. p. 153 (1854); Walker,

List Lepid. Ins. Brit. Mus. xvii. p. 299 (1859); Lederer, Wien. Ent. Mon. vii. p. 354 (1863).

This genus includes dark-coloured Alpine species, with short broad wings, and thickly-scaled bodies. The wings frequently have a silky lustre, and the moths swarm about among the snow in the daytime, looking more like large black flies than moths.

METAXMESTE PHRYGIALIS.

(*Plate CLII., Fig.* 6.)

Pyralis phrygialis, Hübner, Eur. Schmett. vi. fig. 42 (1796?).
Pyralis sericealis, Hübner, *op. cit.* vi. fig. 43 (1796?).
Pyralis rupicolalis, Hübner, *op. cit.* vi. figs. 198, 200 (1803?).
Hercyna rupicolalis, Treitschke, Schmett. Eur. vii. p. 181 (1829).

This species is a native of the Alps, Pyrenees, and Ural Mountains, &c. It expands about half an inch.

The fore-wings are olive-brown, with two broad, suffused, bluish-grey transverse bands, and two dark stigmata; the marginal line is spotted with dusky, and the fringes are grey, and narrowly white at the tips. The hind-wings are greyish-brown, with a light suffused curved band just beyond the middle, and dark grey fringes.

GENUS ERCTA. (*Steniidæ?*)

Ercta, Walker, List Lepid. Ins. Brit. Mus. xvii. p. 425 (1859); Lederer, Wien. Ent. Mon. vii. p. 423 (1863).

A West Indian genus, with very long and slender body and legs, short palpi, rather stout antennæ, and long narrow wings.

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1 *Chrysauge catenulata.*
2 *Mapeta xanthomelas.*
3 *Semnia auritalis.*
4 *Eulepia suradeva.*
5 *Cardamyla carinentalis.*
6 *Metaxemeste phrygialis.*
7 *Evita lipulalis.*

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1. *Chrysauge catenulata.*
2. *Mapeta xanthomelas.*
3. *Semnia auritalis.*
4. *Vitessa suradeva.*
5. *Cardamyla carinentalis.*
6. *Metaxmeste phrygialis.*
7. *Erda tipulalis.*

ERCTA TIPULALIS.

(*Plate CLII., Fig.* 7.)

Ercta tipulalis, Walker, *op. cit.* p. 426, no. 1 (1859); Lederer, *op. cit.* p. 424, Taf. 15, fig. 15 (1863).

This species is found in Haiti.

"Brownish cinereous, whitish beneath. Wings with black marginal points; fore-wings fawn-colour along the costa and along the exterior border; an irregular blackish stripe extending from the base to the tips at a little in front of the middle; orbicular mark forming a blackish dot; reniform indicated by a curved whitish black-bordered streak; a broad whitish nearly hyaline stripe along the interior border. Hind-wings whitish, nearly hyaline, with a slight testaceous tinge along the exterior border, and with a black marginal point. Length of the body, five lines; of the wings, nine lines" (*Walker*).

GENUS NYMPHULA. (*Hydrocampidæ*).

Nymphula, Schrank, Fauna Boica, ii. (2), p. 162 (1802); Hübner, Verz. bek. Schmett. p. 362 (1826?); Treitschke, Schmett. Eur. vii. p. 127 (1829).

Nausinoë, Hübner, *op. cit.* p. 363 (1826?).

Hydrocampa, Latreille, Fam. Nat. p. 478 (1825); Guenée, Spec. Gén. Lépid. Delt. et Pyr. p. 273 (1854); Lederer, Wien. Ent. Mon. vii. p. 451 (1863).

The moths belonging to this genus and its allies are rather small, with long slender bodies, oblong fore-wings, and rounded hind-wings, with sharply-defined white, brown, and yellowish markings. They are called "China Marks" by collectors. The larvæ, which are rather stout, with a small retractile head, feed on water-lilies, and live under the leaves in a case composed of two pieces of leaf.

THE BEAUTIFUL CHINA MARK. NYMPHULA STAGNATA.

(*Plate CLIII., Fig.* 1.)

Pyralis potamogalis, Hübner, Vögel u. Schmett. Taf. 28 (1792); id. Eur. Schmett. vi. fig. 82 (1794).

Phalæna potomogalis, Schrank, Fauna Boica, ii. (2), p. 62 (1802).

Geometra stagnata, Donovan, Nat. Hist. Brit. Ins. ix. p. 9, pl. 363, fig. 3 (1800).

Nymphula nymphæalis, Treitschke, Schmett. Eur. vii. p. 141 (1829).

Hydrocampa nymphæata, Stephens, Ill. Brit. Ent. Haust. iv. p. 39 (1834).

This pretty Moth is a native of Northern Temperate Europe, and Northern Asia, and is common in Britain. It expands from three-quarters of an inch to an inch.

The wings are white and shining, the fore-wings with two brown stripes extending from the base to beyond the middle, the rest of the surface being reticulated with bands formed by two brown approximating lines. There is a brown marginal line, and the fringes are white. The hind-wings have two brown transverse bands.

The moth varies in the arrangement of the bands, which are sometimes almost completely obliterated.

The larva is said to feed on duckweed.

GENUS EUDIOPTIS. (*Margaroniidæ*).

Eudioptis, Hübner, Verz. bek. Schmett. p. 359 (1826?); Stephens, Ill. Brit. Ent. Haust. iv. p. 43 (1834); Moore, Lepid. Ceylon, iii. p. 323 (1886).

Phakellura, Guilding, Phil. Mag. vii. p. 206 (March, 1830); id. Zool. Journ. v. p. 263 (June, 1830); Guenée, Spec. Gén. Lépid. Delt. et Phal. p. 294 (1854).

Phacellura, Lederer, Wien. Ent. Mon. vii. p. 400 (1863); Meyrick, Trans. Ent. Soc. Lond. 1884, p. 297.

This genus includes moderate-sized Moths, with comparatively stout bodies, tufted at the tip, and white, transparent, or yellowish wings, the pale colour being more or less restricted by brown costal and apical borders. They are all tropical or sub-tropical, but inhabit both hemispheres.

EUDIOPTIS INDICA.

(*Plate CLIII., Fig.* 2.)

Eudioptis indica, Saunders, Trans. Ent. Soc. Lond. (2), i. p. 163, pl. 12, figs. 5–7 (1851); Moore, Lepid. Ceylon, iii. p. 324 (1886).

Phakellura gazorialis, Guenée, Spec. Gén. Lépid. Delt. et Pyr. p. 297 (1854).

Phakellura indica, Walker, List Lepid. Ins. Brit. Mus. xviii. p. 514, no. 11 (1859).

Glyphodes indica, Hampson, Faun. Brit. Ind. Moths, iv. p. 360 (1896).

This Moth is widely distributed in the tropical regions of the Old World. It expands about an inch.

The wings are semi-transparent pearly-white and opalescent, with a broad dark brown band along the costa of the fore-wings, and along the hind-margins of all the wings, gradually attenuated on the hind-wings, and ending at the anal angle.

The larva lives on cotton and other plants. It is pale grass-green, with a yellow head. The pupa is dull chestnut-brown, and is enclosed in a portion of leaf which has been drawn together with silk threads.

The paper in which the name *Phakellura* originally occurs, "The Natural History of *Petrophila*, a Lepidopterous genus, in its larva state inhabitating rivers, and furnished with branchiæ"; by the Rev. Lansdown Guilding, B.A., F.L.S., &c.—was read before the Linnean Society of London, on February 2, 1830; but for some reason was never published, except in the

two abstracts quoted above, which, though incidentally referred to by Poey and Westwood, escaped notice in Hagen's "Bibliotheca Entomologica." I therefore quote the abstract from the "Philosophical Magazine."

"Mr. Guilding relates that the very singular little moth upon which he establishes this genus (*Petrophila*) occurs in myriads, in its larval state, on the blocks of basaltic trap that occupy the bed of the river of St. Vincent. Much as it differs in its habits from the majority of *Lepidoptera*, one European species he considers to agree with it in its œconomy, and to be perhaps referable to the sub-genus which he would separate from *Botys*, which, from the variety of forms in which it abounds, appears to him to call for division. The types in Mr. Guilding's cabinet which are most remarkable, and which he incidentally enumerates and describes, are Gen. 1. *Chloephila*, Spec. *lineolata*, found in St. Vincent's; Gen. . *Kamptoptera*, Spec. *fuscescens*, rare in St. Vincent's; Gen. 3. *Phakellura*, Spec. *hyalinata* (Fabr. Ent. Syst. III. (2), 213?) abundant in the Antilles.

"It is the *Botys stratiotalis* (Kirby & Spence, iv. 56, 74) in which Mr. Guilding finds so close a resemblance to his *Petrophila* in many respects, that he is persuaded of their near affinity, although there is a trifling difference in the pupal spiracula and in the shape of the branchiæ.

"The larva obtaining its food on the rocks in the stream, forms silken tunnels, under which it moves in safety, without danger of being carried off by the current. When at maturity the larva builds a more compact habitation, which, together with the metamorphosis of the insect, the author minutely describes; as well as a small Trichopterous insect found in great abundance in its society, and resembling it in œconomy.

"Mr. Guilding thinks it probable that many of the European *Botydæ* found in fenny places, as *B. lemnata, sambucata*, &c., approach to the *Petrophilæ*, while those in hedges and gardens

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1. *Nymphula stagnata.*
2. *Eudioptis indica.*
3. *Margaronia arachnealis.*
4. *Galleria mellonella.*
5. *Hypochalcia ahenella.*
6. *Palparia pinella.*
7. *Eromene ocellea.*
8. *Donacaula mucronella.*

should remain in a separate genus. His arrangement is as follows :—Insecta LEPIDOPTERA ; Sect. NOCTURNA ; Fam. *Botydæ* ; Gen. *Petrophila* ; Spec. *fluviatilis*.

"*P.* argenteo-nivea, fuscescente adumbrata, alarum superiorum strigis apicalibus angulatis, punctulis duabus intermediis, lineisque baseos tribus subcommunibus fuscescentibus ; alarum inferiorum plagâ posticâ argenteo-iridescente, atro-maculatâ ; abdomine fusco fasciato."

The report in the "Zoological Journal" is almost the same as the above ; but the Editor objects to the name *Petrophila*, as preoccupied in Botany.

GENUS MARGARONIA. (*Margaroniidæ.*)

Margaronia, Hübner, Verz. bek. Schmett. p. 358 (1826?) ; Walker, List Lepid. Ins. Brit. Mus. xviii. p. 518 (1859) ; Moore, Lepid. Ceylon, iii. p. 324 (1886).

Margarodes, Guenée, Spec. Gén. Lépid. Delt. et Pyr. p. 324 (1854) ; Lederer, Wien. Ent. Mon. vii. p. 398 (1863) ; Meyrick, Trans. Ent. Soc. Lond. 1854, p. 296, *nom. præocc.*

This is a widely distributed genus, chiefly tropical or sub-tropical, including rather long-winged species, of a pearly-white or grass-green colour, with hardly any markings.

MARGARONIA ARACHNEALIS.

(*Plate CLIII., Fig.* 3.)

Margaronia arachnealis, Walker, List Lepid. Ins. Brit. Mus. xviii. p. 527, no. 21 (1859).

This Moth is found at Sierra Leone.

"Very vivid green. Body beneath, and legs white or glaucous. Head white about the eyes. Palpi blackish toward the tips, white beneath. Antennæ pubescent. Abdomen with a

should remain in a separate genus. His arrangement is as follows :—Insecta LEPIDOPTERA ; Sect. NOCTURNA ; Fam. *Botydæ* ; Gen. *Petrophila* ; Spec. *fluviatilis*.

"*P.* argenteo-nivea, fuscescente adumbrata, alarum superiorum strigis apicalibus angulatis, punctulis duabus intermediis, lineisque baseos tribus subcommunibus fuscescentibus ; alarum inferiorum plagâ posticâ argenteo-iridescente, atro-maculatâ ; abdomine fusco fasciato."

The report in the "Zoological Journal" is almost the same as the above ; but the Editor objects to the name *Petrophila*, as preoccupied in Botany.

GENUS MARGARONIA. (*Margaroniidæ.*)

Margaronia, Hübner, Verz. bek. Schmett. p. 358 (1826?) ; Walker, List Lepid. Ins. Brit. Mus. xviii. p. 518 (1859) ; Moore, Lepid. Ceylon, iii. p. 324 (1886).

Margarodes, Guenée, Spec. Gén. Lépid. Delt. et Pyr. p. 324 (1854) ; Lederer, Wien. Ent. Mon. vii. p. 398 (1863) ; Meyrick, Trans. Ent. Soc. Lond. 1854, p. 296, *nom. præocc.*

This is a widely distributed genus, chiefly tropical or sub-tropical, including rather long-winged species, of a pearly-white or grass-green colour, with hardly any markings.

MARGARONIA ARACHNEALIS.

(*Plate CLIII., Fig.* 3.)

Margaronia arachnealis, Walker, List Lepid. Ins. Brit. Mus. xviii. p. 527, no. 21 (1859).

This Moth is found at Sierra Leone.

"Very vivid green. Body beneath, and legs white or glaucous. Head white about the eyes. Palpi blackish toward the tips, white beneath. Antennæ pubescent. Abdomen with a

in *Hypochalcia*, which we are now considering, the antennæ are not tufted. The *Phycidæ* were a favourite group of the late M. Ragonot; and his monograph of the family is now being published in vols. vii. and viii. of Romanoff's "Mémoires" (vide *anteà*, vol. iv. pp. 190, 192). In *Hypochalcia*, the labial palpi are long, and horizontally produced, with a long filiform upturned terminal joint. The maxillary palpi are filiform, parallel, and appressed to the face. The female is much smaller than the male.

THE DINGY VENEER. HYPOCHALCIA AHENELLA.

(*Plate CLIII., Fig.* 5)

Tinea ahenella, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 135, no. 32 (1776); Zincken in Germar, Mag. Ent. iii. p. 120 (1818).

Tinea aeneella, Hübner, Eur. Schmett. viii. figs. 41, 58 (1796?).

Phycis ahenella, Treitschke, Schmett. Eur. ix. (1) p. 144 (1832).

Araxes ahenella, Stephens, Ill. Brit. Ent. Haust. iv. p. 316 (1834).

The Dingy Veneer is found in Central and South Eastern Europe. It expands from three-quarters of an inch to more than an inch.

The fore-wings are greyish-brown, more or less dusted with ochre-yellow, and crossed transversely by two broad, ill-defined, dark cherry-red bands, which coalesce at the inner margin; the first of these is straight before the middle, and the second is waved behind the middle. These bands are sometimes very indistinct, and the whole of the surface of the wings is then almost uniform. The hind-wings are yellowish-grey, with whitish fringes.

GENUS PALPARIA. (*Palpariidæ.*)

Crambus, Fabricius, Ent. Syst. Suppl. pp. 420, 464 (1793); Leach, Edinb. Encycl. ix. p. 135 (1815); Zeller, Chilon. et

Cramb. p. 14 (1863); Von Heinemann, Schmett. Deutschl. (2) i. (2) p. 117 (1865); *nec Latreille; nec Haworth.*

Palparia, Haworth, Lepid. Brit. p. 481 (1812), *nec Wing.*

This genus is generally called *Crambus;* but in 1810 Latreille fixed *C. semi-rubellus* of Scopoli (one of the *Phycidæ*) as the type of that genus. I therefore adopt for it the very expressive name applied by Haworth to *Crambus*, auct., and its allies.

These are rather small moths, with very long, straight palpi, narrow fore-wings, and broad hind-wings. The fore-wings are streaked in various proportions with brown, ochreous, and white; and the hind-wings are uniform brown, or white. They are called "Grass Moths" by collectors, and are readily disturbed by anyone walking through a meadow, when their light wings make them look very conspicuous; but presently they vanish, settling head downwards on a grass-stem, and folding their wings so closely round the body that they may easily escape observation.

Some of them, belonging to a group to which Hübner gave the generic name of *Catoptria*, are remarkable for the broad silvery stripes on the wings. One of these we have figured.

THE PEARL VENEER. PALPARIA PINELLA.

(*Plate CLIII., Fig.* 6.)

Tinea pinella, Linnæus, Syst. Nat. (ed. x.) i. p. 539, no. 272 (1758); Clerck, Icones, pl. 4, fig. 15 (1759).

Tinea pinetella, Linnæus, Faun. Suec. p. 355 (1761).

Tinea conchella, Hübner, Vög. und Schmett. Taf. 44 (1792); id. Eur. Schmett. viii. fig. 38 (1800).

Chilo pinetellus, Treitschke, Schmett. Eur. ix. (1), p. 94 (1832).

Crambus pinetellus, Stephens, Ill. Brit. Ent. Haust. iv. p. 323 (1834); Kirby, Eur. Butterflies and Moths, p. 411, pl. 61, fig. 10 (1883).

The Pearl Veneer is a native of Central and Northern Europe, and the Eastern Mediterranean Region. It measures about an inch in expanse. The fore-wings are yellowish-brown, with the inner margin paler. From the base extends a long, silvery-white triangle, to beyond the middle of the wings, and between this and the hind-margin is a large oval silvery-white spot. The hind-margin is dotted with black, and the fringes are leaden grey. The hind-wings are white, with a slight bluish lustre.

The moth is found in pine woods in July and August.

GENUS OMMATOPTERYX. (*Palpariidæ.*)

Eromene, Hübner, Verz. bek. Schmett. p. 366 (1826?); Zuett. Chilon. et Cramb. p. 52 (1863), *nom. præocc.*

Euchromius, Guenée, Europ. Micro-Lepid. Ind. Meth. p. 86 (1845); Meyrick, Handb. Brit. Lepid. p. 396 (1895), *nom. præocc.*

This is one of the prettiest genera of the Family to which it belongs; and the only British species can easily be recognised by the row of sub-marginal ocellated spots on the fore-wings.

THE NECKLACE VENEER. EROMENE OCELLEA.

(*Plate CLIII., Fig.* 7.)

Palparia ocellea, Haworth, Lepid. Brit. p. 486 (1812).

Phycis funiculella, Treitschke, Schmett. Eur. ix. (1), p. 200 (1832).

Araxes ocellea, Stephens, Ill. Brit. Ent. Haust. iv. p. 316 (1834).

The Necklace Veneer is found in Temperate Europe, west to Madeira, and eastwards to Asia Minor. It expands about three-quarters of an inch.

The fore-wings are dull golden, dusted with black. There is no first transverse line, but across the middle of the wings runs a pale broad golden band, bordered on both sides with dull

brownish. In the middle of this band is a silvery transverse streak. On the hind margin appears a similar golden and silvery band, which cuts off a triangle at the apex.

Below this, along the fringes, are four velvety-black marks, each ornamented with a golden spot, and fine golden streaks. The fringes are yellowish-grey, and are separated from the apical triangle by a silver line. The hind-wings are white.

It is not a common species in England.

GENUS DONACAULA. (*Chilonidæ.*)

Zincken in Germar, Mag. Ent. ii. p. 33 (1817); Treitschke, Schmett. Eur. viii. p. 293 (1830); ix. (1), p. 60 (1832) *nec Guenée, restr.*

Topeutis, pt. Hübner, Verz. bek. Schmett. p. 366 (1826?).

Schœnobius, pt. Duponchel, Cat. Méth. Lépid. d'Eur. p. 312 (1864); Zeller, Chilon. et Cramb. p. 3 (1863).

Donacaula, Meyrick, Handb. Brit. Lepid. p. 401 (1895).

This genus and its allies resemble *Palparia*, but are larger moths, with narrower wings in proportion, and are found among reeds, and other water-plants, in the stems of which the larvæ feed.

THE DARK HOOK-TIP VENEER. DONACAULA MUCRONELLA.

(*Plate CLIII., Fig.* 8.)

Tinea mucronella, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 136 (1776).

Tinea straminella, Hübner, Eur. Schmett. viii. fig. 284 (1802?).

Chilo mucronellus, Treitschke, Schmett. Eur. ix. (1), p. 67 (1832).

The Dark Hook-tip Veneer is a native of Central and South-Eastern Europe. It expands about an inch.

The fore-wings are pale straw-colour, dusted with brownish, with a dark shade from the base to the apex, and the costa in

front of this rather broadly paler. The hind-wings are yellowish-white. There is a white anal tuft. The female is usually smaller and paler yellow than the male, with snow-white hind-wings.

The moth appears at the end of May, and in June. The larva lives in reeds.

FAMILY PTEROPHORIDÆ.

This Family was formerly placed at the end of the *Lepidoptera*, between the *Tineæ* and the *Orneodidæ;* but the moths are now considered to be nearly allied to the *Pyralidæ*, on account of their long, slender, body, antennæ, and legs with strong spurs, and the long and rather narrow wings, which are held extended like those of a Crane-Fly, or Daddy Long-legs, which the moths greatly resemble when at rest. But the chief character which distinguishes these moths from nearly all other insects, is that, in most of the species, the fore-wings are more or less deeply cleft in two, and the hind-wings are divided, almost to the base, into three distinct feathers.

The larvæ have sixteen legs, and are hairy, as are also some of their pupæ.

GENUS ALUCITA.

Alucita, Linnæus, Syst.Nat. (ed. x.), i. p. 542 (1758); Poda, Mus. Græc. p. 94 (1761); Treitschke, Schmett. Eur. ix. (2), p. 225 (1833), *nec Fabricius*; *nec Stephens.*

Pterophorus, pt. Geoffroy, Ins. Paris, ii. p. 90, (1762).

The type of this genus is the following :—

THE WHITE-PLUME MOTH. ALUCITA PENTADACTYLA.

(*Plate CLVIII., Fig.* 9.)

Alucita pentadactyla, Linnæus, Syst. Nat. (ed. x.), i. p. 542, no. 304 (1758); id. Faun. Suec. p. 371, no. 1457 (1761); Hübner, Eur. Schmett. ix. fig. 1 (1800); Treitschke, Schmett. Eur. ix. (2), p. 249 (1833).

Pterophorus pentadactylus, Stephens, Ill. Brit. Ent. Haust. iv. p. 371 (1835); Kirby, Eur. Butterflies and Moths, p. 415, pl. 62, fig. 19 (1883).

The White-Plume Moth is found throughout the greater part of Europe and Northern and Western Asia. It expands about an inch.

It is white with a silky gloss, only the eyes being black. The wings are ample, and deeply cleft.

The larva feeds on sloe, and on various fruit trees. It is *Chilo*, ...reen, with a white line on the back, and an ochre-yellow line ...e sides. On all the segments there are small raised dusky ...ots, set with brown hairs.

The pupa is coloured like the larva, and is spotted with black, the spots on the belly being smaller and reddish. On the back there is a whitish grey pubescence.

FAMILY ORNEODIDÆ.

The moths belonging to this Family differ from the *Pterophoridæ* by their much shorter and broader wings, each being cleft almost to the base into six separate feathers. The moths rest with their wings expanded, and in this position resemble small *Geometræ*. The larva of the only British species is naked, and lives in the buds of honeysuckle.

GENUS ORNEODES.

Orneodes, Latreille, Précis, p. 148 (1796); id. Hist. Nat. Crust. Ins. iii. p. 418 (1802); xiv. p. 258 (1805); Treitschke, Schmett. Eur. ix. (2) p. 254 (1833).

Alucita, pt. Linnæus, Syst. Nat. (ed. x.) i. p. 542 (1758); Stephens, Ill. Brit. Ent. Haust. iv. p. 378 (1835), *nec Poda*.

THE TWENTY-PLUME MOTH. ORNEODES HEXADACTYLA.

(*Plate CLVIII., Fig.* 10.)

Alucita hexadactyla, Linnæus, Syst. Nat. (ed. x.) i. p. 542, no. 305 (1758); id. Faun. Suec. p. 371, no. 1458 (1761); Stephens, Ill. Brit. Ent. Haust. iv. p. 378 (1835); Curtis, Brit. Ent. xv. pl. 695 (1838); Kirby, Eur. Butterflies and Moths, p. 415 (1883).

Alucita polydactyla, Hübner, Eur. Schmett. ix. fig. 28 (1803 ?); Stephens, Ill. Brit. Ent. Haust. iv. p. 379 (1835).

Orneodes polydactylus, Treitschke, Schmett. Eur. ix. (2), p. 257 (1833).

The Twenty-Plume Moth is found in Temperate and Southern Europe and Asia Minor. It expands from half an inch to two-thirds of an inch across the wings.

Each of the wings is divided into six plumes. When arranged together, the fore-wings show a rusty-yellow ground, with two violet transverse bands, bordered with white. On the costal area are five violet spots, two in front of the first band, one at the commencement of the first band, a crescent-shaped spot between the first and second bands, and lastly one which forms the commencement of the second band. At the tips are small dark dots on a light ground. The hind-wings are paler rusty-yellow, with each of the six areas dotted with dark brown.

TORTRICES.

The Tortrices, or Bell Moths, are an extensive group of small moths, with the fore-wings usually broad and truncated at the end, and rounded hind-wings. The antennæ are simple, the palpi and fringes usually short, and the wings almost always entire. The fore-wings are of bright or variegated colours, and the hind-wings are almost always unicolorous white or brown.

When at rest the moths extend the fore-wings flat over the hind-wings, which gives the insect somewhat of the shape of a bell; hence the name.

The larvæ have sixteen legs, and many of them inhabit rolled-up leaves (hence the name *Tortrix*), while others feed on the seeds or roots of plants, and several infest fruit. The *Tortrices* are often treated as forming one large compact family (*Tortricidæ*), but some authors have tried to divide them into several. The few species which we have room to notice are therefore noted under their genera, and the families to which they have been referred are merely indicated.

GENUS TORTRIX. (*Tortricidæ*.)

Tortrix, Linnæus, Syst. Nat. (ed. x.) i. p. 530 (1758); Poda, Mus. Græc. p. 93 (1761); Treitschke, Schmett. Eur. viii. p. 45 (1830).

The type of this genus is a very common and unmistakeable British insect.

THE GREEN OAK-TORTRIX. TORTRIX VIRIDANA.

(*Plate CLIV., Fig.* 1.)

Tortrix viridana, Linnæus, Syst. Nat. (ed. x.), i. p. 530, no. 203, (1758); id. Faun. Suec. p. 342, no. 1307 (1761); Treitschke, Schmett. Eur. viii. p. 96 (1830); Stephens, Ill. Brit. Ent. Haust. iv. p. 68 (1834); Kirby, Eur. Butterflies and Moths, p. 412, pl. 61, figs. 18–18 b (1883).

The Green Oak Tortrix is found in Temperate and Southern Europe. It expands three-quarters of an inch.

The fore-wings are bright light green, with the costa narrowly yellowish, and the fringes of the same colour. The hind-wings and abdomen are grey. The head and palpi are yellowish.

The larva lives on oak and sallow. It is light green, orna-

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1. *Tortrix viridana.*
2. *Gauris crameriana.*
3. *Ernarmonia saltitans.*
4. " " , *pupa.*
5. *Infested Bean.*
6. *Rhacodia caudana.*
7. *Chimatophila tortricella.*
8. *Eryphantes congellatella, male.*
9. " " , *female.*

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This curious insect is a native of Mexico. It expands three-quarters of an inch.

The fore-wings are greyish-white, varied with ashy, with numerous short oblique dashes on the costa. The apex is black, with a small oval white mark. On the inner margin near the base is a small, square, blackish mark, and a large, conical ashy spot beyond it, striated and margined with black. The hind-margin is variegated with leaden-grey and white, with a row of small, double, black dots. The hind-wings are brown. The head and collar are brownish; the palpi dusky outside, and whitish inside. The larva lives in the seeds of a plant called "*Calliguaja*," and is very lively, the infested seeds appearing to jump about of their own accord.

GENUS RHACODIA. (*Peroneidæ.*)

Rhacodia, Hübner, Verz. bek. Schmett. p. 384 (1826?).
Teras, Treitschke, Schmett. Eur. vii. p. 239 (1829); viii. p. 247 (1830).

A curious genus, remarkable for the irregular outline of the costa of the fore-wings. The palpi are also rather longer than usual in the *Tortrices*.

THE NOTCH-WING. RHACODIA CAUDANA.

(*Plate CLIV., Fig.* 6.)

Pyralis caudana, Fabricius, Syst. Ent. p. 651, no. 38 (1775).
Tortrix effractana, Hübner, Eur. Schmett. vii. fig. 175 (1801).
Teras caudana, Treitschke, Schmett. Eur. viii. p. 248 (1830), x. (3), p. 128 (1835); Kirby, Eur. Butterflies and Moths, p. 412, pl. 61, fig. 16 (1883).

This Moth is a native of England, France, Germany and Russia. It expands about three-quarters of an inch.

The fore-wings are pale purplish-grey, varied with light brick-

red. The costa has, as it were, a piece taken out of the middle, and the tips are hooked. There are small brown and white spots distinctly defined, and these give the wings a mottled appearance, and sometimes the dark spots run into faint bands. The borders of the wings are pale brick-red. The hind-wings are uniform white, slightly dusted with reddish in parts.

This insect is very variable, but may always be recognised by its peculiar shape. The green larva feeds on different kinds of willow.

GENUS CHIMATOPHILA. (*Chimatophilidæ.*)

Oporinia, Hübner, Verz. bek. Schmett. p. 387 (1826 ?); Stephens, Ill Brit. Ent. Haust. iv. p. 234 (1834), *nom. præocc.*

Cheimatophila, Stephens, *op. cit.* p. 172 (1834), Von Heinemann, Schmett. Deutschl. (2) i. (1), p. 64 (1863).

Tortricodes, Guenée, Ann. Soc. Ent. France (2) iii. p. 305 (1845).

A rather aberrant genus, with long and rather narrow wings, and short palpi. The type is almost a cosmopolitan species.

THE CLOUDED WINTER TORTRIX.

CHIMATOPHILA TORTRICELLA.

(*Plate CLIV., Fig.* 7.)

Tinea tortricella, Hübner, Eur. Schmett. viii. fig. 11 (1796 ?).

Diurnea nubilea, Haworth, Lepid. Brit. p. 503 (1812).

Tortrix hyemana, Hübner, Eur. Schmett. vii. fig. 267 (1814 ?).

Lemmatophila alternella, Treitschke, Schmett. Eur. ix. (1), p. 39 (1832); id. x. (3), p. 154 (1835).

Oporinia nubilea, Stephens, Ill. Brit. Ent. Haust. iv. p. 234 (1834).

Oporinia tortricella, id. *t.c.* p. 234 (1834).

Lemmatophila hyemella, Treitschke, Schmett Eur. x. (3), p. 154 (1835).

This species is a native of Central and Southern Europe. It expands rather less than an inch.

The fore-wings are brownish-grey, varied with dark brown and pale grey, with a dark central band, and another narrower band nearer the base, which does not extend to the inner margin. On the costa and at the apex are dark spots. Sometimes all the markings are indistinct. The hind-wings are light brownish-grey.

It is found from October to April in woods.

GENUS ENYPHANTES. (*Exapatidæ.*)

Enyphantes, Hübner, Tentamen, p. 2 (1810?).

Exapate, Hübner, Verz. bek. Schmett. p. 387 (1826?); Stainton, Ins. Brit. Tineina, p. 12 (1854); Von Heinemann, Schmett. Deutschl. (2) i. (1), p. 65 (1863).

This genus, like the last, belongs to a Family of somewhat doubtful position, but they are included by most recent authors in the *Tortrices*, and not in the *Tineæ*.

The tongue is absent, the antennæ are ciliated in the male, the spurs of the four hind tibiæ are very short, and the fore-wings of the female are very short and narrow, while the hind-wings are absent.

THE AUTUMNAL DAGGER. ENYPHANTES CONGELATELLA.

(*Plate CLIV. Fig.* 8, *male; Fig.* 9, *female.*)

Tinea congelatella, Clerck, Icones, pl. 8, fig. 5 (1759).

Tinea gelatella, Linnæus, Faun. Suec. p. 370, no. 1450 (1761); id. Syst. Nat. (ed. xii.), i. (2), p. 883, no. 344 (1767).

Tortrix gelatana, Hübner, Eur. Schmett. viii. fig. 266 (1810?).

Lemmatophila gelatella, Treitschke, Schmett. Eur. ix. (1), p. 34 (1832); x. (3), p. 153 (1835).

Cheimatophila gelatella, Curtis, Ent. Mag. i. p. 191 (1833).
Oxypate gelatella, Stephens, Ill. Brit. Ent. Haust. iv. p. 235 (1834).
Exapate gelatella, Stainton, Ins. Brit. Tineina, p. 12 (1852).
Exapate congelatella, Von Heinemann, Schmett. Deutschl. (2) i. (1), p. 66 (1863).

This Moth is widely distributed in Europe. The male expands nine lines and a half, but the female only expands four lines.

The fore-wings are reddish ashy-grey, with a broad whitish streak on the disc, in which are two dark brown spots, one before, and the other beyond the middle. The apex is whitish, and on the costa, near the apex, is a dark brown spot. The hind-wings are greyish-brown.

The fore-wings of the female are very short and narrow, of a whitish-grey, with brownish margins.

The larva feeds on privet, whitethorn, &c.

FAMILY ÆGERIIDÆ.

Antennæ often pectinated, more or less thickened before the tip, which tapers to a point; proboscis generally long; palpi long, pointed, ascending; abdomen long, and most frequently slender, often with coloured belts, and tufted at the tip. Legs slender, often thickly tufted, with long spurs on the tibiæ, one pair on the middle, and two pairs on the hind tibiæ. Frenulum present. Wings long and narrow, the hind-wings nearly always, and the fore-wings often, transparent, except at the edges. Hind-wings with two or three sub-median nervures. Flight diurnal (rarely nocturnal). The smaller species fly very rapidly, and settle on leaves; the stout-bodied species are sluggish, and rest on the trunks of the trees on which the larvæ have fed.

Larva vermiform, with sixteen legs, feeding in the stems and roots of trees or low plants.

This is a Family of somewhat doubtful position. It was originally included among the *Sphinges*, on account of the shape of the antennæ; but recent authors have been more inclined to refer it to the neighbourhood of the *Pyrales* and *Tineæ*. Thus Dr. Butler has placed it in some of his works between the *Pyrales* and the *Crambi*. Sir George Hampson places it after the *Cymatophoridæ* (our *Thyatiridæ*), and before the *Tinægeriidæ* and *Syntomiidæ* (our *Zygæninæ*), while Mr. Meyrick places it at the beginning of the *Tineina*. Mr. Tutt divides the *Tineites* into three families: *Tineidæ*, *Psychidæ*, and *Sesiidæ*; which are succeeded by the *Cochliopodidæ*.

These insects are most easily obtained by rearing, for on the wing they are readily mistaken for *Hymenoptera* or *Diptera*. Many species are now much less scarce in collections than formerly, though some are still extremely rare. The commonest is the Currant Clear-wing (*Trochilium salmachus*, Linn.), which is often very destructive in gardens, and has now become naturalised in most parts of the world.

GENUS ÆGERIA.

Trochilium, pt. Scopoli, Intr. Hist. Nat. p. 414 (1776); Oken, Naturg. Schul. p. 786 (1821); Stephens, Ill. Brit. Ent. Haust. i. p. 137 (1828).

Ægeria, Fabricius in Illiger. Mag. Insekt. vi. p. 288 (1807); Leach, Edinb. Encycl. ix. p. 131 (1815).

Sphecia, Hübner, Verz. bek. Schmett. p. 127 (1818?).

These are stout-bodied moths, with thick yellow black-belted bodies, and transparent wings, resembling wasps. They are sluggish in their habits, and the abdomen is not tufted at the extremity.

THE HORNET CLEAR-WING. ÆGERIA APIFORMIS.

(*Plate CLV. Fig.* 1.)

Sphinx apiformis, Clerck, Icones, i. pl. 9, fig. 2 (1859); Linnæus, Faun. Suec. p. 289, no. 1093 (1761); Esper, Schmett. ii. (1), p. 122, Taf. 14, fig. 2 (1780); (2) p. 207, Taf. 29, figs. 2, 3 (1781 ?); p. 234, Taf. 36, figs. 2, 3, 4, 11 (1783).

Sphinx vespiformis, Hufnagel, Berlin. Mag. i. (2), p. 182, no. 1 (1766); Capieux, Naturf. xviii. p. 222, pl. 5, figs. 7 (1782).

Sphinx crabroniformis, Denis & Schiffermüller, Syst. V Schmett. Wien. p. 305, no. 2, note (1776); Hübner, Eur. Schmett. ii. fig. 51 (1800?).

Sesia apiformis, Laspeyres, Ses. Eur. p. 7 (1801); Ochsenheimer, Schmett. Eur. ii. p. 121 (1808).

Trochilium apiformis, Stephens, Ill. Brit. Ent. Haust. i. p. 137 (1828); Curtis, Brit. Ent. viii. pl. 372, fig. ** (1831); Kirby, Eur. Butterflies and Moths, p. 77, pl. 20, fig. 6 (1879).

Sphecia apiformis, Buckler, Larvæ of Brit. Lepid. ii. p. 123, pl. 27, fig. 1, 1 a (1887).

Sphæcia apiformis, Barrett, Lepid. Brit. Isl. ii. p. 106, pl. 57, figs. 6, 6 a, b (1893).

The Hornet Clear-wing is common in most parts of Europe and Northern and Western Asia. It expands about an inch and a half.

The head is yellow; the thorax brown, with four yellow spots, and the abdomen yellow, with the first and fourth segments black, and clothed with brown pubescence. The other segments are bordered with black, and the last three are brown on the back, with a line of the same colour on the sides. All the wings are transparent, with the borders, the nervures, and

THE HORNET CLEAR-WING. ÆGERIA APIFORMIS.

(*Plate CLV. Fig.* 1.)

Sphinx apiformis, Clerck, Icones, i. pl. 9, fig. 2 (1859); Linnæus, Faun. Suec. p. 289, no. 1093 (1761); Esper, Schmett. ii. (1), p. 122, Taf. 14, fig. 2 (1780); (2) p. 207, Taf. 29, figs. 2, 3 (1781?); p. 234, Taf. 36, figs. 2, 3, 4, 11 (1783).

Sphinx vespiformis, Hufnagel, Berlin. Mag. i. (2), p. 182, no. 14 (1766); Capieux, Naturf. xviii. p. 222, pl. 5, figs. 7, 8 (1782).

Sphinx crabroniformis, Denis & Schiffermüller, Syst. Werz. Schmett. Wien. p. 305, no. 2, note (1776); Hübner, Eur. Schmett. ii. fig. 51 (1800?).

Sesia apiformis, Laspeyres, Ses. Eur. p. 7 (1801); Ochsenheimer, Schmett. Eur. ii. p. 121 (1808).

Trochilium apiformis, Stephens, Ill. Brit. Ent. Haust. i. p. 137 (1828); Curtis, Brit. Ent. viii. pl. 372, fig. ** (1831); Kirby, Eur. Butterflies and Moths, p. 77, pl. 20, fig. 6 (1879).

Sphecia apiformis, Buckler, Larvæ of Brit. Lepid. ii. p. 123, pl. 27, fig. 1, 1 a (1887).

Sphæcia apiformis, Barrett, Lepid. Brit. Isl. ii. p. 106, pl. 57, figs. 6, 6 a, b (1893).

The Hornet Clear-wing is common in most parts of Europe and Northern and Western Asia. It expands about an inch and a half.

The head is yellow; the thorax brown, with four yellow spots, and the abdomen yellow, with the first and fourth segments black, and clothed with brown pubescence. The other segments are bordered with black, and the last three are brown on the back, with a line of the same colour on the sides. All the wings are transparent, with the borders, the nervures, and

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1. *Ægeria apiformis.*
2. *Memythrus vespiformis.*
3. *Pyropteron chrysidiforme.*
4. *Trochilium spheciforme.*
5. *Thyris usitata.*
6. *Varnia ignita.*

a transverse stripe on the fore-wings rusty-brown. The fringes are tawny.

The larva lives in the trunk and roots of willows and poplars. It is whitish and pubescent, with a dusky dorsal line, and a dark brown head.

The moth is found from May to July, sitting on the trunks of poplars, &c., near the root, when it looks exactly like a large wasp.

GENUS MEMYTHRUS.

Paranthrene, pt. Hübner, Verz. bek. Schmett. p. 128 (1818?); Newman, Ent. Mag. i. p. 83 (Sept. 1832); Walker, List Lepid. Ins. Brit. Mus. viii. p. 13 (1856).

Memythrus, Newman, Sphinx Vespiformis, p. 53 (Jan. 1832).

Sciapteron, Staudinger, Ses. Berol. p. 43 (1854).

The antennæ. are pectinated and ciliated in the male; the body is moderately slender and tufted at the tip, and the fore-wings are almost entirely opaque, except for a slight indication of transparency at the base; the hind-wings are transparent, except the borders.

THE DUSKY CLEAR-WING. MEMYTHRUS VESPIFORMIS.

(*Plate CLV., Fig.* 2.)

Sphinx vespiformis, Linnæus, Faun. Suec. p. 289 (1761).

Sphinx tabaniformis, Von Rottenburg, Naturf. vii. p. 110, no. 4 (1775).

Sphinx asiliformis, Denis & Schiffermüller, Syst. Verz. Schmett. Wien, p. 305, no. 9 (1776); Esper, Schmett. ii. (2), p. 205, Taf. 29, fig. 1 (1782?).

Sesia asiliformis, Laspeyres, Ses. Eur. p. 10 (1801); Ochsenheimer, Schmett. Eur. ii. p. 128 (1808); Barrett, Lepid. Brit. Isl. ii. p. 78, pl. 55, figs. 1, 1 a (1893).

Ægeria asiliformis, Stephens, Ill. Brit. Ent. Haust. i. p. 139 (1828).

Sciapteron tabaniformis, Kirby, Eur. Butterflies and Moths, p. 77 (1879).

The Dusky Clear-wing is found throughout Europe and Western Asia. It expands from an inch and a quarter to an inch and a half.

The body is blue-black; the head with two white spots in front of the eyes, and a yellow ring behind. The thorax has a yellow mark on each side, and a spot of the same colour at the base of the fore-wings. The abdomen has four yellow rings in the male, and three in the female. The anal tuft is deep black, with two yellow longitudinal lines. The fore-wings are brown and opaque, being almost entirely covered with scales; the hind-wings are transparent, with brown borders.

The larva lives in sallow, ash, and aspen.

At the beginning of the century this Moth used to be taken occasionally in the neighbourhood of London; but for some unexplained reason, it appears to have entirely disappeared from this country, almost the last specimens seen at large in England having been taken by Mr. Doubleday in his garden at Epping in 1858.

GENUS PYROPTERON.

Pyropteron, Newman, Ent. Mag. i. p. 75 (1832); Walker, List Lepid. Ins. Brit. Mus. viii. p. 17 (1856).

Antennæ rather slender, finely setose beneath, in the male; and more slender, but slightly sub-clavate, in the female. The body is rather slender, and the abdomen is tufted at the extremity. The fore-wings have a short hyaline streak in the cell, and a large hyaline spot beyond; the hind-wings are transparent, except at the edges.

THE FIERY CLEAR-WING. PYROPTERON CHRYSIDIFORME.

(*Plate CLV., fig.* 3.)

Sphinx chrysidiformis, Esper, Schmett. ii. (1), p. 210, Taf. 30, fig. 2 (1782).

Sphinx hæmorrhoidalis, Cyrillo, Ent. Neap. i. pl. 4, fig. 3 (1787).

Sesia chrysidiformis, Laspeyres, Ses. Eur. p. 15 (1801); Ochsenheimer, Schmett. Eur. ii. p. 143 (1808); Kirby, Eur. Butterflies and Moths, p. 83 (1879); Barrett, Lepid. Brit. Isl. ii. p. 101, pl. 57, figs. 4, 4a, b (1893).

Ægeria chrysidiformis, Stephens, Ill. Brit. Ent. Haust. i. p. 141 (1828).

Trochilium chrysidiformis, Buckler, Larvæ of Brit. Lepid. ii. p. 45, pl. 27, fig. 3, 3 a, b (1887).

The Fiery Clear-wing is found in Western and Southern Europe. It is rare and local in England, but is met with occasionally near Folkestone. It expands three-quarters of an inch, or a little more.

The body is blue-black, with a yellowish-white front and collar; the thorax has a white spot on each side at the base of the wings, and the abdomen has two white belts, one on the fifth, and the other on the terminal segment. The anal tuft is black. The borders, the nervures, and a cross mark in the middle of the fore-wings are black. A triangular area between the base and the central mark, and a rounded space beyond it, are clear and transparent, the rest of the surface being bright orange-red. The hind-wings are transparent, with a minute black spot bordered with red in the middle of the costa.

The larva is said to live in the roots of *Rumex crispus*, *Artemisia campestris*,, and *Elychrysum*.

GENUS TROCHILIUM.

Trochilium, Scopoli, Intr. Hist. Nat. p. 414 (1776); Newman, Ent. Mag. i. p. 78 (1832).

Synanthedon, Hübner, Verz. bek. Schmett. p. 129 (1818?); Newman, *op. cit.* p. 77 (1832); Walker, List Lepid. Ins. Brit. Mus. viii, p. 19 (1856).

Antennæ rather stout, serrated and pubescent beneath, in the male, but not pectinated; body rather slender; abdomen tufted at the tip. Fore-wings with three transparent areas, the longitudinal area extending at least as far as the transverse band; the hind-wings transparent, except at the edges.

THE WHITE-BARRED CLEAR-WING. TROCHILIUM SPHECIFORMIS.

(*Plate CLV., Fig.* 4.)

Sphinx spheciformis, Gerning, Frankf. Beytr. ii, p. 33, pl. 1, fig. 2 (1780); Esper, Schmett. ii (2) 1, p. 212, Taf. 30, fig. 4 (1782); Hübner, Eur. Schmett. ii, figs. 77, 78 (1802?).

Sphinx sphegiformis, Vieweg, Verz. Schmett. i. p. 15 (1789).

Sesia spheciformis, Laspeyres, Ses. Eur. p. 12 (1801); Ochsenheimer, Schmett. Eur. ii, p. 134 (1808); Kirby, Eur. Butterflies and Moths, p. 78 (1879); Barrett, Lepid. of Brit. Isl. ii, p. 82, pl. 55, figs. 3, 3a–c (1893).

Trochilium sphegiformis, Buckler, Larvæ of Brit. Lepid. ii. pp. 49, 127, pl. 28, figs. 1, 1a (1887).

The White-barred Clear-wing is found throughout the greater part of Europe and Northern Asia, but, like so many of this Family, it is rare and local as a British species. It expands about an inch.

The body is shining black, with a yellow longitudinal line on each side of the thorax. The abdomen has a yellow belt on the third segment above, and another on the fifth below; there is also a yellow spot on the surface of the basal segment. The wings are transparent; the fore-wings, with the nervures, the hind margin, apex, and a broad transverse stripe in the

outer third of the wing, blue-black. The hind-wings have the hind margins, nervures, and a cross mark near the middle of the costa also blue-black. The fringes are brownish ash-colour.

The larva lives in the stems of the alder.

FAMILY THYRIDIDÆ.

The antennæ are thickened in the middle, and the basal joint is also thickened. The proboscis is well developed, and the ocelli are absent. The legs are stout and hairy, and the hind tibiæ are armed with two pairs of very long spurs. The body is stout, and extends much beyond the hind-wings. The wings are more or less dentated, and are adorned with vitreous spots. The moths fly over flowers by day.

The larva feeds on pith in the stems of shrubs.

This Family has usually been included in the *Sphinges*, near the *Ægeriidæ*, to which the typical genus is certainly allied. Most of the forms included in this Family by recent authors appear to have no connection with it. Among these is *Varnia* (cf. *antea*, p. 106, pl. 155, fig. 6), a genus more appropriately placed by its describer in the *Noctuæ*, than in juxtaposition with *Thyris*, as other Lepidopterists have proposed.

GENUS THYRIS.

Thyris, Hoffmannsegg, in Illiger, Mag. Insect. ii, p. 39, note (1803); Ochsenheimer, Schmett. Eur. ii, p. 114 (1808); Boisduval, Mon. Zyg. p. 16 (1829).

The antennæ are thicker in the male than in the female; and the abdomen is long and conical. The wings are dark, with large transparent spots. The moths are small, and are chiefly found in Europe, Asia, and North America. They fly over flowers in the daytime.

The larva is naked, with the head small, and the body tapering in front. It lives in the stems of elder, &c., feeding on the pith. The pupa is scabrous.

THYRIS USITATA.

(*Plate CLV., Fig.* 5.)

Thyris usitata, Butler, Ann. & Mag. Nat. Hist. (4) v. p. 367 (1879).

"Dark purplish brown, with cupreous reflections; wings spotted with golden yellow, most of the spots forming a submarginal series; primaries with two unequal and nearly central hyaline white spots, the larger one in front of the smaller; secondaries with a broad, irregular hyaline white belt upon the basal half, but not reaching the costal margin; head, collar, and palpi golden yellow at the sides; tegulæ edged internally with yellow; a snow-white spot on the shoulder; abdomen crossed by two slender white bands. Wings below nearly as above; the yellow spots larger and more numerous; venter crossed by two broad white belts" (*Butler*).

This species is closely allied to the well-known European *Thyris fenestrella* (Scopoli). It is a native of Japan.

TINEÆ.

This is by far the most extensive group of the *Lepidoptera*, at least in temperate climates, and includes a third of our British species. The *Tineæ* are moths of small size, usually with simple antennæ, rounded, or long and narrow, wings, generally with long, or very long fringes, and sometimes with very simple neuration. The structure of the head and palpi, and the form of the hind-wings varies considerably.

The larvæ, too, vary much in structure and habits; they may be wholly footless, or may have from ten to eighteen legs; but sixteen is the normal number, as with most *Lepidoptera*,

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1. *Atychia appendiculata.*
2. *Choreutis nyllerana.*
3. *Diurnea fagella, male.*
4. " " , *female.*
5. *Adela degeerella.*
6. *Hyponomeuta padella.*
7. *Chrysoclista linneella.*
8. *Gracillaria syringella*
9. *Crameria nobilitella.*

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1. *Atychia appendiculata.*
2. *Choreutis myllerana.*
3. *Diurnea fagella, male.*
4. " " , *female.*
5. *Adela degeerella.*
6. *Hyponomeuta padella.*
7. *Chrysoclista linneella.*
8. *Gracillaria syringella*
9. *Crameria nobilitella.*

except the *Geometræ*. They differ much in habits. The true "Clothes-Moths" feed on woollen fabrics, and form cases for themselves; but others form cases of the vegetable substances on which they feed, and a great number of *Tineæ* mine in leaves. They are divided into a considerable number of well-marked Families, representatives of several of which are described or figured in the present work.

GENUS CHOREUTIS. (*Choreutidæ.*)

Anthophila, Haworth, Lepid. Brit. p. 471 (1812), *nec Hübner.*
Choreutis, Hübner, Verz. bek. Schmett. p. 373 (1826?); Von Heinemann, Schmett. Deutschl. (2), ii. (1), p. 2 (1870).

The Family to which this genus belongs is of somewhat doubtful position, being classed by some authors with the *Pyrales*, and by others with the *Tineæ*. It includes small, dull-coloured moths, with rather stout bodies and broad wings, with short fringes. The palpi are ascending. The larvæ have sixteen legs, and feed among leaves spun together by a web; the pupæ are enclosed in cocoons. The moths fly by day, and when at rest hold their wings partly open. The genus *Choreutis* has long bristles on the under-surface of the two first joints of the palpi, the last joint being slender and pointed.

THE SILVER-DOTTED NETTLE-TAP. CHOREUTIS MYLLERANA.
(*Plate CLVI., Fig.* 2.)

Pyralis myllerana, Fabricius, Ent. Syst. iii. (2), p. 277, no. 147 (1794).
Tortrix angustana, Hübner, Eur. Schmett. vii. fig. 204 (1803?).
Anthophila mylleri, Haworth, Lepid. Brit. p. 472, no. 5 (1812); Curtis, Brit. Ent. vii. pl. 320 (1830).
Anthophila punctosa, Haworth, *op. cit.* p. 472, no. 6 (1812).
Choreutes scintilulalis, Treitschke, Schmett. Eur. x. (3), p. 33 (1835).

Simaëthis myllerana, Stephens, Ill. Brit. Ent. Haust. iv. p. 30 (1834).

Simaëthis punctosa, id. *op. cit.*

This Moth is a native of Temperate and Northern Europe, including Britain. It expands about half an inch.

The fore-wings and body are black; the former with three clear white spots on the costa, and others towards the inner margin. Between these are a few silvery or steel-blue dots. In front of the fringes is a dull white or steel-blue line. The hind-wings are dark brown, with whitish-grey fringes, and occasionally traces of a white transverse line near the middle of the inner margin.

GENUS ATYCHIA. (*Atychiidæ.*)

Chimæra, Ochsenheimer, Schmett. Eur. ii. p. 2 (1808), *nom. præocc.*

Atychia, Latreille Gen. Crust. Ins. iv. p. 214 (1809); Von Heinemann, Schmett. Deutschl. (2) ii. (1), p. 7 (1870).

Small stout-bodied moths, with a long abdomen. Ocelli present. Palpi short and thick; upcurved, with a short terminal joint. Fore-wings short, parallel, rounded behind, with short fringes, and twelve nervures, the sub-median nervure forming a long fork at the base. Hind-wings with eight nervures, and three sub-median nervures. In the male the antennæ are pectinated.

The larvæ resemble those of the *Ægeriidæ*, and live in a tube-like web at the roots of grass.

These Moths are chiefly South European, and we have no representative of the Family in England. They were formerly included in the *Sphinges*, but are now referred to the *Tineæ*, or regarded as a separate group preceding the latter.

ATYCHIA APPENDICULATA.

(*Plate CLVI., Fig.* 1.)

Sphinx appendiculata, Esper, Schmett. ii. (2), p. 227, Taf. 35, figs. 5, 6 (1788 ?).

Sphinx chimæra, Hübner, Eur. Schmett. ii. fig. 1 (1797).

Noctua chimæra, Hübner, Eur. Schmett. iv. figs. 314, 315 (1804 ?).

This Moth is found in South-eastern Europe and Western Asia. It expands three-quarters of an inch.

The fore-wings are dark brown, dusted with ochre-yellow in the male, with an ochre-yellow longitudinal stripe from the base, extending two-thirds across the wings, and expanded in its outer part. The hind-wings are dark brown, with a white band near the base, which does not reach either the costa or inner margin. The female has darker fore-wings, with a coppery lustre, and a narrow whitish costa and faintly indicated longitudinal stripe; but no light spot on the hind-wings.

GENUS EUPLOCAMUS. (*Tineidæ.*)

Euplocamus, Latreille, Gen. Crust. Ins. iv. p. 223 (1809); Von Heinemann, Schmett. Deutschl. (2), ii. (1), p. 35 (1870).

The species included in this genus are among the largest of the European *Tineæ*. They are conspicuously coloured, with large white or coloured spots and markings on a black ground; and the antennæ of the males are furnished with very long diverging cilia. The larvæ live in rotten trees and tree-fungi in spring, and the moths appear in summer.

EUPLOCAMUS BIENERTI.

(*Plate CLVIII., Fig.* 2.)

Euplocamus bienerti, Staudinger, Berl. Ent. Zeitschr. xiv. p. 207 (1870); Lederer, Hor. Soc. Ent. Ross. viii. p. 24, pl. 2, figs. 11, 12 (1872).

This species expands about an inch.

It is found in Asia Minor and Northern Persia. The fore-wings are black, with yellow nervures, and the fringes are broadly spotted with orange-yellow, as are also the costa and hind margin, but less broadly, the rest of the wing being thickly mottled with the same colour. The hind-wings are light orange, with a broad black border; the fringes are yellowish. The body is black; the long palpi, a spot towards the back of the thorax, the transverse bands on the abdomen, and the anal tuft are yellow; the legs are also yellow, more or less banded with black; the hind-legs especially are very long, and the hind tibiæ are compressed, yellow, and very strongly spurred. The antennæ are set with very long diverging hairs.

Except in colour, this species is closely allied to *Æ. anthracinalis* (Scopoli), a black South European species, with yellow marks on the head and thorax, and large white spots on the fore-wings.

GENUS TINEA. (*Tineidæ.*)

Tinea, Linnæus, Syst. Nat. (ed. x.) i. p. 534 (1758); Poda, Mus. Græc. p. 94 (1761); Treitschke, Schmett. Eur. ix. (1), p. 12 (1832); Stainton, Ins. Brit. Tineina, p. 24 (1854); Von Heinemann, Schmett. Deutschl. (2) ii. (1), p. 40 (1870).

The head is clothed with woolly hair, and the antennæ are shorter than the wings. The wings are long, more or less oval, and the hind-wings especially are often rather narrow and pointed, with long fringes. This genus includes the true "Clothes Moths"; but there are only a few species which are destructive to clothes. Other species feed on grain, rotten wood, fungi, &c.

THE CLOTHES MOTH. TINEA PELLIONELLA.

Tinea pellionella, Linnæus, Syst. Nat. (ed. x.) i. p. 536, no. 254 (1758); id. Faun. Suec. p, 364, no. 1415 (1761);

Treitschke, Schmett. Eur. ix. (1), p. 15 (1832); Stephens, Ill. Brit. Ent. Haust. iv. p. 345 (1834); Stainton, Ins. Brit. Tineina, p. 33 (1854); Von Heinemann, Schmett. Deutschl. (2), ii. (2), p. 54 (1870); Kirby, Eur. Butterflies and Moths, p. 413 (1883).

Tinea sarcitella, Linnæus, Syst. Nat. (ed. x.) i. p. 536, no. 255 (1758); id. Faun. Suec. p. 364, no. 1416 (1761).

The Clothes Moth is widely distributed, and probably almost cosmopolitan. It expands about half an inch. The fore-wings are light metallic golden brown, with one or two fine dark dots in front of, and a larger one beyond, the middle. The cilia are whitish. The hind-wings are pale grey, with a yellowish shine, and yellowish-white fringes.

The larva feeds on wool, hair, fur, feathers, &c.

It attains a length of about a third of an inch and is yellowish-white, rather shining and wrinkled. The head and cervical plate are brown, the latter divided longitudinally by a white line. There is a dark brownish-red dorsal line, which ends in a red spot, and the ventral surface and legs are white. The larva forms a portable case of the material upon which it is feeding, and the yellowish-brown pupa is either formed in this, or in a slight cocoon.

GENUS ADELA. (*Adelidæ.*)

Adela, Latreille, Précis, p. 147 (1796); id. Hist. Nat. Crust. Ins. iii. p. 417 (1802), xiv. p. 255 (1805); Treitschke, Schmett. Eur. ix. (2), p. 112 (1833); Stainton, Ins. Brit. Tineina, p. 48 (1854); Von Heinemann, Schmett. Deutschl. (2), ii. (1) p. 73 (1870).

This is a genus belonging to a family allied to the *Tineidæ*, but distinguished by the very long and slender antennæ of the

males, and the beautiful golden-green or coppery colour of most of the species. The moths fly by day in woods in spring.

DE GEER'S LONG-HORNED MOTH. ADELA DEGEERELLA.

(*Plate CLVI., Fig.* 5.)

Tinea degeerella, Linnæus, Syst. Nat. (ed. x.) i. p. 540, no. 286 (1758); id. Faun. Suec. p. 360. no. 1393 (1761); Clerck, Icones, pl. 12, fig. 3 (1759).

(?) *Tinea sultzella*, Linnæus, Syst. Nat. (ed. xii.), i. (2) p. 896. no. 427 (1767).

Tinea geerella, Hübner, Eur. Schmett. viii. fig. 130 (1801), fig. 446 (1822).

Adela degeerella, Treitschke, Schmett. Eur. ix. (2), p. 131 (1833), x. (3) p. 207 (1835); Stephens, Ill. Brit. Ent. Haust. iv. p. 230 (1834); Kirby, Eur. Butterflies and Moths, p. 413, pl. 62, fig. 10 (1883); Stainton, Ins. Brit. Tineina, p. 50 (1854); Von Heinemann, Schmett. Deutschl. (2), ii. (1) p. 77 (1870).

This species is found throughout Europe and Asia Minor. It expands about three-quarters of an inch.

The fore-wings are dull golden yellow with dark longitudinal lines in the basal half and in front of the tips. Between these is a golden yellow transverse band, bordered on each side with dark violet, and slightly expanded on the inner margin. The hind-wings are greyish-brown, suffused with violet. The long antennæ are, in the male, brownish-violet towards the base and then white; in the female the basal half is dark violet and much thickened, the rest of the antennæ being white.

The larva feeds in a flat case on Wood Anemone and other low plants. It is yellowish-white, with a black head and a

blackish cervical plate. The third and fourth segments are spotted with grey above.

GENUS HYPONOMEUTA. (*Hyponomeutidæ.*)

Yponomeuta, Latreille, Hist. Nat. Crust. Ins. iii. p. 417 (1802), xiv. p. 417 (1805); Treitschke, Schmett. Eur. ix. (1), p. 208 (1832).

Hyponomeuta, Zeller, Isis, 1844, p. 199; Stainton, Ins. Brit. Tineina, p. 58 (1854); Von Heinemann, Schmett. Deutschl. (2) ii. (1), p. 107 (1870).

These are rather large moths for *Tineæ*, and are easily recognisable by their long white or grey wings, with rows of conspicuous black dots. The larvæ spin webs over their food plant, and are often very destructive, the various species feeding on apple, hawthorn, sloe, box, spindle-tree, &c.

THE SMALL ERMINE MOTH. HYPONOMEUTA PADELLA.
(*Plate CLVI., Fig.* 6.)

Tinea padella, Linnæus, Syst. Nat. (ed. x.), i. p. 535, no. 240 (1758); id. Faun. Suec. p. 354, no. 1364 (1761); Hübner, Eur. Schmett. viii. fig. 87 (1801), figs. 393–395 (1816).

(?) *Yponomeuta cognatella*, Treitschke, Schmett. Eur. ix. (1), p. 220 (1832).

Yponomeuta padella, Stephens, Ill. Brit. Ent. Haust. iv. p. 243 (1834).

Hyponomeuta padella, Kirby, Eur. Butterflies and Moths, p. 413 (1883).

Hyponomeuta padellus, Stainton, Ins. Brit. Tineina, p. 60 (1854).

Hyponomeuta variabilis, Zeller, Isis, 1844, p. 214; Von Heinemann, Schmett. Deutschl. (2), ii. (1), p. 109 (1870).

The Small Ermine Moth is found throughout the greater part of Europe and Asia Minor. It expands from half to three quarters of an inch.

The fore-wings are white with a greyish tinge, with three rows of black dots. The fringes are pale grey or white, with pale grey tips. The hind-wings are brownish grey with lighter fringes.

The larva feeds on hawthorn and apple, and is grey, spotted with black. It feeds gregariously, under a web.

GENUS CRAMERIA. (*Hyponomeutidæ.*)

Crameria, Hübner, Verz. bek. Schmett. p. 168 (1822?).
Cydosia, Westwood, in Jardine's Nat. Libr. Exot. Moths, p. 193 (1841); Walker, List Lepid. Ins. Brit. Mus. ii. p. 523 (1854); Guenée, Ann. Soc. Ent. France, (5), ix. p. 283 (1879).

Antennæ simple; palpi small; proboscis long; wings rather long, entire, fore-wings rather narrow, hind-wings broad, but considerably longer than broad; discoidal cells open.

A small genus of handsome moths, formerly included with the *Lithosiidæ*.

CRAMERIA NOBILITELLA.

(*Plate CLVI., Fig.* 9.)

Tinea nobilitella, Cramer, Pap. Exot. iii. pl. 264, fig. G (1779).
Cydosia nobilitella, Westwood, in Jardine's Nat. Libr. Exot. Moths, p. 193, pl. 24, fig. 2 (1841); Walker, List Lepid. Ins. Brit. Mus. ii. p. 524, no. 1 (1854); Guenée, *op. cit.* p. 286 (1879).
Cydosia cyanella, Guenée, *l.c.* p. 283 (1870).

This Moth is a native of the West Indies and South America. It expands about an inch and a quarter.

The fore-wings are shining steel-blue, each with about fourteen white spots, arranged for the most part in transverse rows of threes; in addition to these there are also several minute white dots near the tips of the wings. Between the

white spots run three shining orange transverse bars, and there is a spot of the same colour on the costa near the base. The hind-wings are white, with a broad blackish marginal band. The body is steel-blue, with six white spots on the thorax, and the legs are black, with white marks.

There are several closely allied forms, which may or may not be distinct species.

GENUS DIURNEA. (*Chimabacchidæ.*)

Diurnea, Haworth, Lepid. Brit. p. 501 (1812); Stephens, Ill. Brit. Ent. Haust. iv. p. 237 (1834); Curtis, Brit. Ent. xvi. pl. 743 (1839).

Chimabache, Hübner, Verz. bek. Schmett. p. 402 (1826?).

Chimabacche, Zeller, Isis, p. 181 (1839); Stainton, Ins. Brit. Tineina, p. 14 (1854); Von Heinemann, Schmett. Deutschl. (2) ii. (1) p. 131 (1870).

This is a genus which is included in the *Exapatidæ* by some authors, while others place it in the *Tineæ*, or treat it as belonging to a distinct Family.

The head is hairy above; the palpi are small, and the proboscis is almost obsolete. Ocelli present. The female has rudimentary wings. In *Diurnea*, the ocelli are small, the face and palpi are clothed with smooth hair, and the fore-wings of the female are oval, and as long as the body, the hind-wings being shorter and narrower.

THE MARSH DAGGER. DIURNEA FAGELLA.

(*Plate CLVI., Fig.* 3, *male; Fig.* 4, *female.*)

Tinea fagella, Denis & Schiffermüller, Syst. Verz. Schmett. Wien. p. 135, no. 34 (1776); Hübner, Eur. Schmett. viii fig. 12 (1793?).

Lemmatophila fagella, Treitschke, Schmett. Eur. ix. (1), p. 26 (1832).

Diurnea fagella, Stephens, Ill. Brit. Ent. Haust. iv. p. 237 (1834).

Chimabacche fagella, Stainton, Ins. Brit. Tineina, p. 15 (1854); Von Heinemann, Schmett. Deutschl. (2), ii. p. 132 (1870).

The Marsh Dagger is a native of Temperate and many parts Southern Europe. The male expands upwards of an inch, and the female two-thirds of an inch. The fore-wings are whitish-grey or pale ashy-grey, with two dark brown transverse stripes, commencing at the costa, but not reaching the hind-margin. The first of these, which is near the base, is dentated, and bordered on the inner side with white. The second is in the middle of the wing, and on it are several dots. Behind it is a faint light brownish spot. In front of the fringes, which are streaked with brownish and whitish-grey, is another zig-zag line of coarse scales, and from the first to the second transverse line runs a waved longitudinal line, sometimes wanting. The entire surface of the wings is, moreover, coarsely dusted with brown, with here and there scattered blackish dots. The hind-wings are uniform ashy-grey or whitish-grey, with grey and white fringes.

The female, which usually sits on the stems of trees, and is unable to fly, but which can run very fast if disturbed, has very long pointed palpi which, like the head and thorax, are ashy-grey. The abdomen is brownish-grey, with whitish rings. The fore-wings are lanceolate and raised. They resemble the abdomen in colour, and are crossed by two black transverse lines, the area between forming a dark band, which contains three raised black dots forming a triangle. There are also raised yellowish-brown atoms on the surface which make the wings appear uneven. The hind-wings consist of pointed stumps, and are pale ashy-grey.

The larva lives on oak, beech, birch, poplar, &c. The head

1. *Cryptophasa irrorata*, male.
2. " " , female.
3. " " , larva.
4. " " , excrescence formed by larva
5. " " , pupa.

is flat, light brown, with dark spots and streaks. The body is flat, and white with a pale green or grey dorsal line, and two rows of hardly visible white warts, set with white hair. The cervical plate is whitish, with a brownish lustre.

The transformation takes place between leaves, in a delicate cocoon, and the pupa is slender, light brown, with dark wing-cases.

GENUS CRYPTOPHASA. (*Cryptophasidæ.*)

Cryptophasa, Lewin, Lepid. Ins. N. S. Wales, p. 11 (1805); Duncan, in Jardine's Nat. Libr. Exot. Moths, p. 117 (1841).

The antennæ are pectinated nearly to the tips in the male, but are simple in the female. The proboscis is obsolete, and the palpi are cylindrical, curved upwards, and pointed. The wings are glossy, with short fringes. The larva has sixteen legs, and is long and cylindrical. It bores into the trunks of trees, and emerges at night to provision its burrow with leaves, on which it feeds.

These Moths, though now referred to the *Tineæ*, more resemble *Bombyces* or *Noctuæ* in size and appearance; and they are among the largest *Tineæ* known.

CRYPTOPHASA IRRORATA.

(*Plate CLVII.*)

Cryptophasa irrorata, Lewin, Lepid. Ins. N. S. Wales, p. 11, pl. 10 (1805); Duncan, in Jardine's Nat. Libr. Exot. Moths, p. 117, pl. 10 (1841).

This remarkable species is a native of Australia.

It expands from an inch and three-quarters to two inches and a quarter.

The fore-wings are dusky grey, thickly speckled with brown and white atoms, with a conspicuous ear-shaped spot beyond the middle of the wings and an angular patch of dark dots

near the shoulders. The hind-wings are blackish with silvery margins.

The eggs of this moth are laid on the bark of *Casaurina*, where a branch is given off, and the white red-spotted larva, as soon as it emerges, bores its way into the bark, and makes a cylindrical passage to the centre of the stem, where it lives, weaving over the entrance a convex cover formed of ends of leaves, and its own excrement. This cover is securely attached at its upper part, the lower end remaining movable, so that the larva can pass in and out. After sunset it goes in search of food, which it conveys, a leaf at a time, to its dwelling, and drags down into the cylindrical passage. In this manner the larva spends the whole of the night, and towards daybreak retires quickly to its retreat, where it lies hidden with its head towards the entrance, feeding on the stored leaves. In this passage the pupa is formed in January without a cocoon, and the moth appears in about a fortnight, in February.

GENUS HARPELLA. (*Gelechiidæ.*)

Harpella, Schrank, Fauna Boica, ii. (2), p. 168 (1802); Zeller, Isis, 1839, p. 191; Stainton, Ins. Brit. Tineina, p. 151 (1854); Von Heinemann, Schmett. Deutschl. (2), ii. p. 371 (1870).

Alabonia, Hübner, Verz. bek. Schmett. p. 418 (1826?); Stephens, Ill. Brit. Ent. Haust. iv. p. 226 (1834).

The largest family of the *Micro-Lepidoptera* is that of the *Gelechiidæ*, to which the present genus belongs. *Harpella* includes one or two conspicuous species of bright colours, and of large size for *Tineæ*. In *Harpella*, the palpi are very long, compressed, the second joint scaly, and the terminal joint slender, pointed, and obliquely raised. The wings are oval, rather broad, and rounded at the tips, with moderately long

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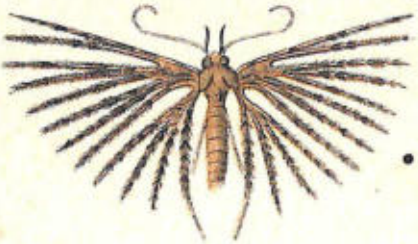

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1. *Eretmocera lætissima.*
2. *Euplocamus lienerti.*
3. *Harpella geoffrella.*
4. *Œcophora sulphurella.*
5. *Coleophora anatipennella.*
6. *Lithocolletis spinolella.*
7. *Antispila treitschkiella.*
8. *Microsetia microtheriella.*
9. *Alucita pentadactyla.*
10. *Orneodes hexadactyla.*
11. *Micropteryx aureatella*

fringes. The larvæ have sixteen legs, and feed on rotten wood under bark. The moths fly in woods in spring.

HARPELLA GEOFFRELLA.

(*Plate CLVIII., Fig.* 3.)

Tinea geoffrella, Linnæus, Syst. Nat. (ed. xii.), i. (2), p. 896, no. 430 (1767).

Alabonia geoffroyella, Stephens, Ill. Brit. Ent. Haust. iv. p. 227 (1834).

Harpella geoffrella, Stainton, Ins. Brit. Tineina, p. 152 (1854); Von Heinemann, Schmett. Deutschl. (2) ii. (1), p. 372 (1870).

This beautiful Moth is found in most parts of Central and Southern Europe. It expands about three-quarters of an inch. The fore-wings are yellow, clouded with brown in the marginal third, and with two leaden-blue streaks rising from the base. Beyond the middle are two conspicuous triangular pale yellow spots, one on the costa, and the other on the inner margin. The hind-wings are brown. It frequents hedges and woods, where it flies about on sunny mornings.

GENUS ŒCOPHORA. (*Œcophoridæ.*)

Œcophora, Latreille, Précis, p. 146 (1796); id. Hist. Nat. Crust. Ins. iii. p. 417 (1802); xiv. p. 251 (1805); Curtis, Brit. Ent. ix. pl. 408 (1832); Stephens, Ill. Brit. Ent. Haust. iv. p. 227 (1834); Zeller, Isis, 1839, p. 191, *nec Stainton restr.*

Dasycerus, Haworth, Lepid. Brit. p. 524 (1829).

Dasycera, Stephens, Cat. Brit. Ins. ii. p. 199 (1829); Stainton, Ins. Brit. Tineina, p. 155 (1854); Von Heinemann, Schmett. Deutschl. (2) ii. (1), p. 373 (1870).

These are pretty little black and yellow moths, with long and moderately broad wings, and the hind-wings with long

fringes. The antennæ are thickened towards the base, and hairy on the back; the palpi are up-curved, and the tips of the wings are rounded.

The larvæ have sixteen legs, and feed on rotten wood under bark.

THE LEAST YELLOW UNDER-WING. ŒCOPHORA SULPHURELLA. (*Plate CLVIII., Fig.* 4.)

Alucita sulphurella, Fabricius, Syst. Ent. p. 670, no. 19 (1775).
Tinea cornutella, id. Ent. Syst. Suppl. p. 492, no. 63 (1798).
Tinea orbonella, Hübner, Eur. Schmett. viii. fig. 313 (1816?).
Œcophora sulphurella, Curtis, Brit. Ent. ix. pl. 408 (1832); Stephens, Ill. Brit. Ent. Haust. iv. p. 228 (1834).
Dasycera sulphurella, Stainton, Ins. Brit. Tineina, p. 154 (1854); Von Heinemann, Schmett. Deutschl. (2) ii. (1), p. 373 (1870).

The Least Yellow Under-wing is found throughout the greater part of Europe. It expands seven lines and a half.

The fore-wings are olive-brown, dusted with yellow, especially towards the hind margin. From the base run two short yellow longitudinal streaks, and there is a small pale yellow spot on the costa, and a larger triangular spot of the same colour beyond the middle of the inner margin. The hind-wings are pale ochre-yellow, with dark brown tips.

The larva lives in decayed wood. It is greyish-white, spotted with blackish, with a reddish-brown head and second segment.

GENUS ERETMOCERA. (*Tinægeriidæ.*)

Eretmocera, Zeller, Vet. Akad. Handl. Stockh. 1852, p. 96 (1854); Walsingham, Trans. Ent. Soc. Lond. 1881, p. 271; 1889, p. 19.
Exodomorpha, Walker, List Lepid. Ins. Brit. Mus. xxix. p. 833 (1864).

The *Tinægeriidæ* are a Family of small tropical moths, regarded as intermediate between the *Ægeriidæ* and *Gelechiidæ*. The moths are brilliantly coloured, with long narrow wings, and long fringes, a strong proboscis, and antennæ long and heavily fringed for the greater part of their length. The legs are long, with two pairs of strong spurs on the hind tibiæ; and in several species the legs and abdomen are more or less tufted.

There is a monograph of this group by Lord Walsingham in the Transactions of the Entomological Society of London for 1889.

Eretmocera has the antennæ a little thickened in the middle, and fringed on one side for two-thirds of its length; and a large tuft at the tip of the abdomen.

ERETMOCERA LÆTISSIMA.

(*Plate CLVIII., Fig.* 1.)

Eretmocera lætissima, Zeller, Vet. Akad. Handl. Stockh. 1852, p. 100 (1854); Walsingham, Trans. Ent. Soc. Lond. 1889, p. 33, pl. 6, fig. 17.

Exodomorpha divisella, Walker, List Lepid. Ins. Brit. Mus. xxix. p. 833 (1864); Walsingham, *tom. cit.* p. 34 (1889).

This Moth inhabits tropical and sub-tropical Africa.

Walker's description of his *E. divisella* is as follows:—"Dark purplish cupreous. Head beneath, and pectus on each side, pale gilded yellow. Abdomen scarlet, with a purplish cupreous spot near the base, which is gilded yellow; a purplish cupreous spot on each side at the tip; under side gilded yellow, with two purplish bands; first band near the base widely interrupted; second sub-apical, entire. Fore-wings with three pale yellow dots; first dot discal, near the base; second costal, opposite the third, which is near the end of the interior border. Hind-wings gilded; costa and fringe red, the latter blackish cupreous

towards the tip of the wing. Length of the body, two lines and three-quarters; of the wings, five lines and a half."

GENUS GRACILLARIA. (*Gracillariidæ.*)

Gracillaria, Haworth, Lepid. Brit. p. 527 (1829); Curtis, Brit. Ent. x. pl. 479 (1833); Stephens, Ill. Brit. Ent. Haust. iv. p. 363 (1835).

Gracilaria, Zeller, Isis, 1839, p. 208; id. Linn. Ent. ii. p. 312 (1847); Stainton, Ins. Brit. Tineina, p. 194 (1854); Von Heinemann & Wocke, Schmett. Deutschl. (2) ii (2), p. 616 (1817).

The Family to which this genus belongs has long antennæ and palpi, and long slender wings with very long fringes. The larvæ have only fourteen legs. The smooth head, and the absence of a tuft of hair on the second joint of the palpi, distinguish *Gracillaria* from the allied genera.

THE SMALL LILAC MOTH. GRACILLARIA SYRINGELLA.

(*Plate CLVI., Fig.* 8.)

Tinea syringella, Fabricius, Ent. Syst. iii. (2), p. 328, no. 177 (1794); id. *op. cit.* Suppl. p. 496, no. 84 (1798).

Gracillaria anastomosis, Haworth, Lepid. Brit. p. 530 (1829); Curtis, Brit. Ent. x. pl. 479 (1833).

Ornix ardeæpennella, Treitschke, Schmett. Eur. ix. (2), p. 205 (1833).

Gracilaria syringella, Stainton, Ins. Brit. Tin. p. 198 (1854); Kirby, Eur. Butterflies and Moths, p. 414 (1883); Von Heinemann & Wocke, Schmett. Deutschl. (2) ii. (2), p. 624 (1877).

The Small Lilac Moth has a wide range in Europe. It expands half an inch.

The fore-wings are yellowish-white, with the base brown,

marbled with white. There is a brown blotch on the inner margin near the base, and there are three oblique brown bands. The tips of the wings are brownish, with two whitish spots on the costa. The hind-wings are grey, with paler cilia.

The larva mines the leaves of privet, ash and lilac, and is whitish with a light-brown head.

GENUS COLEOPHORA. (*Coleophoridæ.*)

Coleophora, Hübner, Tentamen, p. 2 (1810?); Zeller, Isis, 1839, p. 191 (1839); id. Linn. Ent. iv. p. 191 (1849); Stainton, Ins. Brit. Tineina, p. 208 (1854); Von Heinemann & Wocke, Schmett. Deutschl. (2) ii. (2), p. 530 (1877).

Porrectaria, Haworth, Lepid. Brit. p. 533 (1829); Stephens, Ill. Brit. Ent. Haust. iv. p. 284 (1835).

This is a large genus of small moths, with long and narrow pointed wings, and very long fringes. The antennæ are extended forward in repose, and have frequently a tuft of hair at the base beneath. The hind tibiæ are hairy, with two pairs of spurs beyond the middle.

The larvæ have sixteen legs, and live in small cases on their food-plants; they feed on leaves or seeds.

The following species is the type of the genus.

THE GOOSE-FEATHER MOTH. COLEOPHORA ANATIPENNELLA. (*Plate CLVIII., Fig.* 5.)

Tinea anatipennella, Hübner, Eur. Schmett. viii. fig. 186 (1801).

Ornix anatipennella, Treitschke, Schmett. Eur. ix (2), p. 211 (1833); x. (3), p. 217 (1835).

Porrectaria anatipennella, Stephens, Ill. Brit. Ent. Haust. iv. p. 285 (1834).

Coleophora anatipennella, Stainton, Ins. Brit. Tineina p. 215 (1854); Von Heinemann & Wocke, Schmett. Deutschl. (2) ii. (2), p. 583 (1877).

The Goose-Feather Moth is a native of Northern and Central Europe. It expands seven lines and a half.

The fore-wings are pale ashy-grey, with numerous light brown atoms towards the apex, and a few near the base. These do not run into lines or spots, but remain distinct. The fringes are ashy. The hind-wings are brownish. The antennæ are ringed with grey and white.

The larva lives on lime, hazel, sloe, oak, and other trees, and has a dark brown case, shaped somewhat like a pistol, which stands upright on the leaf.

GENUS CHRYSOCLISTA. (*Lavernidæ.*)

Chrysoclista, Stainton, Ins. Brit. Tineina, p. 240 (1854); Von Heinemann & Wocke, Schmett. Deutschl. (2) ii. (2), p. 432 (1877).

This is a beautiful genus, with tufts of metallic raised scales on the wings. The wings are long and narrow, and the hind-wings, which are nearly as long as the fore-wings, have long fringes. The larvæ have sixteen legs.

CHRYSOCLISTA LINNEELLA.

(*Plate CLVI., Fig.* 7.)

Tinea linneella, Clerck, Icones, pl. 12, fig. 8 (1759); Linnæus, Faun. Suec. p. 362, no. 1408 (1761).

Glyphipteryx linneella, Curtis, Brit. Ent. iv. pl. 152 (1827); Stephens, Ill. Brit. Ent. Haust. iv. p. 271 (1834).

Chrysoclista linneella, Stainton, Ins. Brit. Tineina, p. 241 (1854); Von Heinemann & Wocke, Schmett. Deutschl. (2) ii. (2), p. 433 (1877).

This species inhabits Central and Southern Europe. It expands half an inch.

The fore-wings are deep orange, narrowly bordered with

dark brown, except at the tips, which are broadly dark brown. From the base passes a silvery streak, and there is a silvery mark below the costa, and two on the inner margin. The hind-wings are dark purple. The fringes of all the wings are blackish.

The larva lives under the bark of lime trees, and is yellowish-white, with a light brown head.

GENUS ANTISPILA. (*Heliozelidæ.*)

Antispila, Hübner, Verz. bek. Schmett. p. 419 (1826); Stainton, Man. Brit. Butt. & Moths, ii. p. 366 (1859); id. Nat. Hist. Tineina, xi. p. 298 (1870); Von Heinemann & Wocke, Schmett. Deutschl. (2) ii. (2), p. 515 (1877).

This genus includes a few species with rather stout bodies, short antennæ, broad fore-wings, and lanceolate hind-wings, with long fringes.

The footless larvæ mine in leaves, and pupate in flat cases on the surface of the ground, or hang suspended by a thread to a leaf.

ANTISPILA TREITSCHKIELLA.

(*Plate CLVIII., Fig.* 7.)

Œcophora treitschkiella, Duponchel, Lépid. France, Suppl. iv. p. 319, pl. 77, fig. 1 (1842).

Elachista treitschkiella, Fischer von Röslerstamm, Abbild. Schmett. p. 297, pl. 100, fig. 4 (1843); Stainton, Ins. Brit. Tineina, p. 250 (1854).

Antispila treitschkiella, Stainton, Nat. Hist. Tineina, xi. p. 318, pl. 8, fig. 3 (1870); Von Heinemann & Wocke, Schmett. Deutschl. (2) ii. (2), p. 515 (1877).

This is a small bronzy-brown moth, not more than a quarter of an inch in expanse, with a silvery band towards the base of the fore-wings, and two silvery spots beyond, that

towards the costa round, and that towards the inner margin triangular.

The larva mines in the leaves of the dogwood in autumn, and the moth appears in the following June.

A similar, but much smaller, species, with no transverse band, but with two triangular spots on the costa of the fore-wings, and two others on the inner margin, mines in vine-leaves in Southern Europe. A long and interesting account of its habits, by Godeheu de Riville, the then governor of Malta, was published as long ago as 1750; but though the original French paper was afterwards printed in German in 1774, it was not till 1871 that the insect was re-discovered at Carrara by the Hon. Beatrice de Grey; and the moth was reared and described by Stainton, who had provisionally named it *Elachista (?) rivillei* in 1854, and reprinted Riville's observations in his "Tineina of Southern Europe," chap. xi., calling the insect "The Lost Pleiad."

This is only another instance of the importance of studying old records, from which much useful but forgotten information can often be gathered by the present generation of naturalists.

GENUS LITHOCOLLETIS. (*Lithocolletidæ.*)

Lithocolletis, Hübner, Verz. bek. Schmett. p. 423 (1826); Stainton, Ins. Brit. Tineina, p. 264 (1854); id. Nat. Hist. Tineina, ii. p. 2 (1857); Von Heinemann & Wocke, Schmett. Deutschl. (2) ii. (2), p. 662 (1877).

This is an extensive genus of small species with oval fore-wings, and narrow lanceolate hind-wings. There is a tuft of hair on the head, and the palpi are short, slender, and decumbent. The larvæ have fourteen legs, and mine in the leaves of trees.

LITHOCOLLETIS SPINOLELLA.

(*Plate CLVIII., Fig.* 6.)

Phalæna blancardella, Donovan, Brit. Ins. xi. p. 90, pl. 392, fig. 2 (1806) *nec Fabricius*.

Argyromiges sylvella, Duncan in Jardine's Nat. Libr. Brit. Moths, p. 262, pl. 30, fig. 1 (1835) *nec Curtis*.

Elachista spinolella, Duponchel, Lépid. France, xi. p. 535, pl. 308, fig. 8 (1838); Herrich-Schäffer, Schmett. Eur. v. p. 332, fig. 797 (1854).

Elachista hilarella, Zetterstedt, Ins. Lapp. p. 1010 (1840).

Lithocolletis spinolella, Stainton, Ins. Brit. Tineina, p. 273 (1854); id. Nat. Hist. Tineina, ii. p. 136, pl. 3, fig. 2 (1857).

Lithocolletis spinicolella, Von Heinemann & Wocke, Schmett. Deutschl. (2), ii. (2), p. 671 (1877).

This Moth is found throughout Central Europe. It expands from three lines and a half to four lines and a half.

The fore-wings are saffron-yellow, more or less suffused with grey, with a straight basal streak, a slightly curved transverse band, three hooks on the costa, and two on the hind margins, silvery-white. The hind-wings are grey.

The larva mines the under-surface of the leaves of *Salix caprea* and *S. silesiaca*, &c.

GENUS MICROSETIA. (*Nepticulidæ.*)

Microsetia, Stephens, Ill. Brit. Ent. Haust. iv. p. 263 (1834).

Nepticula, Zeller, Linn. Ent. iii. p. 301 (1848); Stainton, Ins. Brit. Tineina, p. 295 (1854); id. Nat. Hist. Tineina, i. p. 2 (1855); Von Heinemann & Wocke, Schmett. Deutschl. (2) ii. (2), p. 727 (1877).

The head is hairy, the antennæ rather thick, and not more than two-thirds as long as the fore-wings; the labial palpi are

short and drooping, and the maxillary palpi are composed of several joints.

The larvæ have eighteen rudimentary pro-legs, and mine in leaves, but generally pupate outside the mine.

The moths are often marked with brilliant metallic spots, and might be very conspicuous, but for their diminutive size. They are the smallest known *Lepidoptera*, and the species figured is the smallest of all.

THE NUT MINER. MICROSETIA MICROTHERIELLA.

(*Plate CLVIII., Fig.* 8.)

Nepticula microtheriella, Stainton, Ins. Brit. Tineina, p. 302 (1854); id. Nat. Hist. Tineina, i. p. 118, pl. 2, fig. 3 (1855); Von Heinemann & Wocke, Schmett. Deutschl. (2) ii. (2), p. 747 (1877).

This Moth is found in various parts of Europe, including Britain. It expands only a line and three-quarters.

"Head and face yellowish, slightly mixed with fuscous. Palpi whitish. Antennæ fuscous; basal joint whitish. Anterior wings fuscous, slightly tinged with purple, especially towards the apex; beyond the middle is a slightly oblique, rather slender, whitish fascia; cilia fuscous. Posterior wings grey, with paler cilia.

"The smallest Lepidopterous insect! Appears in May and August, but rarely met with in the perfect state; the small yellowish-green larva makes extremely narrow tortuous galleries in the leaves of the nut and hornbeam, occurring in autumn and July. It is sometimes so abundant that upwards of thirty may be found in a single leaf! The rather firm cocoon is of a pale buff colour" (*Stainton*).

GENUS MICROPTERYX. (*Micropterygidæ.*)

Micropterix, Hübner, Verz. bek. Schmett. p. 426 (1826?).

Micropteryx, Zeller, Isis, 1839, p. 185; id. Linn. Ent. v. p. 322 (1850); Stainton, Ins. Brit. Tineina, p. 42 (1854).

Eriocephala, Curtis, Brit. Ent. xvi. pl. 751 (1839); Von Heinemann & Wocke, Schmett. Deutschl. (2), ii. (2), p. 772 (1877); Meyrick, Handb. Brit. Lepid. p. 805 (1895).

This genus is one of the most remarkable of all the *Lepidoptera* (*vide anteà*, vol. 4, pp. xxxiii. xli. 125, 148). The fore and hind-wings have the same number of nervures; the wing-cells are bisected, and there is an accessory cell above them; and the perfect insect is provided with mandibles, but no tongue.

The moths are small green and purple insects, which frequent flowers. The larvæ are footless, and for a long time were passed over by Micro-Lepidopterists as those of *Coleoptera*.

This genus is usually called *Eriocephala*, the name *Micropteryx* being applied to another, which possesses a short proboscis, but no mandibles, and wants the accessory cell above the discoidal cells of the wings. But the type of *Micropteryx* is *M. aureatella* (Scopoli), and that of *Eriocephala* is *E. calthella* (Linn.), both of which fall under the present genus, for which, of course, the former name must be retained.

MICROPTERYX AUREATELLA.

(*Plate CLVIII., Fig.* 11.)

Tinea aureatella, Scopoli, Ent. Carn. p. 254, no. 662 (1763).

Tinea allionella, Fabricius, Ent. Syst. iii. (2), p. 321, no. 148 (1794).

Tinea ammanella, Hübner, Eur. Schmett. viii. fig. 388 (1816).

Adela ammanella, Treitschke, Schmett. Eur. ix. (2), p. 125 (1833).

Lampronia ammanella, Stephens, Ill. Brit. Ent. Haust. iv. p. 362, pl. 41, fig. 2 (1835).

Micropteryx allionella, Stainton, Ins. Brit. Tineina, p. 43 (1854).
Eriocephala aureatella, Von Heinemann & Wocke, Schmett. Deutschl. (2), ii. (2), p. 774 (1877).

This Moth is found in most parts of Temperate Europe. It expands four lines and a half.

The fore-wings are shining bright purple, with an almost straight golden band near the base, and another oblique one in the middle of the wings, which is curved behind. Between this last and the apex is a golden spot. The fringes are brownish-grey. The hind-wings are greyish-purple, with greyish fringes.

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